



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southwest Fisheries Science Center  
8604 La Jolla Shores Drive  
La Jolla, CA 92037

4/17/09

## CRUISE INSTRUCTIONS

NOAA Ship: NOAA Ship *Miller Freeman*

Cruise Number: MF-09-01

Cruise Dates: May 4 - 11, 2009

Cruise Title: Sardine Acoustic Survey

Study Area: San Francisco to US/Mexican border out to 300 nautical miles

### Itinerary:

1 - 2 MAY	Seattle, WA	Ship loading and gear preparation
2 - 4 MAY	Seattle, WA to San Francisco, CA	Equipment trials
4 MAY	San Francisco, CA	Ship loading for rockfish cruise
4 MAY	Depart San Francisco, CA	Survey
11 MAY	Arrive San Diego, CA, PM	Offload equipment

*Miller Freeman* will on load personnel as well as gear for the subsequent rockfish cruise in San Francisco, CA prior to the survey.

Tracklines and trawl stations are flexible to accommodate the testing of acoustic gear.

Sponsoring Institution: NOAA/NMFS, Southwest Fisheries Science Center (SWFSC)  
Fisheries Resources Division (FRD)

### Cruise Description and Objectives:

1. To conduct acoustic equipment trials during the transit from Seattle to San Francisco.
2. To survey pelagic fish stocks between San Francisco and San Diego, CA, along track lines placed across high density areas for sardine determined



from sardine survey on FROSTI.

3. To continuously record multi-frequency acoustic backscatter with the Simrad EK60s.
4. To improve methods for acoustic target identification and target strength estimation.
5. To validate the acoustic measurements using directed net sampling.
6. To validate the acoustic measurements using images collected with a newly-developed, towed, stereo camera system (FasTowCam).
7. To record sea-surface temperature and salinity, indexed by geographic position and time, with the ship's Scientific Computing System.
8. To record current profiles throughout the duration of the cruise with the Acoustic Doppler Current Profiler (synchronized with the Simrad EK60 echosounders).
9. To monitor environmental conditions within the CalCOFI survey area.
10. To make continuous observations of sea birds and marine mammals.

Chief Scientist: Sam McClatchie, SWFSC (858) 752- 8495 (cellular),  
Sam.McClatchie@noaa.gov

## **PLAN OF OPERATIONS**

### 1.0 OPERATIONS

1.1 The *Miller Freeman* will conduct operations in the Southern California Bight as well as occupying adaptively determined stations north of Point Conception up to San Francisco. After departure from San Francisco, the *Miller Freeman* will proceed to the area with highest densities of fish and fish-eggs, based on reports from the sardine survey aboard FROSTI. The *Miller Freeman* will conduct the operations described below beginning on that transect. The *Miller Freeman* operations will be focused on surveying areas of high density fish and/or fish-eggs. Portions of transects or stations where no fish are caught in trawls from the concurrent survey will be avoided by the *Miller Freeman*. Operations off the standard transects, on ad-hoc lines, may be conducted in response to underway data, as determined by the Cruise Leader and Chief Scientist.

1.1.1 Weather observations. Observations will be taken on all stations.

1.1.2 Thermosalinometer sampling - The ship will provide and maintain a thermosalinometer (TSG), which is calibrated and in working order, for continuous

measurement of surface water temperature and salinity. A backup unit (calibrated and in working order) will also be provided by the vessel and remain aboard during the cruise. The Scientific Computing System (SCS) will serve as the main data collection system. All SCS data will be provided to SWFSC personnel at the completion of the cruise.

1.1.3 Acoustics –The Simrad EK60 depth sounder will be operated, at 18, 38, 120, and 200 kHz and interfaced to a data acquisition system to estimate micronekton and preliminary estimates of small pelagic fish relative biomass between 0 and 250 m. The vessel's depth sounders may be used at the discretion of the Commanding Officer, but will normally remain off while underway. The ship shall inform the Cruise Leader of any use of the vessel's sounders, as it interferes with the signals received on the scientific EK60. Its use will be continuous.

The SWFSC's Advanced Survey Technologies group will be testing new technology of a high-speed, towed, stereo-camera system (FasTowCam). This system will consist of a small deck mounted winch, a CAT 5 cable reinforced with Kevlar and the towed-body with the stereo camera and electronics inside the fish. The towed-body will be deployed at the discretion of the acoustician after notification to the bridge for target verification of the acoustic signal.

The FasTowCam system will be deployed and operated continuously during transits between stations at speeds up to 15 knots, and will be recovered just prior to subsequent station occupancy or stationary operations of the ship. If the operator detects or suspects problems, the camera system will be recovered for inspection and remediation. The bridge will be notified of recovery operations that may require the ship to slow and deck crew to assist.

The FasTowCam will also be maneuvered within optical range of fish schools identified from echograms in an effort to identify and obtain size information and tilt distributions from the schools. The depth of the FasTowCam can be adjusted using diving planes as well as by manipulating the wire out and vessel speed. Since the hull transducers are separated from the FasTowCam, these operations may require complex maneuvers by the vessel including course changes on short notice, 180 degree turns, repeat passage over the same ground, and changes in vessel speed.

1.1.4 Mid-water trawling – The Santa Cruz rockfish mid-water trawl will be used for non-conventional mid-water trawling using directed tows fishing on acoustic marks identified from echograms. Individual tows will target selected marks, taking care to record in the station log sufficient data to identify as much as possible the trajectory of the net tow. Acoustic data from the Furuno net sensor will be used to record whether a fish school entered the mouth of the net according to the judgment of an experienced trawl operator.

The trawl net will not be fitted with a marine mammal excluder device. To avoid risk of

bycatch, the trawl will be fished on acoustic marks below 20 m depth, and will be used during daylight hours wherever possible.

Trawl catch will be sorted into small pelagic fish and other organisms. Representative samples of other organisms will be labeled and frozen. Small pelagic fish will be sorted to species, length frequencies measured (to cm) for the entire catch (or a random subsample of the catch), weighed in aggregate by species, labeled and frozen. Sardine will be sexed and their gonads removed and preserved in formalin, prior to freezing.

1.1.5 ADCP – The ship’s ADCP should run continuously and be logged to a data acquisition system. Complete system settings will be provided by the oceanographer, but will include 5-minute averaging of currents, AGC and 4 beam returns in 60 8-meter bins. The ADCP will be set to receive an external trigger from the EK60 to avoid cross talk.

1.1.6 Seabird observations – During transit between stations, a marine bird observer will be recording location and species of various marine seabirds.

## 2.0 SCIENTIFIC PERSONNEL

2.1 Chief Scientist - The Chief Scientist is Sam McClatchie, SWFSC, at phone (858) 752-8495.

The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship, (2) exceed the time allotted for the cruise, (3) result in undue additional expense, or (4) change the general intent of the project.

### 2.2 Participating Scientists

Please see Appendix 3.

2.3 Medical Forms - All scientific personnel will complete a NOAA Health Services Questionnaire (NHSQ) prior to embarking, as per NC Instruction 6000. This form will be routed through MOP Health Services for approval 30 days prior to the cruise.

## 3.0 EQUIPMENT

3.1 Supplied by scientific party:

1. 37% Formalin (SWFSC)
2. Tris buffer (SWFSC)
3. Sodium borate (SWFSC)
4. 30 cc and 50 cc syringes (SWFSC)
5. Canulas (SWFSC)

6. Pint, quart and gallon jars (SWFSC)
7. Inside and outside labels (SWFSC)
8. Motion compensated balances (SWFSC)
9. Fish measuring boards (SWFSC)
10. FasTowCam and winch (SWFSC)
11. Laptop computer to control and monitor FasTowCam
12. USB HDD to archive EK60 data (SWFSC)

3.2 Supplied by ship - We request the following systems and their associated support services, sufficient consumables, back-up units, and on-site spares. All measurement instruments are assumed to have current calibrations and we request that all pertinent calibration information be included in the data package.

1. Port and starboard winches with .322" conductive cable
2. Port and starboard trawl winches with 1" trawl cable
3. Port and starboard gantries with trawl blocks for 1" trawl cable
4. A-frames w/blocks to accommodate .322" cable
5. CTD, rosette and bottles
6. Winch monitoring system
7. Seabird thermosalinometer
8. Acoustic Doppler Current Profiler w/writeable CD drive
9. Multiple frequency (18, 38, 120 and 200 kHz) EK60 GPTs and transducers

3.3 Installation and Maintenance - Prior to departure from San Francisco, the Chief Scientist and members of the scientific party may board the vessel, with permission of the Commanding Officer, to test survey equipment and environmental sensors.

3.4 Hazardous Materials - The Chief Scientist or Cruise Leader shall be responsible for complying with NC Instruction 6280a, Hazardous Materials and Hazardous Waste; policy, guidance, and training, dated February 4, 1991, paragraph 7.g and paragraph 9. By Federal Law, the ship may not sail without a complete inventory of Material Safety Data Sheets (MSDS's) and appropriating neutralizing agents, buffers, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemicals brought on board. The Chief Scientist or Cruise Leader will provide the Commanding Officer with a copy of all MSDS's prior to the cruise.

#### 4.0 DATA RESPONSIBILITIES

4.1 Collection of Data - The Chief Scientist or Cruise Leader will receive all original data related to the project. The Chief Scientist or Cruise Leader will in turn furnish the Commanding Officer with a complete inventory listing of all data gathered by the scientific party, detailing types of operations and quantities of data prior to departing the ship. All data gathered by the vessel's personnel that are desired by the Chief Scientist will be released to the Chief Scientist, including supplementary data specimens and

photos gathered by the scientific crew. It is also requested that the ship's clocks remain at PST throughout the duration of the cruise. All sample times are recorded in PST.

4.2 Dissemination of Data - The Chief Scientist is responsible for the quality assurance, disposition and archiving of data and specimens collected aboard the ship. The Chief Scientist is also responsible for the dissemination of copies of these data to cruise participants and to any other requesters. The SWFSC cruise report will be submitted according to SWFSC procedures to appropriate persons and groups.

4.3 Evaluation Form - The Chief Scientist or Cruise Leader will complete the Ship Operations Evaluation Form and forward it to the Office of Marine and Aviation Operations. The Commanding Officer will provide this form.

## 5.0 ADDITIONAL INVESTIGATIONS AND PROJECTS

5.1 Ancillary Projects - Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force. Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions. Any additional work will be conducted so as not to interfere with operations as outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the primary project with approval from the Commanding Officer.

## 6.0 COMMUNICATIONS

6.1 Radios - The Cruise Leader or designee may request, from the Commanding Officer, the use of radio transceivers aboard the ship to communicate with other vessels and aircraft, if necessary.

6.2 Telephone - The Cruise Leader or designee may require access to the ship's INMARSAT or cellular telephone systems with permission from the Commanding Officer. The Commanding Officer will provide the Cruise Leader with a log of all INMARSAT calls made from the ship for SWFSC business at the end of each leg. In accordance with the Communications Reimbursement Policy, SWFSC will pay these charges via a transfer of funds from SWFSC to the ship.

6.3 Electronic Mail - All members of the scientific party will have access to e-mail for communications with persons not aboard the ship. The amount of such communication traffic will be determined by the Chief Scientist or Cruise Leader.

6.4 Routine Reports - The Cruise Leader will submit a weekly cruise report, along with time and attendance for the scientific party, to the Survey Coordinator each Thursday during the cruise via e-mail or, if e-mail is not functioning properly, via fax.

## 7.0 MISCELLANEOUS

7.1 Pre-cruise Meeting - A pre-cruise meeting between the Chief Scientist or Cruise Leader and the Commanding Officer (and his staff) will be held prior to the start of the cruise to identify operational requirements (i.e., overtime, modifications, repairs or procurement). The date and time for this meeting is yet to be scheduled.

7.2 Underway Meetings - Meetings between the Commanding Officer (and other officers) and the Cruise Leader should occur at the beginning and end of each leg to discuss and solve any problems or changes that may arise. Additional meetings should occur as needed.

7.3 Debrief - A post-cruise debriefing will be held between the Chief Scientist or Cruise Leader and the Commanding Officer. If serious problems are identified, the Commanding Officer shall notify the Marine Operations Center, Pacific, in the most direct means available. The Chief Scientist or Cruise Leader shall document identified problems in the Ship Operations Evaluation Form. The time and date for the debrief will be determined toward the end of the cruise.

7.4 Time and Attendance - Time and Attendance will be filled out by the SWFSC timekeeper while the ship is at sea, based on information transmitted by the Cruise Leader to the Survey Coordinator. Scheduled overtime is authorized for Saturdays, Sundays, holidays and any hours over a standard eight hour week day. Irregular overtime will be authorized by the Cruise Leader as required. SWFSC personnel are authorized per diem at the rate of \$3.00 per day to be paid via a travel voucher at the termination of the cruise. Task Number 28LEF01-P1A will pay for per diem and overtime for any SWFSC permanent, term or temporary employees.


7.5 Navigation - Primary control will be GPS, also dead reckoning based on visual bearings and radar ranges when possible.


7.6 Scientific Spaces - The Cruise Leader shall be responsible for the proper upkeep and cleaning of all spaces assigned to the scientific party, both laboratory and living spaces, throughout the cruise. The Cruise Leader or Chief Scientist will make berthing assignments for scientific personnel on a per-leg basis, with approval of the Commanding Officer.

7.7 Foreign Nationals Access to NMAO Vessels -  
Please see Appendix 4.

For further information contact Sam McClatchie, Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA, 8604 La Jolla Shores Drive, La Jolla, CA 92037; sam.mcclatchie@noaa.gov, Phone 858-546-7083. More information about the cruise and project can be found at the project's website:

<http://swfsc.nmfs.noaa.gov/frd/CalCOFI/CC1.htm>

Prepared by:  \_\_\_\_\_ Date: April 16, 2009  
David Demer, Ph.D. (Seattle-San Francisco), Sam McClatchie, Ph.D. (SF to SD)  
Cruise Leader, SWFSC

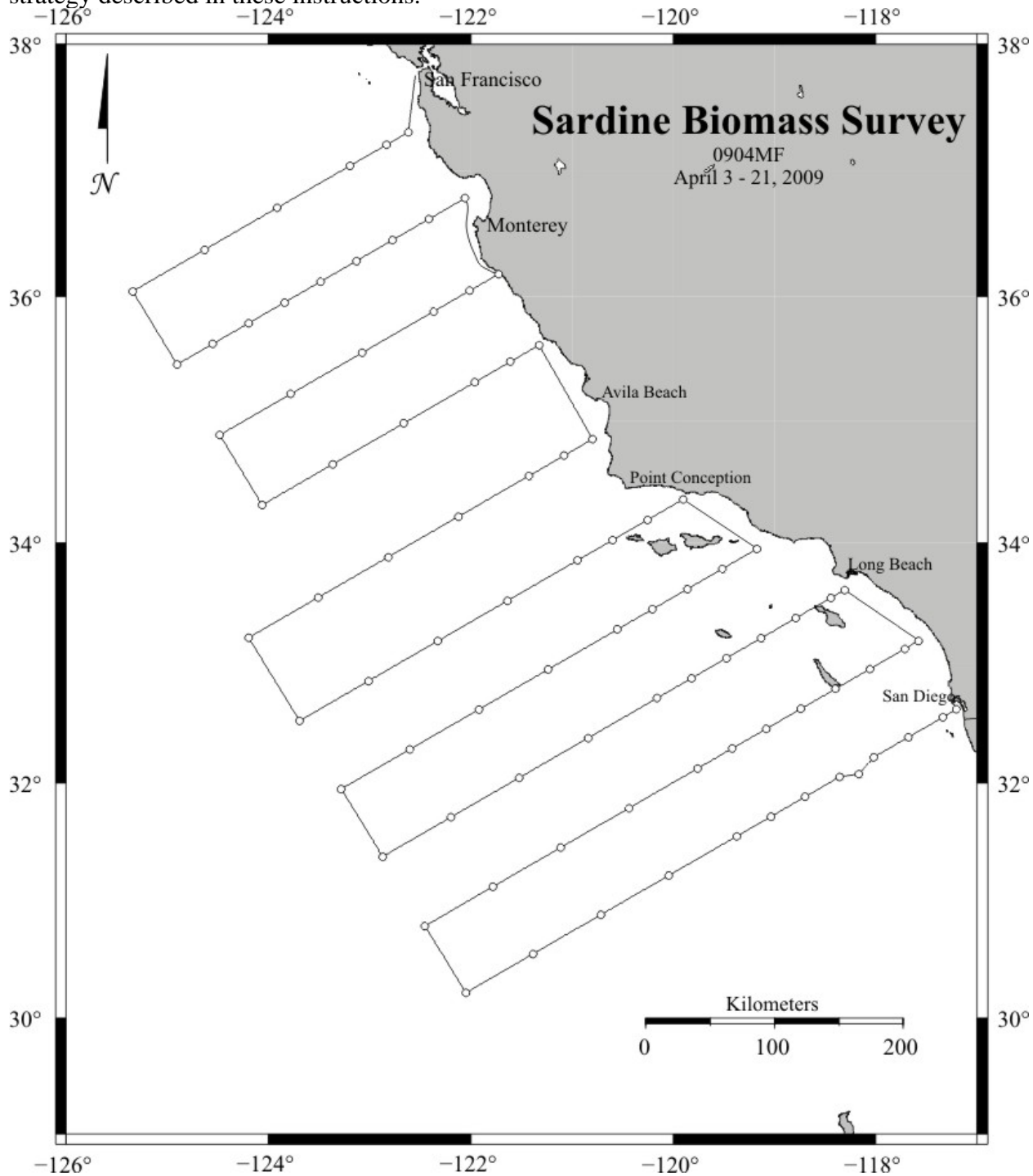
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Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
Norm W. Bartoo, PhD.  
Acting Science & Research Director  
Southwest Region

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
CAPT Michelle Bullock  
Commanding Officer  
NOAA Marine Operations Center - Pacific



Appendix 1. Potential area of survey 0904MF survey. Stations and transects will not follow the transects and stations shown, but will rather be determined according to the adaptive-sampling strategy described in these instructions.



## Appendix 2. Station positions:

Depart San Francisco, CA

Station positions for trawling are to be determined according to the presence of fishable acoustic marks.

Transects are to be determined by the positions of high fish densities detected during the sardine survey aboard FROSTI

Arrive San Diego, CA

### Appendix 3. Personnel for the CalCOFI 0904MF Survey

*Miller Freeman:*

#### Personnel for the CalCOFI 0904MF transit from Seattle to San Francisco

Acoustic Engineer	David Demer	SWFSC
Equipment Specialist	Steve Sessions	SWFSC
FasTowCam project Leader	Derek Needham	STS
Mechanical Engineer	Mike Patterson	STS
Bird Observer	Michael Force	FIAER

#### Personnel for the CalCOFI 0904MF Survey from San Francisco to San Diego

Position	Name	Affiliation	Berth
Cruise Leader	Sam McClatchie	SWFSC	
Fishery Biologist	Sue Manion	SWFSC	
Fishery Biologist	Ed Weber	SWFSC	
Equipment Specialist	Steve Sessions	SWFSC	
Acoustic Engineer	Josiah Renfree	SWFSC	
FasTowCam project Leader	Derek Needham	STS	
Mechanical Engineer	Mike Patterson	STS	
Bird Observer	Michael Force	FIAER	

## Appendix 4. Foreign National Access

### Foreign National Access and Deemed Export Controls on NMAO Vessels

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (<http://deemedexports.noaa.gov>). The foreign national's sponsor is responsible for obtaining clearances and export licenses required and for providing for required escorts by the NAO. Programs sponsoring foreign nationals should consult with their designated line office personnel to assist with the process (<http://deemedexports.noaa.gov/contacts.html>).

The following are basic requirements. Full compliance with NAO 207-12 is required.

#### **Responsibilities of the Chief Scientist:**

Ensure the following is provided to the Commanding Officer before any foreign national will be allowed on board for any reason:

1. Written notification identifying the NOAA Program individual who is responsible for ensuring compliance with NOAA and export regulations for the foreign national (see Foreign National Sponsor responsibilities below).
2. A copy of the DOC/OSY clearance authorization for access by the foreign national.
3. A copy of Appendix B of NAO 207-12 with NOAA Chief Administrative Officer concurrence endorsement.
4. Written notification that the foreign national has been cleared against the State, Commerce and Treasury departments' Lists to Check.  
<http://www.bis.doc.gov/ComplianceAndEnforcement/ListsToCheck.htm>
5. Provide the NOAA Foreign National List spreadsheet for each foreign national in the scientific party.

Escorts – The Chief Scientist is responsible to provide escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.

Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.

Export Control - The Chief Scientist is responsible for complying with NAO 207-12 and the development of Technology Access Control Plans for items they bring aboard. The Chief Scientist must notify the Commanding Officer of any export controlled items they bring aboard and any access restrictions associated with these items.

The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

### **Responsibilities of the Commanding Officer:**

Ensure only those foreign nationals with DOC/OSY clearance are granted access.

Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written NMAO approval and compliance with export and sanction regulations.

Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.

Ensure receipt from the Chief Scientist of the NOAA Foreign National List spreadsheet for each foreign national in the scientific party.

Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.

Export Control - 8 weeks in advance of the cruise, provide the Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program controlled technology.

The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.

### **Responsibilities of the Foreign National Sponsor**

Export Control - The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being

provided access to the controlled technology onboard regardless of the technology's ownership.

The Departmental Sponsor/NOAA of the foreign national shall assign an on-board Program individual, who will be responsible for the foreign national while on board. The identified individual must be a U.S. citizen, NOAA employee or be approved by the vessel's DOC Regional Security Officer homeport.

Ensure completion and submission of Appendix C (Certification of Conditions and Responsibilities for a Foreign National Guest) as required by NAO 207-12 Section 5.03.h.