

The role of marine technicians aboard ship

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Ship time request

Project Title: EAGER: Collaborative Proposal: Early career chief scientist training in biological oceanography

Project Short Title: Chief Sci training

Project Status: Submitted

UNOLS Project ID #: 106288

Version #: 1

Last Modified: 4/5/2019 10:54:00 AM

Date Submitted: 9/19/2018

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Science Discipline: Biological Oceanography

Large Program Abbr:

If Other Science Discipline, specify:

Large Program Comments:

Project Status: New Proposal

Agency/Division/Program	Grant/Project Number	Agency Funding Status
NSF/OCE/IPS	1911831	Funded
Agency Description:	NSF - 7 days University of Hawaii state match - 1 day Office of Naval Research - 2 days	

Institutional Proposal #:

Proposal Deadline submitted for:

Project Start Date: 1/01/2019

End Date: 12/31/2020

Project Budget:

Year	Ship(s) Requested (Name Or Size)	Total Days Req.	Start Date	Repeat/Multi-ship/ Clearance Req./Est. Cost	Status
2019	Kilo Moana	12	7/24/2019	N/N/N/410070	Submitted

STR – Important stuff for techs

Project Webpage:

Summary of Field Work: This is a 10 day, chief scientist training cruise for early career biological and chemical oceanographers. Science activities will be based at Station ALOHA (21.75N, 158W) and will include training in shipboard scientific instrumentation. Work will focus on intensive (day/night) sampling of both the upper ocean (0-150 m) and the mesopelagic waters (200-1000 m). Training will include familiarization with responsibilities and role of chief scientist and training in proficiency with shipboard equipment and instrumentation.

Summary of Facility Requirements: Some of the instrumentation and equipment to be used includes: CTD rosette, ADCP, various bio-optical instrumentation, MOCNESS tows, vertically-integrated net tows (0-200 m), free-drifting arrays (sediment traps), and various instruments sampled from the ship's seawater intake system. Will require use of the A-frame, CTD winch (0.322 conducting wire), and conducting cable for MOCNESS tows (0.621 fiber optic).

Summary of Other Requirements or Comments:

STR – Important stuff for techs

Chief Scientist: Matthew Church

in Science Party: 26

of Science Teams: 1

of Marine Techs: 2

Science Party Explanation: We plan to bring as many early career scientists as can be accommodated on the KM. We will need two shipboard technicians to assist with the round-the-clock operations.

Instrumentation that affects scheduling

Dynamic Positioning

ADCP

Multibeam

Fiber Optic (.681)

Radioisotope use - briefly describe

Other Operator Provided Inst. - Describe

PI-Provided Vans - briefly describe (2)

Instrumentation Explanation: The cruise will utilize a MOCNESS for repeat day/night tows in the upper 1000 m. We will also regularly use the CTD rosette. There is a possibility that we will utilize radioisotopes (¹⁴C) and if so would require the UH-OTG radioisotope van. We may also bring up to 2 PI provided laboratory vans. Finally, we will also require a backpack winch capable of deploying and recovering free-drifting arrays (sediment traps)

Major Ancillary Facilities

Radioisotope Lab Van

Portable Winch

Ancillary Facilities Explanation:

STR – Important stuff for techs

- Mission summary and equipment needed
 - Vans (radiation, cold lab van, etc.)
 - Winches, wires and major equipment (e.g., CTD, MOCNESS, multibeam, etc.)
 - Location, including work in foreign territorial waters (within 12 n. miles of other countries)
 - Radioisotope requirements
 - Rough guidance on number of scientists
- Cruises are allocated to ships by the UNOLS scheduling committee
- After assignment to a ship, the scheduler uses this information to develop a tentative ship schedule (Letter of Intent)

Initial cruise planning

- The tech manager looks for any resources that may need to be located.
 - May need to locate a technician with special skills, e.g., dredging or coring.
 - May need to arrange with other institutions for shared-use equipment not located at the home institution.
 - Cold lab vans are in short supply
- Ship schedules get finalized late in the year. At that time, we make an initial assignment of marine technicians to the cruise.
- Cruises supported by private funding will require a contractual arrangement
- At UH, the tech manager and the lead technician will start working with the PI or chief scientist on cruise details.

Detailed cruise planning

- Hazmat planning
- Radioisotopes
 - Rad van
 - Types of radioactive materials (RAM) needed
 - Scientists must be added the institution's RAM license. They must have documentation of training. Institution will handle rad waste after cruise.
- Laboratory work
 - Scientists working in labs must have documentation of lab hygiene training
- Chemicals needed
 - Responsibility of scientists to provide. Delivery times can be important.
 - Provide the ship with all Safety Data Sheets (replacements for MSDS)
 - Responsibility of scientists to dispose of waste materials.
- Dive operations require dive plans be cleared with institution's dive safety officer.
- Unmanned aircraft system (aka, drone) operations

Detailed cruise planning

- Pre-cruise planning form

MISC SCIENTIFIC INSTRUMENTS

- Acoustic Transducer and Deckbox – Benthos Model DS-7000-1
- Acoustic Deckbox – Edgetech Model 8011AT
- Argos Receiver – Model GONIO 400
- Radio Beacons – Novatech Designs, Inc. - *Channels 67, 69, 70, 72*
- Radio Direction Finder – Simrad variable frequency RDF
- Strobes – OAR High Intensity Strobe Flashers
- Fume Hoods – Labconco Protector Laboratory Hoods: Chemistry and Wet labs

SHIPBOARD WATER REQUIREMENTS

- Underway Scientific Seawater System (USSW)- Projected use (volume/day):
*Plumbed via Teflon-lined pipe and/or PVC piping to all lab spaces (except computer lab) and van locations.
This water comes from a suction port about 25' below the waterline on the forward stbd hull section.*
 - Thermosalinograph
SBE45 MicroTSG Thermosalinograph & SBE38 Digital Oceanographic Thermometer
 - General Oceanics Automated Flowing pCO₂ Measuring System – Model 8050
Note: Data currently is automatically posted on a daily basis to a public FTP site.
 - Chlorophyll Fluorometer - Wetlabs WETStar Chlorophyll Fluorometer
 - General Seawater availability - *available on main deck and 02/03 weather deck*
 - *UltraPure Fresh Water System
 - Pacific RO 40 Reverse Osmosis System (Barnstead 100 Liter Diamond Storage Reservoir)
Projected use (volume/day): *(40 liters/hour production rate)*
 - Barnstead NANOpure Diamond Analytical System (18.2 MΩ)
Projected use (volume/day): *(1.6 liters/minute production rate)*
- *One set of filter cartridges provided for Pure Water Systems;
Additional cartridges must be supplied by scientific party**

Detailed cruise planning

- Pre-cruise planning form

CRANES, WINCHES, BLOCKS, WIRE ROPE & ELECTRO-MECHANICAL CABLES

- 0.322" 3-conductor Hydrographic Winch System** – *Caley Ocean Systems, Inc.*
5,000 lb Maximum working load
- *Traction Winch System** – *Dynacon Inc.*
 - *0.680" coaxial cable (10,000 lb working load)
 - *0.681" 3-conductor/3-single mode fiber-optic cable (14,000 lb working load)
- Typical Voltage to be used:** **Typical Current to be used:**
 - *9/16" Dredge/Trawl Winch cable (24,375 lb elastic limit)
- TSE Mooring Winch;**
7000 lbs line pull; 16 RPM (max linespeed)
20" diameter drum; 58" diameter flange; 30" wide drum
- SeaMac Tow Winch (small);**
1800 lbs line pull; 0-200 fpm
20" diameter drum; 34" diameter flange; 12" wide drum
- SeaMac Tow Winch (large);**
3200 lbs line pull; 0-180 fpm
20" diameter drum; 58" diameter flange; 48" wide drum
- DSE Retriever Winch**
1300 lbs line pull; 0-100 fpm (0-30 m/min)
18" diameter drum; 36" diameter flange; 18" wide drum
- Harken 20" Block**
Trace metal free, with wire-out, rate & tension readout. Logging capable.

Detailed cruise planning

- Development of deck layout
- Tentative lab assignments and/or arrangements
- Additional satellite bandwidth requirements
- Coordinate shipping of equipment for storage until the cruise

Shortly before sailing

- RVSS Safety Manual, chapter 1
- Shipboard orientation manual
- Science party list and berthing plan
- Notification of any dietary restrictions
- Shipboard civility training
- Export controls concerns
 - List of scientific party, including full name and citizenship
 - PI/CS must review the ship's technology control plan and acknowledge receipt

Mobilization

- The marine techs will coordinate with the CS and the deck department to load and arrange large equipment such as winches, vans and large program-provided gear
- Scientists personal gear will either be loaded on pallets and removed scientists when aboard or will be hand carried aboard by scientists
- Be aware that other ship operations may be occurring and may impact mobilization, e.g., fueling
- Loading galley stores – if a call goes out for loading stores you can make yourself very popular with the stewards and cruise by helping out!

Sailing day

- Be aboard early
- Get advice from the marine techs how to minimize your use of satellite bandwidth
- Observe departure from decks not in use by the ship's crew
- Safety briefing and drills will commence shortly after the ship clears the harbor and sea buoy
- Settle in if you haven't already

Daily operations

- In conjunction with the CS, the techs are responsible for coordinating operations between the science party and the bridge.
- Techs on watch are normally will be in contact with the bridge via radio.
- Aboard the KM, techs are responsible for 12 hours of operations
 - Lead deck ops
 - Ensure data is being acquired by underway science data loggers
 - Trouble shoot problems as able (both for science and the crew)
 - In short, be everywhere at once.

Daily operations

- Techs are responsible for routine data acquisition
- Techs support science operations but do not work for the CS; they work for the tech manager
 - They do not process data...

Post-cruise

- Techs are responsible for getting raw data to the CS
- They also get data off the ship and turn it over for submission to R2R
- Remove gear from the ship and assist scientists in packing their own equipment.
- Along with the CS, they inspect the labs and the science staterooms for cleanliness and to make sure that everything is removed.
- PLEASE MAKE SURE ALL SAMPLES AND CHEMICALS HAVE BEEN REMOVED FROM THE SHIP!
- If you have a significant amount of used or waste chemicals, coordinate with the tech manager to see if a company is required to dispose of them.

Shipping samples home

- Scientists are responsible for shipping their samples home
- If the shipment contains chemicals or dry ice please make sure the carrier has all the information needed to accept the shipment. It's best if someone from the science party is available to work directly with the carrier.
- Please don't leave before you know your samples will be accepted.
- The techs and/or the marine center probably don't have the information that carriers will need to accept the shipment. One scientist had to return from the airport to deal with their shipment.
- Dan Fornari of WHOI says he never leaves town before his shipments have been picked up. **GOOD ADVICE!**

Post-cruise followup

- Fill out a post-cruise assessment form!
- R2R will contact you about any restrictions on release of your cruise data.

New cruise planning application

- Supported by UNOLS
- In operation aboard the Endeavour and other ships are evaluating it
- UH is migrating to this application and it was used in preparing for your cruise. Any feedback?