UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Alaska Fisheries Science Center
Resource Assessment and Conservation Engineering
7600 Sand Point Way NE
Seattle, WA 98115

Date Submitted: April 4, 2014

Platform: NOAA Ship *Oscar Dyson*

Project Number: DY-14-06 (OMAO)

Project Title: Eco-FOCI/EMA Spring Ichthyoplankton and Larval Walleye Pollock Assessment Survey – Bering Sea

Project Dates: May 20, 2014 to June 8, 2014

Prepared by: _____ Dated: 4/4/14
Steven Porter
Chief Scientist
ECO-FOCI/RACE/AFSC

Approved by: _____ Dated: 4/4/14
Jeff Napp
Division Director
RACE/AFSC

Approved by: _____ Dated: 4/15/14
Dr. Douglas P. DeMaster
Science and Research Director
Alaska Fisheries Science Center

Approved by: _____ Dated: _____
Captain Wade J. Blake, NOAA
Commanding Officer
Marine Operations Center – Pacific

I. Overview

A. Brief Summary and Project Period. We will conduct an ichthyoplankton and zooplankton project in the eastern Bering Sea. The project will depart from Dutch Harbor, Alaska at 0900 hours on 20 May 2014, and arrive in Dutch Harbor, Alaska, at 0900 hours on 8 June 2014.

B. Days at Sea (DAS)

Of the 20 DAS scheduled for this project, 20 DAS are funded by an OMAO Allocation. This project is estimated to exhibit a high Operational Tempo.

C. Operating Area. A map and list of stations are in Appendices 1 and 2. Stations will be occupied in a grid in the eastern Bering Sea.

D. Summary of Objectives. The primary objective is to conduct an assessment of eggs and larvae of Walleye Pollock (*Gadus chalcogrammus*) over the eastern Bering Sea shelf. We will also examine the interactions among climate, weather, and ichthyoplankton distribution and abundance. This work is needed to describe larval fish assemblages and determine how physical and biological factors affect the transport and survival of fish larvae. The project is a collaboration between two AFSC Programs, The Ecosystems and Fisheries Oceanography Coordinated Investigations Program (Eco-FOCI) and the Ecosystem Monitoring and Assessment Program (EMA).

E. Participating Institutions. Alaska Fisheries Science Center (AFSC) and Pacific Marine Environmental Laboratory (PMEL).

F. Personnel/Science Party: name, title, gender, affiliation, and nationality

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Porter, Steven	Chief Scientist	18 May	9 June	Male	AFSC	USA
Andrews, Alex	Fisheries Biologist	18 May	8 June	Male	AFSC	USA
Blood, Deborah	Fisheries Biologist	18 May	8 June	Female	AFSC	USA
Guy, Lisa	Scientist	18 May	8 June	Female	PMEL	USA
Strausz, David	Scientist	18 May	9 June	Male	PMEL	USA

G. Administrative

1. Points of Contacts:

Chief Scientist

Steven Porter

NOAA – Fisheries, Alaska Fisheries Science Center

7600 Sand Point Way NE

Seattle, WA 98115

(206) 526-4271 (Ph.); (206) 526-6723 (FAX)

Steve.Porter@noaa.gov

Field Operations Officer

Lt. Mark Frydrych

NOAA Ship *Oscar Dyson*

(206) 295-0550 (Cell)

Ops.Oscar.Dyson@noaa.gov

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

This project will be conducted under the Scientific Research Permit #2014-B1 issued by the National Marine Fisheries Service on January 21, 2014 to Douglas P. DeMaster.

II. Operations

The Chief Scientist is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. Project Itinerary:

Date	Activity
May 18	Embark 5 Scientists in Dutch Harbor, Alaska
May 19	Load scientific gear. Assemble equipment.
May 20	Depart Dutch Harbor 0900 hrs, and proceed to first station
May 20 - June 7	Conduct survey in eastern Bering Sea
June 8	Arrive Dutch Harbor 0900 hrs; disembark equipment, samples, and Scientists
June 9	Disembark samples, and remaining Scientists

B. Staging and Destaging:

Staging Plan – The equipment necessary for the project will be shipped to Dutch Harbor and loaded onto NOAA Ship *Oscar Dyson* prior to departure from Dutch Harbor. Most scientific gear will be loaded prior to the previous mooring project, however additional crates of sampling jars will be loaded prior to the beginning of this project. Assistance with craning is requested on May 19, 2014. We will require dedicated use of the chemistry, hydrographic, wet, dry, and fish processing labs for sample and equipment preparation and request as much counter and cabinet space as possible. We will use the survey office for FASTCAT/SEACAT operations. We request the assistance of two Survey Technicians in processing all samples and conducting sampling activities.

De-staging Plan – Samples and gear will be offloaded on June 8 and also possibly on June 9, 2014 in Dutch Harbor, AK. Assistance with craning is requested.

C. Operations to be Conducted: We will conduct operations 24/7.

1. **Underway Operations** --- The ship's Scientific Computer System (SCS) shall operate throughout the project, acquiring and logging data from navigation, meteorological, and oceanographic sensors. See FOCI Standard Operating Instructions (**SOI 5.2** and **SOI 5.3**) for specific requirements.

2. **Station Operations** – The project will begin upon departure from Dutch Harbor, Alaska at 0900 ADT on 20 May 2014. Sampling will occur at pre-determined stations in a grid array (15 nmi apart) encompassing the Unimak Island and Alaska Peninsula vicinity, the outer continental shelf at least as far north as the Pribilof Islands and potentially farther (time and ice permitting) (Appendices 1 and 2). At each grid location, Walleye Pollock will be sampled using 20/60-cm diameter bongo array equipped with a FASTCAT data recorder (T, S, depth).

CTD

The CTD (SOI 3.2.1) will be deployed at selected stations during the project determined at the discretion of the Chief Scientist and Commanding Officer. The purpose of this operation is to confirm accurate temperature and salinity measurements of the FASTCAT, and measure temperature and salinity profiles before the MultiNet is deployed. The Survey Department will be given 24 hours notice about when this operation will take place. One SCS button is needed to mark:

1) CTD at depth

At each station, the following should be input into the SCS before button pushes: Station number, haul number, and FOCI grid designation. When the "CTD at depth" button is pushed, the following information should be displayed on the SCS screen in the survey office: Depth, Lat and Lon (degrees and decimal minutes), wire out, date, time (GMT).

Bongo net

The 20/60-cm Bongo net (SOI 3.2.2) will be deployed to a depth of 300 meters, or 10 meters off the bottom, whichever is shallowest. 60-cm net mesh will be 0.505 mm for both nets, and 0.150 mm for both 20-cm bongo nets. The sample collected in Net 1 of the 60-cm bongo will be used to quantify ichthyoplankton and invertebrate zooplankton population density; it will be preserved in a 5% formalin-seawater solution buffered with sodium borate (2%). The sample collected in Net 2 will be used to estimate Walleye Pollock egg and larvae density and sorted for larval fish taxa of interest. Special interest taxa will be preserved in 100% EtOH in scintillation vials. Walleye Pollock larvae for condition analysis will also be taken from that net and frozen at -80°C. The sample collected in Net 1 of the 20-cm bongo will be used to quantify invertebrate zooplankton population density; it will be preserved in a 5% formalin-seawater solution buffered with sodium borate (2%). Net 2 will be used as a back-up to Net 1, and discarded if not needed. A FASTCAT profiler (with SEACAT profiler as back-up as per Section III Equipment) will be used to position the net in real time and to obtain profiles of water temperature and salinity. Three SCS buttons are needed to mark:

1) Bongo at Surface (deploy)
2) Bongo at depth
3) Bongo at Surface (retrieve)

At each station, the following should be input into the SCS before button pushes: Station number, haul number, and FOCI grid designation. When the Bongo at depth button is pushed, the following information from the time of the "Bongo at depth" button push should be displayed on the SCS screen in the survey office: Depth, Lat and Lon (degrees and decimal minutes), wire out, date, time (GMT).

CalVET net

The CalVET net (with 53-micrometer mesh) (SOI 3.2.6) for collecting Walleye Pollock larvae prey will be deployed at select stations where feeding-stage Walleye Pollock larvae are present, at the discretion of the Chief Scientist and Commanding Officer. We anticipate this operation to be conducted at approximately 25 stations. To deploy the CalVET net, the bongo array needs to be removed, and the bongo weight attached to a shackle on the FASTCAT or SEACAT. The CalVET needs to be attached above the FASTCAT or SEACAT. Standard tow depth for microzooplankton collection is 60 m. The CalVET depth should be monitored by the SEACAT and files should be saved. The net should be lowered and retrieved at a rate of 45 - 60 m/min. The tow should be vertical with the ship maneuvering only to maintain zero wire angle. If wire angle is 10° from zero (vertical)

for more than 30 seconds during the tow, performance will be recorded as "questionable", and the tow may need to be redone. One SCS button is needed to mark:

1) CalVET at depth

At each station, the following should be input into the SCS before button pushes: Station number, haul number, and FOCI grid designation. When the "CalVET at depth" button is pushed, the following information should be displayed on the SCS screen in the survey office: Depth, Lat and Lon (degrees and decimal minutes), wire out, date, time (GMT).

MultiNet

The Multi Plankton Sampler MultiNet Type Midi (MultiNet, Appendix 3) may be deployed to determine vertical distribution of fish larvae and zooplankton (0.333 or 0.505-mm mesh). Sampling will be over Bering Canyon at selected stations (Appendix 1, 2), the exact number and locations will be determined at the discretion of the Chief Scientist and Commanding Officer, and may be changed depending on conditions and cruise priorities.

We request assistance from the ship's Electronics Technician, Survey Technician and / or Deck Department as needed to help set up the electronic and physical termination, rig the MultiNet for fishing, and help trouble shoot the MultiNet . We also request help switching between the Bongo and MultiNet on the aft Oceo winch as needed during the cruise.

The MultiNet has a steal frame that can be used with up to 5 nets to sample different water depths. It requires a conducting cable and will be deployed off the aft oceanographic winch that the Bongo array is usually attached to. Before deployment of the Multinet, the Seacat and Bongo array will be detached and the MultiNet will be electronically and physically terminated to that conducting wire. When we are finished using the MultiNet, the Seacat and Bongo Array will be re-connected to continue the rest of our routine sampling. The MultiNet plankton samples will be processed in a similar manner as those from the Bongo.

Eight SCS buttons are needed to mark:
1) MultiNet at surface (deploy)
2) At depth
3) Net 1
4) Net 2
5) Net 3
6) Net 4
7) Net 5
8) MultiNet at surface (retrieve)

At each station, the following should be input into the SCS before button pushes: Station number, haul number, and FOCI grid designation. When a button is pushed, the following information should be displayed on the SCS screen in the survey office: Depth, Lat and Lon (degrees and decimal minutes), wire out, date, time (GMT).

Approximate sampling depth intervals (this may change depending on bottom depth and sampling needs):
0-25 m
25-50 m
50-100 m
100-200 m
200-300 m

Multinet will never be deployed to less than 15 m from bottom.

D. Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (**http://www.ndc.noaa.gov/dr.html**) and require the approval of the ship's Commanding Officer.

Dives are not planned for this project.

E. Applicable Restrictions

Conditions which preclude normal operations: None known.

III. Equipment

A. Equipment and Capabilities provided by the ship (itemized)

- Hydrographic winch with slip rings and 3-conductor cable terminated for the SBE-49 FASTCAT, for bongo and CalVET net tow operations,
- Sorting table in slime lab,
- Sea-Bird Electronics' SBE-19+ SEACAT system (backup to the FASTCAT),
- Wire speed indicators and readout for both hydrographic winches visible in Dry Lab or where SEACAT operations occur,
- Video monitors in Acoustics and Chemistry labs for viewing SCS and Electronic MOA output, and chart of ship's current position and the labeled survey grid stations,
- Connection from science computer in acoustics to access FASTCAT or SEACAT data files collected by the ship's computer in the survey office,
- For meteorological observations: 2 anemometers (one R. M. Young system interfaced to the SCS), calibrated air thermometer (wet-and dry-bulb) and a calibrated barometer and/or barograph,
- Freezer space (approx. 4x4x4 feet) at -20° C and -80° C,
- SIMRAD ES-60 and SIMRAD EK-60 echosounders,
- Use of Pentium PC in Dry and/or Computer Lab for data analysis,
- Scientific Computer System (SCS),
- Laboratory space with exhaust hood, sink, lab tables, and storage space,
- Sea-water hoses and spray nozzles to wash nets (quarterdeck and aft deck),
- Adequate deck lighting for night-time operations,
- Navigational equipment including GPS and radar,
- Safety harnesses for working on starboard sampling station/hero platform and fantail, and
- Ship's crane(s) used for loading and/or deploying gear and supplies.

B. Equipment and Capabilities provided by the scientists (itemized)

- Plankton sampling gear:
  - Two 20/60-cm bongo sampling arrays (505 and 150 micron mesh nets and all necessary accessories),
  - Back-up bongo nets and codends,
  - One CalVET net (53 micron mesh nets and all necessary accessories),
  - Two wire-angle indicators
- Cruise Operations Database (COD) software and forms
- FASTCAT system including all necessary accessories
- Multinet, depressor, nets, and necessary accessories
- Computers for COD database, and FASTCAT processing,
- Printer,
- Office supplies,
- Miscellaneous scientific sampling and processing equipment
  - 5-gal buckets (5),
  - Float coats

- Sieves, jar holder, funnels, squirt bottles,
- 32-oz jars, closures, and labels,
- 12 flowmeters, calibration data, hardware for attaching and maintaining them,
- Preservative-dispenser equipment,
- Hazardous materials spill kit.

IV. Hazardous Materials

A. Policy and Compliance

The Chief Scientist is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program's Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship's Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

B. Inventory

See attached Appendix 4.

C. Chemical safety and spill response procedures

See attached Appendix 4.

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

The Midwater Assessment and Conservation Engineering program (MACE) of the AFSC will be collecting acoustic data during the cruise. This involves starting data collection upon leaving port to begin the cruise, collecting data throughout the cruise, and end collection at the end of the cruise end while entering port. Survey department has agreed to turn the acoustic system on and off, and confirm that it is logging data.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. Disposition of Data and Reports

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information.* To guide the implementation of these NAOs, NOAA's Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

A. Data Classifications: *Under Development*

a. OMAO Data

b. Program Data

B. Responsibilities: *Under Development*

VII. Meetings, Vessel Familiarization, and Project Evaluations

A. Pre-Project Meeting: The Chief Scientist and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Chief Scientist in arranging this meeting.

B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

C. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.

D. Project Evaluation Report: Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at http://www.omao.noaa.gov/fleeteval.html and provides a "Submit" button at the end.

The Customer Satisfaction Survey is one of the primary methods OMAO and Marine Operations (MO) utilize to improve ship customer service. Information submitted through the form is automatically input into a spreadsheet accessible to OMAO and MO management for use in preparing quarterly briefings. Marine Operations Centers (MOC) address concerns and praise with the applicable ship. Following the quarterly briefings the data are briefed to the Deputy Director of OMAO.

VIII. Miscellaneous

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Chief Scientist is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Chief Scientist is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Chief Scientist will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Chief Scientist to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, Revised: 02 JAN 2012) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website http://www.corporateservices.noaa.gov/~noaaforms/eforms/nf57-10-01.pdf.

All NHSQs submitted after March 1, 2014 must be accompanied by **NOAA Form (NF) 57-10-02** - Tuberculosis Screening Document in compliance with **OMAO Policy 1008** (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).

The only secure email process approved by NOAA is **Accellion Secure File Transfer** which requires the sender to setup an account. **Accellion's Web Users Guide** is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to **accellionAlerts@doc.gov** requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The 'Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Pacific
2002 SE Marine Science Dr.
Newport, OR 97365
Telephone 541-867-8822
Fax 541-867-8856
Email MOP.Health-Services@noaa.gov

Prior to departure, the Chief Scientist must provide an electronic listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: contact name, address, relationship to member, and telephone number.

C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship's Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship's primary means of communication with the Marine Operations Center is via e-mail and the

Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged at least 30 days in advance.

E. IT Security

Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

(1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
(2) Installation of the latest critical operating system security patches.
(3) No external public Internet Service Provider (ISP) connections.

Completion of the above requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

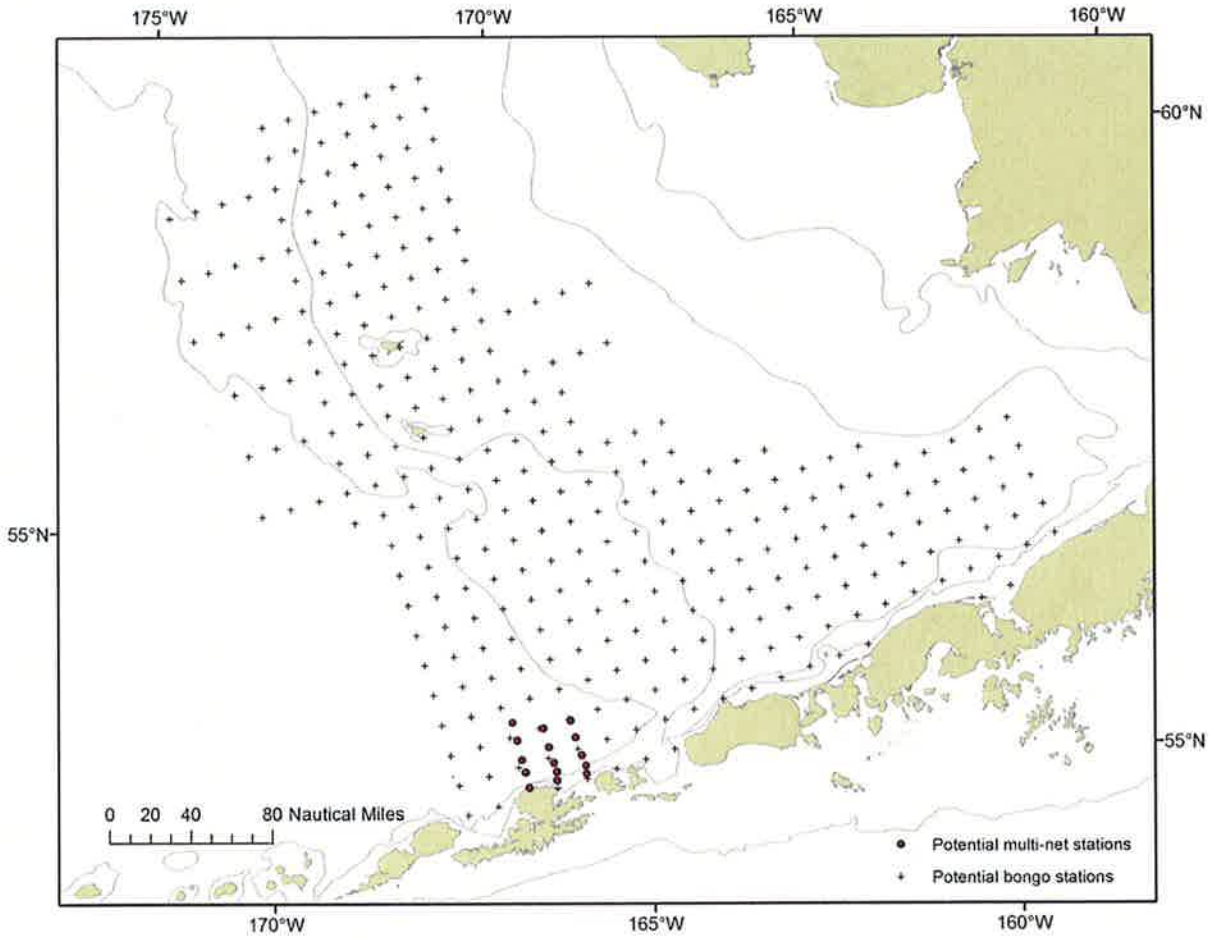
F. Foreign National Guests Access to OMAO Facilities and Platforms

Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

VIII. Appendices

1. Map of project area and station grid.
2. Station/Waypoint list (coordinates in Latitude, Longitude: degree-minutes)
3. MulitNet information
4. Inventory of hazardous chemicals and chemical safety and spill response plan.

Appendix 1. Map of potential stations. Some station locations may shift dependent on spatial extent of sea ice.



Appendix 2. Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes)

SN grid	EW grid	lat deg	lat min	lon deg	lon min
K	7	56	35.9376	160	0.384
K	10	56	49.1268	160	13.428
K	13	57	2.3154	160	26.556
K	16	57	15.5046	160	39.756
K	19	57	28.6938	160	53.034
N	7	56	28.7766	160	24.306
N	10	56	41.9652	160	37.308
N	13	56	55.1544	160	50.394
N	16	57	8.3436	161	3.552
N	19	57	21.5328	161	16.788
Q	4	56	8.4264	160	35.262
Q	7	56	21.6156	160	48.15
Q	10	56	34.8042	161	1.116
Q	13	56	47.9934	161	14.154
Q	16	57	1.1826	161	27.27
Q	19	57	14.3718	161	40.464
T	4	56	1.2654	160	59.07
T	7	56	14.4546	161	11.922
T	10	56	27.6432	161	24.846
T	13	56	40.8324	161	37.842
T	16	56	54.0216	161	50.916
T	19	57	7.2108	162	4.068
W	7	56	7.2936	161	35.622
W	10	56	20.4822	161	48.504
W	13	56	33.6714	162	1.458
W	16	56	46.8606	162	14.496
W	19	57	0.0498	162	27.606
Z	7	56	0.132	161	59.244
Z	10	56	13.3212	162	12.084
Z	13	56	26.5104	162	25.002
Z	16	56	39.6996	162	37.998
Z	19	56	52.8888	162	51.066
Z	22	57	6.078	163	4.206
AC	7	55	52.971	162	22.794
AC	10	56	6.1602	162	35.598
AC	13	56	19.3494	162	48.474
AC	16	56	32.5386	163	1.428
AC	19	56	45.7278	163	14.454
AC	22	56	58.917	163	27.558
AF	4	55	32.6214	162	33.582
AF	7	55	45.81	162	46.272
AF	10	55	58.9992	162	59.034
AF	13	56	12.1884	163	11.874
AF	16	56	25.3776	163	24.786
AF	19	56	38.5668	163	37.77
AF	22	56	51.7554	163	50.832
AI	4	55	25.4604	162	57.024
AI	7	55	38.649	163	9.678
AI	10	55	51.8382	163	22.404
AI	13	56	5.0274	163	35.202

Al	16	56	18.2166	163	48.072
Al	19	56	31.4058	164	1.02
Al	22	56	44.5944	164	14.04
Al	25	56	57.7836	164	27.132
AL	4	55	18.2994	163	20.4
AL	7	55	31.488	163	33.018
AL	10	55	44.6772	163	45.702
AL	13	55	57.8664	163	58.458
AL	16	56	11.0556	164	11.292
AL	19	56	24.2448	164	24.198
AL	22	56	37.4334	164	37.176
AL	25	56	50.6226	164	50.232
AO	4	55	11.1378	163	43.704
AO	7	55	24.327	163	56.28
AO	10	55	37.5162	164	8.928
AO	13	55	50.7054	164	21.648
AO	16	56	3.8946	164	34.44
AO	19	56	17.0838	164	47.304
AO	22	56	30.2724	165	0.24
AO	25	56	43.4616	165	13.254
AR	4	55	3.9768	164	6.936
AR	7	55	17.166	164	19.476
AR	10	55	30.3552	164	32.088
AR	13	55	43.5444	164	44.766
AR	16	55	56.7336	164	57.516
AR	19	56	9.9222	165	10.344
AR	22	56	23.1114	165	23.238
AR	25	56	36.3006	165	36.21
AR	28	56	49.4898	165	49.26
AR	31	57	2.679	166	2.388
AU	4	54	56.8158	164	30.096
AU	7	55	10.005	164	42.6
AU	10	55	23.1942	164	55.176
AU	13	55	36.3834	165	7.812
AU	16	55	49.5726	165	20.526
AU	19	56	2.7612	165	33.312
AU	22	56	15.9504	165	46.17
AU	25	56	29.1396	165	59.1
AU	28	56	42.3288	166	12.108
AU	31	56	55.518	166	25.194
AU	40	57	35.085	167	4.914
AU	46	58	1.4634	167	31.794
AX	4	54	49.6548	164	53.19
AX	7	55	2.844	165	5.658
AX	10	55	16.0332	165	18.192
AX	13	55	29.2224	165	30.798
AX	16	55	42.4116	165	43.47
AX	19	55	55.6002	165	56.214
AX	22	56	8.7894	166	9.036
AX	25	56	21.9786	166	21.924
AX	28	56	35.1678	166	34.89
AX	31	56	48.357	166	47.934

AX	40	57	27.924	167	27.522
AX	46	57	54.3024	167	54.318
BA	1	54	29.3046	165	3.852
BA	4	54	42.4938	165	16.218
BA	7	54	55.683	165	28.644
BA	10	55	8.8722	165	41.142
BA	13	55	22.0614	165	53.706
BA	16	55	35.2506	166	6.342
BA	19	55	48.4392	166	19.05
BA	22	56	1.6284	166	31.83
BA	25	56	14.8176	166	44.682
BA	28	56	28.0068	166	57.606
BA	31	56	41.196	167	10.608
BA	34	56	54.3846	167	23.682
BA	37	57	7.5738	167	36.834
BA	40	57	20.763	167	50.07
BA	46	57	47.1414	168	16.77
BD	1	54	22.1436	165	26.844
BD	4	54	35.3328	165	39.174
BD	7	54	48.522	165	51.564
BD	10	55	1.7112	166	4.02
BD	13	55	14.9004	166	16.548
BD	16	55	28.089	166	29.148
BD	19	55	41.2782	166	41.814
BD	22	55	54.4674	166	54.558
BD	25	56	7.6566	167	7.368
BD	28	56	20.8458	167	20.256
BD	31	56	34.035	167	33.216
BD	34	56	47.2236	167	46.248
BD	37	57	0.4128	167	59.358
BD	40	57	13.602	168	12.552
BD	46	57	39.9804	168	39.168
BG	1	54	14.9826	165	49.77
BG	4	54	28.1718	166	2.058
BG	7	54	41.361	166	14.412
BG	25	56	0.4956	167	29.994
BG	28	56	13.6848	167	42.84
BG	31	56	26.874	167	55.758
BG	34	56	40.0626	168	8.748
BG	37	56	53.2518	168	21.822
BG	40	57	6.441	168	34.968
BG	43	57	19.6302	168	48.192
BG	46	57	32.8194	169	1.5
BG	49	57	46.008	169	14.886
BG	52	57	59.1972	169	28.35
BG	55	58	12.3864	169	41.904
BG	58	58	25.5756	169	55.536
BG	61	58	38.7648	170	9.258
BG	64	58	51.9534	170	23.064
BG	67	59	5.1426	170	36.954
BG	70	59	18.3318	170	50.94
BJ	1	54	7.8216	166	12.624

BJ	4	54	21.0108	166	24.882
BJ	7	54	34.2	166	37.2
BJ	31	56	19.7124	168	18.234
BJ	34	56	32.9016	168	31.188
BJ	37	56	46.0908	168	44.214
BJ	40	56	59.28	168	57.324
BJ	43	57	12.4692	169	10.506
BJ	46	57	25.6584	169	23.766
BJ	49	57	38.847	169	37.11
BJ	52	57	52.0362	169	50.532
BJ	55	58	5.2254	170	4.032
BJ	58	58	18.4146	170	17.622
BJ	61	58	31.6038	170	31.296
BJ	64	58	44.7924	170	45.054
BJ	67	58	57.9816	170	58.902
BJ	70	59	11.1708	171	12.84
BM	1	54	0.6606	166	35.418
BM	4	54	13.8498	166	47.634
BM	7	54	27.039	166	59.916
BM	31	56	12.5514	168	40.65
BM	34	56	25.7406	168	53.562
BM	37	56	38.9298	169	6.546
BM	40	56	52.119	169	19.614
BM	43	57	5.3082	169	32.754
BM	46	57	18.4968	169	45.972
BM	49	57	31.686	169	59.268
BM	52	57	44.8752	170	12.648
BM	55	57	58.0644	170	26.106
BM	58	58	11.2536	170	39.648
BM	61	58	24.4428	170	53.28
BM	64	58	37.6314	171	6.99
BM	67	58	50.8206	171	20.79
BM	70	59	4.0098	171	34.674
BP	4	54	6.6888	167	10.32
BP	7	54	19.878	167	22.572
BP	31	56	5.3904	169	3
BP	34	56	18.5796	169	15.87
BP	37	56	31.7688	169	28.818
BP	40	56	44.958	169	41.838
BP	43	56	58.1472	169	54.936
BP	46	57	11.3358	170	8.112
BP	49	57	24.525	170	21.372
BP	52	57	37.7142	170	34.704
BP	55	57	50.9034	170	48.12
BP	58	58	4.0926	171	1.614
BP	61	58	17.2812	171	15.198
BP	64	58	30.4704	171	28.866
BP	67	58	43.6596	171	42.618
BP	70	58	56.8488	171	56.454
BS	1	53	46.3386	167	20.796
BS	4	53	59.5278	167	32.94
BS	7	54	12.717	167	45.156

BS	31	55	58.2294	169	25.284
BS	34	56	11.4186	169	38.118
BS	37	56	24.6078	169	51.024
BS	40	56	37.797	170	4.002
BS	43	56	50.9862	170	17.058
BS	46	57	4.1748	170	30.192
BS	49	57	17.364	170	43.404
BS	52	57	30.5532	170	56.7
BS	55	57	43.7424	171	10.068
BS	58	57	56.9316	171	23.52
BS	61	58	10.1202	171	37.056
BS	64	58	23.3094	171	50.676
BS	67	58	36.4986	172	4.38
BS	70	58	49.6878	172	18.174
BV	1	53	39.1776	167	43.386
BV	4	53	52.3668	167	55.5
BV	7	54	5.556	168	7.674
BV	31	55	51.0684	169	47.508
BV	34	56	4.2576	170	0.3
BV	37	56	17.4468	170	13.164
BV	40	56	30.636	170	26.106
BV	43	56	43.8252	170	39.126
BV	46	56	57.0138	170	52.218
BV	49	57	10.203	171	5.388
BV	52	57	23.3922	171	18.636
BV	55	57	36.5814	171	31.962
BV	58	57	49.7706	171	45.372
BV	61	58	2.9592	171	58.86
BV	64	58	16.1484	172	12.432
BV	67	58	29.3376	172	26.094
BV	70	58	42.5268	172	39.84
BY	31	55	43.9074	170	9.666
BY	34	55	57.0966	170	22.422
BY	37	56	10.2858	170	35.244
BY	40	56	23.475	170	48.144
BY	43	56	36.6636	171	1.122
BY	46	56	49.8528	171	14.172
BY	49	57	3.042	171	27.3
BY	52	57	16.2312	171	40.506
BY	55	57	29.4204	171	53.79
BY	58	57	42.6096	172	7.152
BY	61	57	55.7982	172	20.598
BY	64	58	8.9874	172	34.128
BY	67	58	22.1766	172	47.742
BY	70	58	35.3658	173	1.44
CB	34	55	49.9356	170	44.478
CB	40	56	16.314	171	10.128
CB	46	56	42.6918	171	36.072
CB	52	57	9.0702	172	2.322
CB	58	57	35.4486	172	28.884
CB	64	58	1.8264	172	55.764
CE	34	55	42.7746	171	6.48

CE	40	56	9.153	171	32.046
CE	46	56	35.5308	171	57.912
CE	52	57	1.9092	172	24.072
CE	58	57	28.287	172	50.55
CE	64	57	54.6654	173	17.346
CH	34	55	35.6136	171	28.416
CH	40	56	1.992	171	53.904
CH	46	56	28.3698	172	19.686
CH	52	56	54.7482	172	45.768
CH	58	57	21.126	173	12.162
CH	64	57	47.5044	173	38.868
CK	52	56	47.5872	173	7.404
CK	58	57	13.965	173	33.708
CK	64	57	40.3434	174	0.33
BV	10	54	18.7452	168	19.92
BV	13	54	31.9338	168	32.226
BV	16	54	45.123	168	44.604
BV	19	54	58.3122	168	57.042
BV	22	55	11.5014	169	9.558
BV	25	55	24.6906	169	22.134
BV	28	55	37.8792	169	34.782
BS	10	54	25.9062	167	57.432
BS	13	54	39.0948	168	9.78
BS	16	54	52.284	168	22.188
BS	19	55	5.4732	168	34.668
BS	22	55	18.6624	168	47.214
BS	25	55	31.8516	168	59.832
BS	28	55	45.0408	169	12.522
BP	10	54	33.0672	167	34.884
BP	13	54	46.2564	167	47.262
BP	16	54	59.445	167	59.712
BP	19	55	12.6342	168	12.228
BP	22	55	25.8234	168	24.816
BP	25	55	39.0126	168	37.47
BP	28	55	52.2018	168	50.196
BM	10	54	40.2282	167	12.27
BM	13	54	53.4174	167	24.684
BM	16	55	6.606	167	37.17
BM	19	55	19.7952	167	49.722
BM	22	55	32.9844	168	2.346
BM	25	55	46.1736	168	15.042
BM	28	55	59.3628	168	27.81
BJ	10	54	47.3892	166	49.584
BJ	13	55	0.5784	167	2.04
BJ	16	55	13.767	167	14.562
BJ	19	55	26.9562	167	27.156
BJ	22	55	40.1454	167	39.816
BJ	25	55	53.3346	167	52.548
BJ	28	56	6.5238	168	5.352
BG	10	54	54.5502	166	26.838
BG	13	55	7.7394	166	39.33
BG	16	55	20.928	166	51.888

BG	19	55	34.1172	167	4.518
BG	22	55	47.3064	167	17.22
BG	25	56	0.4956	167	29.994
BG	28	56	13.6848	167	42.84

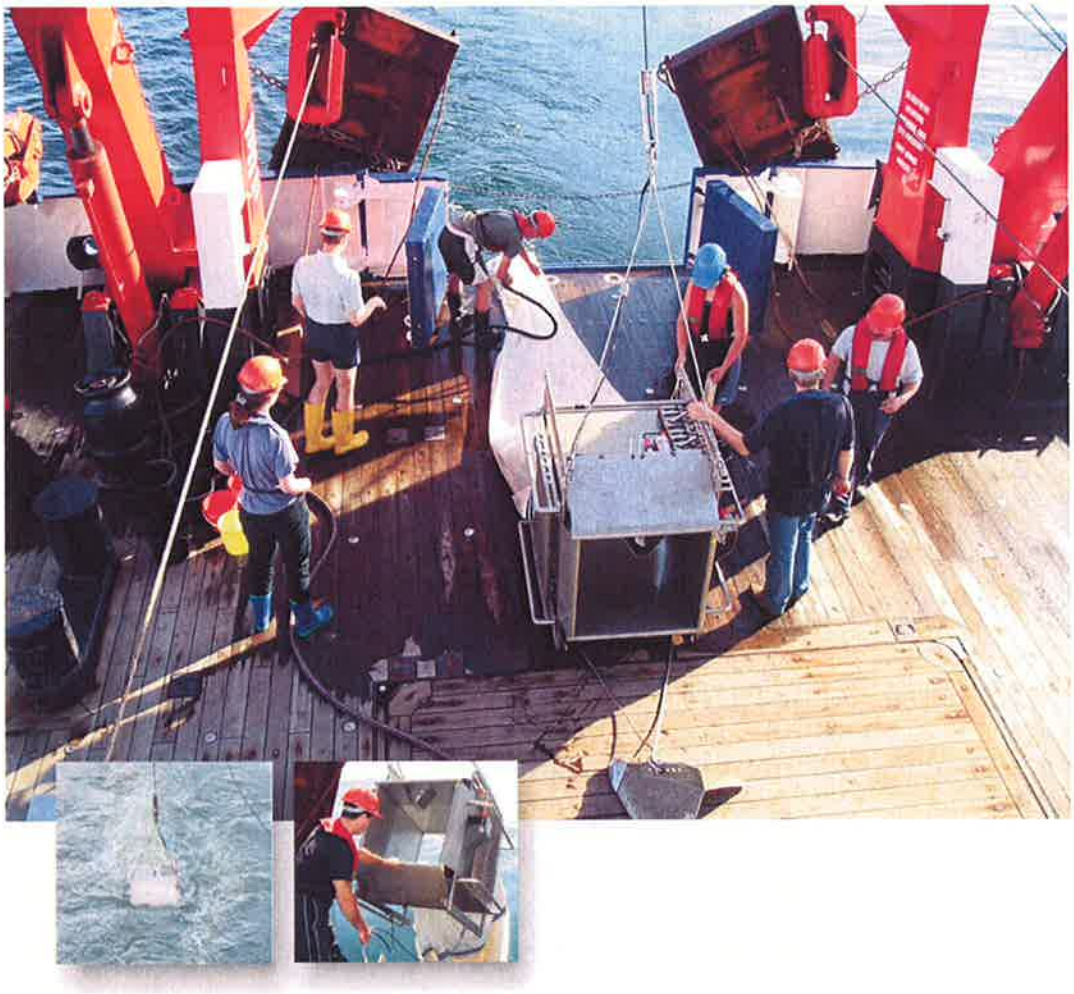
Potential MultiNet stations

Station Name	Lat Deg	Lat Min	Lon Deg	Lon Min
AE1	54	10.1	166	14
AE2	54	14	166	15.8
AE3	54	18.3	166	21
AE4	54	26.2	166	28.8
AE5	54	33.7	166	35.6
AW5	54	27.5	166	56.3
AW4	54	19.2	166	49.1
AW3	54	12.3	166	42.6
AW2	54	8.4	166	39.1
AW1	54	4.3	166	37.2
UT1	53	58.2	166	58.2
UT2	54	5.1	167	4
UT3	54	10.5	167	9
UT4	54	19.3	167	16
UT5	54	27.1	167	22.8

HYDRO-BIOS

MultiNet®

Multi Plankton Sampler



Features:

- Combined online/offline use (standard)
- Bi-directional communication
- Standard depth range 3000 m
- Long distance FSK-telemetry (> 10000m)
- Low power consumption
- Battery operated Underwater Unit, max. voltage of 5 V at the conductor cable
- Electronics operate from -40°C up to +85°
- EC-conformity (CE) EN 50081-1, EN 50082-1
- expandable range of sensors

The System

Sampling sea and ocean at its best - with the improved MultiNet® generation of the Multiple Plankton Sampler, the worlds leading sampling system for horizontal and vertical collections in successive water layers.

New: for combined online/offline use

Equipped with 5 resp. 9 net bags the MultiNet® can be delivered in 4 sizes (apertures) : Mini (0.125 m²), Midi (0.25 m²), Maxi (0.5 m²) and Mammoth (1 m²).

The system consists of a mains powered Deck Command Unit and a stainless steel frame with canvas part to which 5 (9) net bags are attached by means of zip fasteners. The net bags are opened and closed by means of an arrangement of levers which are triggered by a battery powered Motor Unit. The commands for actuation of the net bags are given via single or multi-conductor cable (not included in our scope of delivery) between the Underwater Unit and the Deck Command Unit.

A wide selection of mesh sizes for the net bags is available to meet the requirements of all standard and non-standard applications. For common horizontal collections a mesh size of 300 microns (mesh sizes from 100 to 500 microns available) is recommended, for vertical collections mesh sizes from 55 to 500 micron are applicable.

An integrated Pressure Sensor (measuring range according to customer´s requirements) allows continuous supervision of the actual operating depth which is indicated together with all relevant system data at the LCD-display of the Deck Command Unit.

Two Electronic Flow Meters with automatic angle compensation are mounted to the Underwater Unit: one inside the opening of the Underwater Unit for the determination of the amount of water passing through the opened nets, one outside the opening for the determination of clogging effects.

For horizontal collections the MultiNet® is used with a V-Fin Depth Depressor, to carry out vertical collections, a stainless steel support is securely attached to the bucket holder and enables a quick lowering to depth.

Operation

In its initial position the MultiNet® is brought to water with all net bags closed. The water flows freely through the frame allowing to lower it to the greatest desired depth with high paying out speed where the first net bag is opened by push button control from the Deck Command Unit. At the end of the desired period of horizontal collection resp. after passing the desired depth interval in case of vertical operation, the first net bag is closed by a second command. The second net is opened simultaneously. This procedure is repeated for the remaining net bags, while the Deck Command Unit indicates the number of the active net bag. During operations of Mini and Midi versions the last net (no. 5) remains open, it collects plankton from the smallest desired depth up to the water surface.

During operations of the Maxi and Mammoth versions the last net (no. 9) can be closed before reaching the water surface.

The Specialties

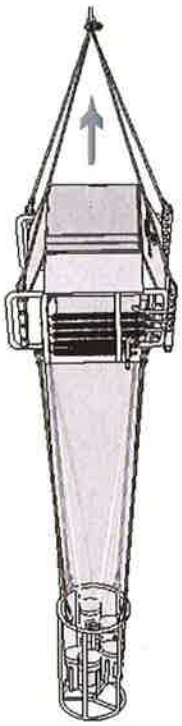
Offline Use
In case that a conducting cable is not available on board of the vessel, the required sampling depth can be pre-programmed via personal computer. During offline use the activation of the net bags is carried out automatically according to the pre-selected depth intervals. All measuring data are stored inside the internal data memory of 16 MByte during the operation and can be read by a PC when the MultiNet® is back on board.

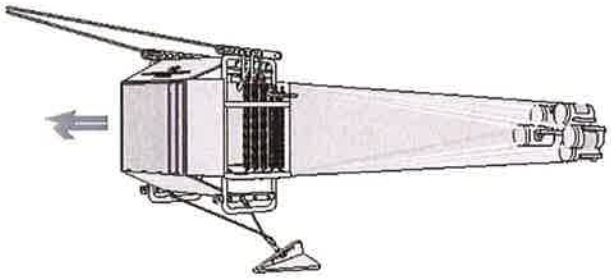
Options

CT-Set
Together with the optional CT-Set the system offers the full capability of a state-of-the-art oceanographic Multi Parameter Probe. The CT-Set consists of one conductivity sensor, one temperature sensor and an additional electronics board which are completely integrated into the Motor Unit of the MultiNet®. From the CTD data the system computes salinity, density and sound velocity according to UNESCO formulas.

CT-Set for MultiNet®
Conductivity sensor: 0 ... 65 ± 0.01 mS/cm,
Temperature sensor: -2 ... +32 ± 0.005°C
Data rate : 1 Hz (1 data set per second)

No. 450 500





- ./ Additional sensors of various parameters
- ./ Special version for operational depths down to 6000 metres
- ./ Pitch and Roll sensor (standard for the Mammoth)

Technical Data

Underwater Unit:	Type Mini No. 438 120	Type Midi No. 438 130	Type Maxi No. 438 140	Type Mammoth No. 438 160
Dimensions (w x l x h):	65 cm x 90 cm x 80 cm	80 cm x 90 cm x 95 cm	120 cm x 110 cm x 135 cm	150 cm x 120 cm x 160 cm
Net opening:	35.5 cm x 35.5 cm = 0.125 m²	50 cm x 50 cm = 0.25 m²	71 cm x 71 cm = 0.5 m²	100 cm x 100 cm = 1 m²
Net Bags:	5 pcs., length: 160 cm	5 pcs., length: 250 cm	9 pcs., length: 365 cm	9 pcs., length: 550 cm
Standard mesh size:	300 microns	300 microns	300 microns	300 microns
Net Buckets:	5 pcs., 11 cm dia.	5 pcs., 11 cm dia.	9 pcs., 11 cm dia.	9 pcs., 11 cm dia.
	5 pcs. Soft Net Bucket	5 pcs. Soft Net Bucket	9 pcs. Soft Net Bucket	9 pcs. Soft Net Bucket
Weights:				
Net Frame:	approx. 75 kg	approx. 100 kg	approx. 260 kg	approx. 390 kg
Stainless Steel Support:	approx. 30 kg	approx. 50 kg	approx. 70 kg	approx. 100 kg
V-Fin Depth Depressor:	approx. 22 kg	approx. 22 kg	approx. 70 kg	approx. 70 kg
Overall length ready for operation (from bridle to net bucket):	470 cm	560 cm	800 cm	1000 cm
Materials:				
Net frame:	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Motor Unit and Battery Housing:	Titanium	Titanium	Titanium	Titanium
Net Bags:	Polyamide	Polyamide	Polyamide	Polyamide
Net Buckets:	PVC/ Canvas	PVC/ Canvas	PVC/ Canvas	PVC/ Canvas
V-Fin Depth Depressor:	Aluminium, lead-weighted	Aluminium, lead-weighted	Aluminium, lead-weighted	Aluminium, lead-weighted
Operational Depth:	Standard 3000 metres	Standard 3000 metres	Standard 3000 metres	Standard 3000 metres
Pressure Sensor:	Standard 3000.0 dbar ± 0.1% f.s. (other ranges on request)	Standard 3000.0 dbar ± 0.1% f.s. (other ranges on request)	Standard 3000.0 dbar ± 0.1% f.s. (other ranges on request)	Standard 3000.0 dbar ± 0.1% f.s. (other ranges on request)
Connection Plug:	SUBCONN BH 2 M	SUBCONN BH 2 M	SUBCONN BH 2 M	SUBCONN BH 2 M
Cable Counter Plug:	SUBCONN IL 2 F	SUBCONN IL 2 F	SUBCONN IL 2 F	SUBCONN IL 2 F
Cable connection:	Single- or multi-conductor cable, one pole can be in contact with sea water			
Breaking load: for shallow water applications (up to 500 m):	approx. 1500 kg	approx. 2000 kg	approx. 4000 kg	approx. 8000 kg
for deep sea applications (from 500 m up to 3000 m):	approx. 5000 kg	approx. 8000 kg	approx. 12000 kg	approx. 18000 kg
Max. cable resistance (go-and-return line):	1000 Ohms	1000 Ohms	1000 Ohms	1000 Ohms
Deck Command Unit:	Metal housing for use in 19" rack or as table housing, not for use on deck; push button control for net changing; indication of net number, pressure, battery status, ... Supertwist LCD-display with LED backlight; Interface for Personal Computer (RS 232)			
Power Supply:				
Underwater Unit:	3 Lithium Batteries DL 123 A/3V, sufficient for approx. 100 hours operation			
Deck Command Unit:	85 - 260 VAC	85 - 260 VAC	85 - 260 VAC	85 - 260 VAC
Towing Speed:				
Recommended for nets with 300 microns standard mesh size:				
Horizontal Collections:	max. 4 knots	max. 4 knots	max. 4 knots	max. 4 knots
Vertical Collections	max. 1 m per sec.	max. 1 m per sec.	max. 1 m per sec.	max. 1 m per sec.

The single- or multi-conductor cable is not included in our scope of delivery.

Appendix 4. Inventory of hazardous chemicals and chemical safety and spill response plan.

A) Invenentory (itemized)

Common Name	Concentration	Amount	Spill Response (all FOCI personnel)	Notes
Formaldehyde	37%	5 – 5 gal.	Gloves Eye Protection Fan-Pads Formalex Plastic bag	Dyson loaded 2/4/2014, working volume for all Spring and Fall projects. MSDS, hygiene plan, and SOPs provided at time of loading.
Ethanol	100%	4 – 1 gal.	Gloves 3M Sorbent Pads Plastic bag	Loaded 2/4/2014, working volume for all Spring and Fall projects.
Sodium Borate Solution	5-6%	1 – 5 gal.	Gloves Paper towels Plastic bag	Loaded 2/4/2014, not a regulated chemical.
Sodium Borate Powder	100%	1 – 500 g	Gloves Wet paper towels Plastic bag	Loaded 2/4/2014, not a regulated chemical.
Ethylene Glycol	100%	1 – 500 ml	Gloves Paper towels Plastic bag	Loaded 2/4/2014, not a regulated chemical.
Formalex	100%	2 - 1 gal.	Gloves Paper towels	Loaded 2/4/2014, not a regulated solution. Used for spill cleanup.

Spill Kit Contents	Amount	Use	Total Spill Volume Controllable	Notes
Formalex	2-1 gallon	Formaldehyde cleanup (all concentrations)	1.5 gallons 1:1 control	Formalex will be used in conjunction with Fan-Pads to reduce total spill

				volume.
Fan-Pads	1 roll (50 sheets)	Formaldehyde cleanup (all concentrations)	50 sheets=50-150 ml spills	Formalex will be used in conjunction with Fan-Pads to reduce total spill volume.
3 M Pads	10 pads	Ethanol cleanup	10 pads=10-250ml spills	Pads may be reused if dried out.
Nitrile Gloves	4 pairs each S,M,L,XL	For all cleanup procedures	N/A	Gloves will be restocked by each survey group.
Eye Protection	4 pairs	Formaldehyde cleanup	N/A	Eye protection will be cleaned before re-use.
Tyvex Lab Coats	2 coats	Formaldehyde cleanup	N/A	Coats will be cleaned with Fan-Pads and Formalex before reuse.
Plastic Bags	2	Formaldehyde cleanup/Fan Pads	N/A	Bags may be packed full and sealed.

B) Chemical safety and spill response procedures

Chemicals will be transported, stored and used in a manner that will avoid any spills and adequate containment, absorbents and cleanup materials will be available in the event of a chemical spill.

The scientific chemicals to be used for this project are: (1) ethyl alcohol (100%) and (2) formaldehyde (37%). Other chemicals brought aboard are consumer products in consumer quantities. Dilutions of the scientific chemicals will be used to preserve in faunal organisms collected with bongo nets, as described in the Operations section of these Project Instructions. Use of these chemicals and the specified dilutions will only occur in exterior locations on the ship away from air intakes. Scientific chemicals shall not be disposed over the side.

Standard Operating Procedures and Information Sheets are provided here for the scientific chemicals. Included are details concerning personal protective equipment, work area precautions, special handling and storage requirements, spill and accident procedures/first aid, waste disposal and other pertinent information. Both small and large spills are of particular concern. In both cases, the spill response is intended to first contain the spill and then neutralize it. This may be easily accomplished for small spills depending on the degree of vessel motion and the prevailing environmental conditions. In all cases, the first responder should quickly evaluate the risks of personal exposure versus the potential impacts of a delayed response to the spill and act accordingly. For example, if the spill is small and it is safe to do so, a neutralizing agent should be rapidly applied to encircle/contain the spill and then cover it. However, a large formaldehyde spill (> 1 L) is extremely hazardous and individuals at risk of exposure should immediately leave the area. The CO or OOD should be notified immediately so that a response team with self-contained breathing apparatus (SCBA) can be deployed to complete the cleanup operation or dispense the hazard with a fire hose directed overboard. The vessel's course should be adjusted to minimize exposure of personnel to wind-driven vapors and to limit spread of the spill due to vessel motion. The reportable quantity (RQ) of formaldehyde is 1,000 pounds and the RQ for ethyl alcohol is 5,000 pounds which greatly exceed the quantities brought aboard for this project.

Standard Operating Procedures – Formaldehyde At-Sea

Chemical Name: 37% Formaldehyde

UN Number: 1198

Hazard Ratings: (on a scale of 0 to 4)

Health (blue): 3 Flammability (red): 2

Reactivity (yellow): 2 Special (white):

Personal Protection Gear Needed

*gloves

*goggles or face shield

Special Handling Instructions

* If a ventilation hood is not available, then pouring of chemical must be done outside. At least two people should be involved with large chemical transfers in case of an emergency.

* Chemical must be stored at temperatures above 15° c to prevent polymerization of paraformaldehyde.

First Aid

* If swallowed, give large amounts of drinking water and induce vomitting.

*If vapors inhaled, get out into fresh air immediately. Give oxygen if breathing is difficult.

* If spilled on skin or splashed in eyes, flush with water for at least 15 minutes.

Spill Cleanup Procedures

For small spills (500-1000 mls):

Cover spill quickly with a Fan Pad and spray on Formalex to deactivate and absorb chemical. Let material sit for 10 - 15 minutes. Dispose of materials in plastic bag.

For large spills (1000 mls - ?):

Use a combination of Fan Pads and Formalex as quickly as possible to contain spill and deactivate it. Vacate area and try to ventilate room, if possible. Call Bridge immediately.

Deactivation/Disposal Procedures At Sea

*Formalex is a greenish liquid that is to be used to insure proper chemical deactivation. Formalex should also be used in conjunction with Fan Pads. Place used Fan Pad in plastic bag, seal, and put in bottom of Spill Kit.

*Fan Pads may be used to absorb small spills alone but these pads work best when used with Formalex to immediately control the vapor layer.

Shipping Procedures and Restrictions

37% formaldehyde cannot be ship by air due to its flammability rating.

All quantities should be over-packed with absorbency material in case the original container is damaged. When shipping by barge or land, labels are not required for quantities under 110 gallons by D.O.T. but the container should have MSDSs and the UN number readily available.

Standard Operating Procedures – Ethanol At-Sea

Chemical Name: 100% Alcohol

UN Number: 1170

Hazard Ratings: (on a scale of 0 to 4)

Health (blue): 2 Flammability (red): 3

Reactivity (yellow): 1 Special (white):

Personal Protection Gear Needed

*gloves

*goggles or face shield when pouring

Special Handling Instructions

* Keep away from heat, flame, and other potential ignition sources.

* Store in a well ventilated area or in a flammable cabinet.

First Aid

* If swallowed, give large amounts of drinking water and induce vomitting.

* If vapors inhaled, get out into fresh air immediately. Give oxygen if breathing is difficult.

* If spilled on skin or splashed in eyes, flush with water for at least 15 minutes.

Spill Cleanup Procedures

Absorb ethanol with 3M Sorbent Pads and allow to dry in a well ventilated area away from ignition source.

Deactivation/Disposal Procedures At Sea

Use 3M Sorbent Pads to absorb the ethanol. Put used pads outside to dry (secure from blowing overboard and exposure to flame). Once dry, the pads may be reused or burned.

Shipping Procedures and Restrictions

Due to the flammability rating of 95% ethanol, this chemical cannot be shipped by air. Transportation by barge or land vehicle will require the ethanol container to be over-packed with absorbent materials such as clumping kitty litter or shredded paper. Include MSDSs and the UN number with the shipment for reference in the event of a spill.