The R/V Kilo Moana is a 186' Small Waterplane Area Twin Hull (SWATH) vessel owned by the U.S. Navy and operated by the University of Hawaii Marine Center. Because of the unique SWATH design, the Kilo Moana is a very stable and comfortable platform from which to conduct oceanographic research. The ship was designed as a multi-purpose oceanographic research vessel with extensive equipment for geophysical (2 multibeam echosounders, subbottom profiler, gravimeter and magnetometer), physical oceanographic (Doppler current profilers, CTDs, pCO2); meteorological and radioisotope research. Over 2500 sq. ft. of space is provided in 8 different laboratories and over 4000 sq. ft. of exterior working space is available on the aft main deck and the forward 01 deck. The Kilo Moana was built in 2001 and commissioned in 2002. The vessel operates out of Honolulu, Hawaii, and has worked throughout the Pacific. The cruising speed is 12 kt., with a minimum speed of less than 1 kt. and station keeping supported by dynamic positioning.

Specifications

<table>
<thead>
<tr>
<th>DESIGN</th>
<th>Small Waterplane Area Twin Hull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built</td>
<td>2002</td>
</tr>
<tr>
<td>Length</td>
<td>186'</td>
</tr>
<tr>
<td>Beam</td>
<td>88'</td>
</tr>
<tr>
<td>Speed</td>
<td></td>
</tr>
<tr>
<td>· CRUISING &amp; SURVEY</td>
<td>12Kts</td>
</tr>
<tr>
<td>· FULL</td>
<td>15kts</td>
</tr>
<tr>
<td>· MINIMUM</td>
<td>&lt;1kts</td>
</tr>
<tr>
<td>ENDURANCE</td>
<td>50 days Food/Stores/FW</td>
</tr>
<tr>
<td>DRAFT</td>
<td>25’ (Max), 23’ (Min)</td>
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<tr>
<td>RANGE</td>
<td>10,000 NM @ 12 Kts</td>
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<tr>
<td>GROSS TONNAGE</td>
<td>3060 IGT, 1407 RGT</td>
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<tr>
<td>DISPLACEMENT</td>
<td>2542 LT at 25’ draft</td>
</tr>
<tr>
<td>FUEL CAPACITY</td>
<td>130,000 Gals</td>
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<tr>
<td>FULLY AIR CONDITIONED</td>
<td></td>
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<tr>
<td>OPERABILITY</td>
<td>SEA STATE 6 (low end)</td>
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<tr>
<td>COMPLEMENT:</td>
<td></td>
</tr>
<tr>
<td><strong>CREW</strong></td>
<td>20</td>
</tr>
<tr>
<td>----------</td>
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</tr>
<tr>
<td><strong>SCIENTIFIC PERSONNEL</strong></td>
<td>28</td>
</tr>
</tbody>
</table>

**LABORATORIES:**
- Hydrographic: 290 sq. ft.
- Chemical: 290 sq. ft.
- Wet: 320 sq. ft.
- I-Met: 270 sq. ft.
- General #1: 170 sq. ft.
- General #2: 560 sq. ft.
- Computer: 560 sq. ft.
- Science: 90 sq. ft.

**CONFERENCE ROOM:** 270 sq. ft.

**LIBRARY:** 260 sq. ft.

**STAGING BAY:** 370 sq. ft.

**EXTERIOR WORKING SPACE:**
- Aft Main Deck: 2,200 sq. ft.
- Fwd 0-1 Deck: 2,000 sq. ft.

**MAIN PROPULSION**
- Diesel Electric
- Caterpillar 3508B diesel engines: 4
- 910 kW diesel generators: 4
- 1.5 MW Westinghouse (Cl.3) DC motors: 2
- Pulse SCRs & phase shifting transformers: 12

**BOW THRUSTER**
- Elliott White Gill Model 40

**PROPELLERS**
- Twin, Fixed Pitch, 5 Blade

**DYNAMIC POSITION & SHIP CONTROL**
- Kongsberg SDP-11 DP

**EMERGENCY GENERATOR**
- Caterpillar 1406, 190 kW

**INCINERATOR**
- Yes

**SEWAGE SYSTEM**
- Orca II, Type II Marine Sanitation Device

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

CLEAN POWER
- Conditioned electrical power is provided to support sensitive scientific equipment.
- 12 kW of uninterruptible power and 88 kW clean power is provided to the laboratories.

CERTIFICATION:
- ABS: A1 Circle E, AMS, Ice Class DO
- ACCU UWLD (Underwater inspection in lieu of dry docking) Unrestricted ocean service
- USCG: Oceanographic Research Vessel (Sub Chapter U)

OWNERHSIP: U. S. Navy

CALL SIGN: WDA 7827

IMO #: 9229037

STATE REGISTRATION ID: HA 0532 XS

Scientific Equipment

Underway Science Seawater Intake

The easiest source of seawater on board the KM is to tap into the ship's standard science seawater in one of the various labs. This water comes from a suction port about 25' below the waterline on the forward stbd hull section. It is distributed throughout the ship's labs via Teflon coated and/or PVC piping (depending on location).

The pumps are March Model TE-8K-MD. The housing is polypropylene and utilizes magnetic drive to eliminate penetration of metal motor shaft and need for a seal. UNC SW piping is polypropylene lined steel flanged pipe. The pipe lining forms a gasket on the flanges.

Data Logging/Processing Computers

- Linux-based data logging system, SISCON, remote serial data acquisition with UDP data stream to centralized loggers;
- Backup: Thecus Network Attached Servers with 11 terrabyte RAID level 5 storage (2)
- Remote Data displays: desktop PCs, laptop PCs, 3 PC104 PCs, & TV monitors (20+)
- Email Communications: HiSeasNet (VSAT) and Fleet Broadband 500
Printers Printer Xerox Phaser 7400 Color Laser Printer, HP DesignJet 800ps 42” plotter

Navigation and Timing Equipment
- TSS POS/MV 320 – Integrated Inertial Nav and GPS system
- Furuno GP-150
- Underwater Navigation: HPR418 transducer stem for mounting science-provided acoustic instruments
- Spectracom NetClock/GPS 9383 Timeservers (2)

Geophysical Sonar Equipment
- Multibeam – Simrad EM710: 1° x 1° system, 70-100 kHz swath mapping, 10-1800 m depth range
- Multibeam – Simrad EM122: 1° x 2° system, 12 kHz swath mapping, 300-11,000 m depth range
- 4 kHz Sub-Bottom Profiler – Knudsen 320B/R deck box + array of sixteen TR-75 Massa transducers
- The Kilo Moana collects swath bathymetry data every day at sea. Onboard technicians support the multibeam hardware, software, and data acquisition, including QA-QC and archiving. Scientists may also request additional Specialized Services for a mapping specialist to sail on their leg when swath bathymetry/imagery is critical to their cruise objectives and real-time decision making. In such cases, additional sound velocity profiling, shipboard data processing, seafloor imaging and charting will be available customized to their specifications.
- The multibeam systems include software and computer hardware for survey planning and underway operations, as well as real-time gridding and display of bathymetry and acoustic imagery in the main computer lab. Sonar data acquisition is conducted on Windows workstations using Simrad SIS software. Sonar processing software includes HMRG sonar tools (bathymetry and backscatter processing and charting), the MB-System (bathymetry processing and charting), SAIC Saber (survey planning and area based bathymetry editing), the Generic Mapping Tools (GMT) package for image manipulation and charting, and GeoMapApp tools for display of geophysical data. These systems run on UNIX, Linux and PC workstations devoted to multibeam processing and charting.

Marine Geology and Geophysics Equipment
- Gravity Meter, Bell BGM-3 Marine Gravimeter
- Land Gravimeter for land ties, Lacoste R serial # 1
- Magnetometer, Geometrics Model G-882 Cesium
• Rectangular dredges**, 18" x 48" with a 60" chain link bag
• Rock Saw, Model 80BQ Sowers Cut-Off Saw
• Standard Piston Coring Equipment**, capable 20 ft cores & 40 ft cores

** needs advanced planning – Contact UH Marine Center

Oceanographic Instrumentation

• RDI 38 kHz and 300 kHz ADCPs with UHDAS acquisition and display software
• Seabird SBE 9/11plus CTD housing with pressure sensor, rated for 6,800m depth rating, equipped with:
  o 2 Sea-Bird SBE 3P temperature sensors
  o 2 Sea-Bird SBE 4C conductivity sensors
  o 2 Sea-Bird SBE 43 dissolved oxygen sensors
  o Other auxiliary sensors can be included by prior arrangement:
    ▪ Biospherical QSP-2300 log scalar PAR sensor (2,000 m depth rating),
    ▪ Wetlabs ECO FLNTU Chlorophyll Fluorometer & Turbidity sensor (6,000 m depth rating),
    ▪ Seapoint SCF Chlorophyll Fluorometer (6,000 m depth rating),
    ▪ Wetlabs C-Star 25 cm transmissometer (6,000 m depth rating),
    ▪ Applied Microsystems SVPlus sound velocity profiler (5,000 m depth rating).
  o For casts being conducted near the sea bottom an altimeter or a 12 kHz acoustic pinger will be attached to the frame to monitor the package’s height off the sea floor.
  o Water samples can be collected with 12 L PVC sampling bottles with internal Teflon-coated springs. The bottles can be triggered at any depth with a Seabird SBE 32 carousel.
  o 24-bottle and 12-bottle rosette frames are available.
• Underway scientific seawater system available in Hydro Lab, Chemistry Lab, Wet Lab, Lab 1, Lab 2 and IMET Lab
  o Sea-Bird SBE 45 MicroTSG Thermosalinograph
  o Fluorometer, Turner10-AU-005 (Continuous sea water flow-Benchtop model)
  o Fast repetition rate fluorometer (FRRF)
  o Seawater available in labs
• General Oceaneics Model 8050 underway pCO2 measuring system
• Sippican MK-21/PC Based XBT system including hand held launcher
• Barnstead Millipure Deionized Water System
• Thermo Scientific Revco Elite Plus -86°C freezer, 21 ft³ capacity
Meteorological Systems

- Campbell Scientific Micrologger CR3000
- RM Young Wind Monitor 5016-5 MA, port and starboard
- 5106 Vaisala PTB220 Barometer (class A)
- Rotronic Hygromers MP101A-C5 – Humidity Probe
- RM Young 50203 Precipitation Gauge
- OSI Optical Range Guage (ORG)
- RM Young RTD 41342 Resistive Temperature Device
- Eppley Precision Spectral Pyranometer (PSP)
- Eppley Precision Infrared Radiometer (PIR)
- Biospherical QSR-2200 Scalar Surface Photosynthetically Available Radiation (PAR)

Additional General Purpose Equipment

- 1 – Benthos 2216 12kHz Pinger
- Tritech Altimeter PA200/20-6K8
- Benthos Acoustic Transducer & Deck Box, DS-7000-1; EdgeTech 8011AT Deckbox
- 2 – OAR VHF radio Beacons;
- 2 – OAR High Intensity Strobe Flashers
- Misc analog & digital scopes and function generators

Radiostope Laboratory Van

- Packard Bioscience Tri-Carb 2900TR liquid scintillation counter and color printer
- Fume hood (26”x20”)
- Two refrigerators, 8.7 ft³ each
- Sink (18”x15”x12”) with fresh/salt water; over-the-side, ships’ sewage and local discharge drains
- Counter space, 38 ft²

Other Portable Equipment

- TSE Mooring Winch
- SeaMac Tow Winch (small)
- SeaMac Tow Winch (large)
- DSE Retriever Winch
- Harken 20” Block – trace metal free, with wire-out, rate & tension readout. Logging capable.
- Small capstan, 18” drum
- Large capstan, 24” drum

**Support Equipment**

**HANDLING EQUIPMENT**

The aft portion of the main deck is configured to carry, launch, and recover equipment over-the-stern and over-the-side. Deck equipment is designed to meet ABS certification for lifting gear and 46 CFR requirements. Installation permits a variety of oceanographic operations at sea, including: coring, water sampling, equipment launch and recovery, and array and trawl towing. All working deck areas include deck bolts on a 2’ x 2’ grid pattern for securing itinerant scientific equipment.

**STERN U-FRAME**

A Dynacon U-Frame is mounted on the transom to launch and recover oceanographic equipment and support cable running from the traction winch. It is designed to handle 30,000 lb. towing load and 20,000 lb. luffing load and reach 12 feet beyond the transom. It is configured for towing .681 electro-optical cable, .680 coaxial cable and 9/16” 3×19 trawl wire.

**CRANES AND WINCHES**

- A North American, MCT-2555 heavy lift crane is installed on the port side to load and off load and move equipment around the aft working deck. Depending on boom angle it has max capacity of 8 tons at 35 ft radius and 4 tons at 55 foot radius. SWL of wire is 9820 lbs.
- A Caley towing crane mounted on the starboard side can launch, tow and recover equipment deployed with cable stored on the integrated Caley heave-compensating, auto-rendering hydrographic winch. This system carries up to 10,000 m of .322 EM wire.
- A Dynacon traction unit and storage drum are located in the winch and wire rooms on the main deck. The drum can carry 10,000 meters of either .681 electro-optical cable, .680 coaxial cable or 9/16” 3×19 trawl wire. An additional storage drum can be carried on the 02 deck to allow more than one type of wire to be used on a given cruise, though there are limitations on the amount of wire that can be carried on the second drum.

< ---- Last Edit: 09-04-2014 ---- >