university of hawai'i
ocean OTG
technology group

University of Hawaii Marine Center
965 N Nimitz Hwy,
Honolulu, Hawaii 96817
www.soest.hawaii.edu/UMC

R/V Kilo Moana Pre-Cruise Planning Form

Rev. 11 -2017

Cruise Number Designation: Cruise Dates:	Starting Port: Ending Port:

Chief Scientist: Phone: Email:	Address:

Co-Chief Scientist: Phone: Email:	Address:

Other Key Contact: Phone: Email:	Address:

Lead Marine Technician: Phone: Email:	Ship-To Address: **University of Hawaii Marine Center** **KILO MOANA, ATTN: *(Chief Scientist's name)*** **965 N Nimitz Hwy, Honolulu, Hawaii 96817**

Ship Specifications

Length Overall = 56.6m (185' 7") Waterline Length = 52.4m (172') Maximum Breadth = 26.8m (88') Full Load Draft = 7.6m (25') Displacement = 2542LT	Accommodations = 48 Science Party = 26 + 2 techs Range-10,000 nautical miles Endurance = 50 Days Cruising Speed= 12kts	Lab Space = 256m² (2762 ft²) Working Deck = 414m² (4460 ft²) Freeboard (to Main Deck) = 4.6m (15') Survey Speed = 12kts/S.S.6 Mission Support = 100LT

Computer Systems

- General purpose Windows computers available in most labs and library
- Network access and remote data display available in all labs and staterooms

Communication Systems

- HF (SSB), VHF, GMDSS (JRC Area 4 Cert d VHF), HiSeasNet (VSAT), Fleet Broadband 500
- Ship-wide fiber-optic computer network (100 Mbit)
- Email and Internet access readily available

Navigation Systems

• Integrated Bridge • EDI Vessel Control System (VCS) • Inertial Reference Unit • TSS, Inc. Model POS/MV 320 • Dual Navigat X MK1 Digital Gyrocompass	• Worldwide differential GPS (CNAV) • Maris ECDIS 900 • 3 & 10 cm Surface Search Radars • Taiyo VHF Radio Direction Finder • Sperry Marine Decca Bridgemaster E250

SCIENTIFIC EQUIPMENT REQUIREMENTS

Please check all instruments & equipment required

UNDERWATER NAVIGATION / COMMUNICATIONS

☐ * **Simrad HL3880 transducer stem**
35 cm gate valve, capable of extending ~1m below ship's hull, see photos on Kilo Moana website
http://www.soest.hawaii.edu/UMC/cms/kilo-moana/

* **USBL Navigation**

☐ Sonardyne Ranger 2 USBL with H7000 transceiver mounted on the transducer stem,
able to track vehicles beneath the ship at a minimum of 5000 m. Two beacons available.

☐ * **Reson TC1037 Acoustic Transducer – 12 kHz**
can be mounted on the transducer stem or deployed by cable from the aft deck.

☐ * **Project-provided transducer Navigation**
can be mounted on the transducer stem or deployed by cable from the aft deck.

*** Advanced planning is required for all underwater navigation or communications equipment.**

ECHO SOUNDERS

* **Deep Water Multibeam Echo Sounder**

☐ Kongsberg Simrad EM122 – *Standard policy is to operate at all times*
1° x 2° system, *12kHz , 864 Beams, 150° angular coverage,* 300-11,000 m depth *range*

* **Shallow Water Multibeam Echo Sounder**

☐ Kongsberg Simrad EM710 – *Standard policy is to operate at all times*
1° x 1° system, *70-100kHz, 256 Beams, 140° angular coverage, 10-1800 m depth range*

☐ ** **Expendable Bathymetric Thermography (XBT)** – Sippican MK21 PC with hand-launcher
Projected number of launches/day:

Sub-Bottom Profiler - Knudsen CHIRP 3260 Dual Frequency Echo Sounder

☐ 4 kHz
☐ 12 kHz (passive only, typically used for tracking pingers)

Acoustic Doppler Current Profilers – *Standard policy is to operate at all times unless otherwise directed by Chief Scientist. 38 kHz ADCP can interfere with EM710 multibeam*

☐ RD Instruments Mariner Workhorse 300 kHz
☐ RD Instruments Ocean Surveyor 38 kHz

***Kongsberg-Simrad EA500 Hydrographic Single Narrow Beam Echo Sounder**

☐ 38 kHz
☐ 200 kHz

**** For Bathymetric Surveys, a science lab watch is required <u>or</u> full multibeam support***

***** OTG provides for one (1) XBT to be launched/day; Additional XBT's <u>must</u> be supplied by scientific party***

CTD SYSTEMS

Anticipated Maximum Depth for CTD Casts: meters

☐ **CTD Rosette - 24-Bottle (1 of 2)** – 12 liter bottles
☐ **CTD Rosette - 24-Bottle (2 of 2)** – 12 liter bottles
☐ 12 liter bottles for use with messengers on hydrowire
Number and size of bottles required: Max Depth: meters

☐ **CTD Instruments** - SBE 911+ Standard Dual-Sensor System *(6,800m depth rating)*
Temperature Probe – SBE Model 3-02/F (dual)
Conductivity Sensor - SBE Model 4-02/0 (dual)
Oxygen Sensor - SBE Model 43

☐ **Pinger** – Benthos Model BFP 312HP 12 kHz Bottom Finding Deep Sea Pinger *(6,000m depth rating)*
☐ **PAR Sensor** – Biospherical QSP-2300 Log Scalar PAR sensor *(2,000m depth rating)*
(Integrated with QSR-2200 Scalar Surface PAR Reference sensor)
☐ **Fluorometer** – Wetlabs ECO-FLNTU Chlorophyll Fluorometer & Turbidity *(6,000m depth rating)*
☐ **Fluorometer** – Seapoint SCF Chlorophyll Fluorometer *(6,000m depth rating)*
☐ **Transmissometer** – Wetlabs C-Star 25cm (*6,000m depth rating)*
☐ **Bottom Contact Switch** – Seabird *(6,800 depth rating)*
☐ **Altimeter** – Tritech Altimeter PA200/20-6K8
☐ **Sound Velocity Profiler** - Applied Microsystems SVPlus *(5,000m depth rating)*

GEOPHYSICAL EQUIPMENT

- ☐ **Marine Gravimeter** – Bell BGM-3 – *Standard policy is to operate at all times*
- ☐ * **Land Gravimeter (for land ties)**– LaCoste-Romberg Geodetic Gravity Meter
- ☐ **Magnetometer** – Geometrics Model G-882 (Total Field Magnetometer)
  Towed instrument requires auxiliary winch positioned on main deck
- ☐ ** **Piston Coring –** equipment capable of 10', and 20' cores
- ☐ ** **Gravity Coring** – capable of 20' cores
- ☐ ** **Wax Coring** – various wax cores can be made available
- ☐ ** **Rectangle Dredges** – 18"x36" with 60" chain link bag

*** Locating and providing access to land tie locations is the responsibility of the science party requesting land ties. The science party is expected to assist technicians with gravity land ties.**

****Advanced planning is required for all geophysical sampling equipment.**

METEOROLOGICAL SYSTEMS

- ☐ **Anemometer** – RM Young 5106 Wind Sensor
- ☐ **Barometer** – 5106 Vaisala PTB220 Digital Barometer
- ☐ **Humidity** – Rotronic Hygromers MP101A-C5 Humidity Probe
- ☐ **Precipitation** – RM Young 50203 Precipitation Gauge
- ☐ **Precipitation** – OSI Optical Rain Gauge (ORG)
- ☐ **Temperature** – RM Young 41342 Resistive Temperature Device (RTD)
- **Radiometers**
  - ☐ Biospherical QSR-2200 Scalar Surface Photosynthetically Available Radiation (PAR)
  - ☐ Eppley Precision Spectral Pyranometer (PSP)
  - ☐ Eppley Precision Infrared Radiometer (PIR)

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 <u>must</u> be supplied by scientific party***

OTHER REQUIREMENTS

☐ *** Plotter | HP DesignJet 800ps**

42" large format printer – ink-jet – color and black & white - networked

Refrigerator/Freezer Storage

☐ Thermo Scientific Revco Elite PLUS -86°C Upright Freezer; Quantity: 1; 20.2ft^3

☐ Cospolich 37-40 ^{o}F Refrigerator; Quantity: 1; 10ft^3

☐ Cospolich Freezer/Refrigerator; Quantity: 2; 6ft^3; 3ft^3

☐ Cospolich 5 ^{o}C to 0 ^{o}C Freezer; Quantity: 1; 10ft^3

Ice-Making

☐ Cornelius IMD-600-30 Ice Machine; 618 lbs/24-hour cycle

Power Availability

☐ 12 kW uninterruptible power & 88 kW clean power in lab spaces

☐ 208V outlet on starboard side, main deck

☐ 480V outlet on port side, & Staging Bay, main deck

☐ 480V outlet on port and starboard side, 01 deck at van storage

Compressed Air

☐ Ship has two compressor rated for 200 PSI, 40.5 CFM each with additional auxiliary capacity available of 125CFM@125PSI.

Science air compressor (Really big Ingersoll Rand compressor*check for details)

Air Outlets on Main deck, port & starboard; compressed air available in all scientific labs

*** Advanced planning is required for use of plotter.**

VANS

Forms and guidelines can be found at: http://www.soest.hawaii.edu/UMC/cms/hazardous-materials/

☐ **Radiation Van**

Perkin Elmer TriCarb 4910TR liquid scintillation counter & color printer

Refrigerators (2); Total area: 8.7ft^3

Counter Space: 38 ft^2; Fume hood; 26" x 20"

List all isotopes, including quantity and activity levels, to be brought aboard:

Per Nuclear Regulatory Commission (NRC) guidelines, surveys are to be performed at regular intervals. The science party is expected to conduct these surveys and provide the materials required to perform these tests.

☐ Check if you have submitted plans of isotope use to UH Radiation Safety Officer (RSO)

Plan must include:

- Transportation to/from vessel
- Use on vessel
- Handling of waste and non-used isotopes
- Description of supplies/equipment the science party will be supplying for waste and liquid scintillation surveys

UH RSO: Irene Sakimoto; isakimot@hawaii.edu; (808) 956-6475

ALL radioisotope work must be conducted within the radiation van – no exceptions

☐ **General Science Van**

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.

☐ **Heavy Lift Crane (Port side)**
North American Crane Co.
Lift Capacity of 20,000 lbs at 30' radius; 5,000 lbs at 40' radius
Capable of deploying trawl wire or .680/.681 EM cable from traction winch

☐ **A-Frame**
Dynacon, Inc.
Dredge/trawl wire, or 0.680/0.681 cable deployed through flag block on A-frame
20,000 lbs SWL Dynamic; 30,000 lbs SWL Static

☐ **Towing Crane** (Starboard side)
Caley Ocean Systems, Inc.
Capable of deploying 0.322 EM cable from hydrographic (CTD) winch

☐ **Capstan** – small
18" Drum; 2 speed (10-12m/min; 20m/min)

☐ **Capstan** – large
24" Drum; 2 speed (18m/min; 32m/min)

Advance planning required for change-out of wire

SCIENTIST-PROVIDED INSTRUMENTS

Please list all instruments/devices intended to be deployed/recovered off the ship (nets, MOCNESS, other instruments, etc.) and provide as much detail about number of launches per day, depths, duration of deployments, ship requirements for these instruments, etc. Attach additional pages or cruise plan as required:

Please list science-party instruments – including unusual power requirements - desired to be integrated with ship's data logging systems:

Shipments to UH Marine Center should be arranged in advance with lead technician. Containers being shipped must have a Container Arrival form delivered to Port Operations Manager in advance.
This is available at http*://www.soest.hawaii.edu/UMC/cms/forms/*

HAZARDOUS MATERIALS (pt.1 of 2)

General Information

- It is required to submit MSDS sheets for **ALL** hazardous materials brought on board.
- The correct technical name and necessary identification of the material intended to be loaded must be properly labeled and placarded in accordance with the IMDG Code, CFRs and MARPOL 73/78.
- **ALL** hazardous material to be brought aboard by the oncoming scientific group must be packaged separate from all other science equipment. Please include a label with the Chief Scientist's name, Cruise ID and date.
- **ALL** hazardous material containers no matter how small or how many must be labeled with the name and phone number of the person responsible for the material.
- **ALL** hazardous material must be stored in the appropriate locker aboard the vessel. An amount not to exceed one-day's use of material may be located in the lab where the material will be used.
- **ALL** specialized spill kits need to be provided by the oncoming science party. Only general (acids, bases & mercury) chemical spill kits are provided. A sufficient quantity of spill response material must be brought so as to clean **ALL** the associated hazardous material brought aboard for the mission.
- It is the scientist's responsibility to be trained and proficient in the handling of **ALL** chemicals, their disposal, and spill control procedures.
- **ALL** proper safety equipment required for the hazardous material must be brought by the science party. This includes items such as safety glasses, lab coats, gloves, respirators, and etc.
- UH Environmental Health and Safety Office waste disposal policy is that any non-UH user aboard the Kilo Moana must either coordinate waste disposal efforts through a UH scientist or utilize a commercial disposal service. In either case, arrangements must be made to have the material taken directly from the ship to the facility.
- No waste can be stored, even temporarily, at the UH Marine Center. Technicians can provide users with local contact numbers for hazmat waste disposal.

* Please list **ALL** hazardous materials, including chemical and radioactive, to be brought aboard and their quantities. Include any storage or handling requirements ship-ops should be aware of.

Hazardous, Chemical or Radioactive Material Name	Quantity	Storage or Handling Requirements

Forms and guidelines can be found at: http://www.soest.hawaii.edu/UMC/cms/hazardous-materials/

HAZARDOUS MATERIALS (pt.2 of 2)

* Please list **ALL** individuals below that will be working with the inventoried materials along with their hazardous material handling and laboratory safety training completed title and date.

Name	Date of Training	Training

1. Will you be generating hazardous waste? ☐Yes ☐ No

   If yes, explain: _____

2. Are we recovering deployed instruments? ☐Yes ☐ No

   If yes, do these instruments contain hazardous material? ☐Yes ☐ No

3. If yes to the above, please check the type(s) of hazardous material

   ☐Corrosives ☐Cryogenic ☐Flammables ☐Reactive ☐Toxic/poisonous

   Please list all hazardous material contained in the instruments.

   _____

4. Have you read UNOLS Research Vessel Safety Standards Manual Ch.9 (Scientific and Shipboard Hazardous Materials?)

   ☐Yes ☐ No

I confirm, to the best of my knowledge, that the hazardous material list submitted and my answers to the questions above are complete and accurate. I agree to use these materials in a safe and clean manner and in accordance with the above rules. I state further that I am responsible for the prompt reimbursement to the University of Hawaii for any costs incurred by the latter to the ship, and to destroy, dispose of or clean up the hazardous materials utilized or generated by my research project.

Principal Investigator/Chief Scientist Current Date: _____ Cruise ID: _____

_____ _____

(Print Name) (Signature)

Forms and guidelines can be found at: http://www.soest.hawaii.edu/UMC/cms/hazardous-materials/