Research Vessel *Sally Ride*

Welcome Aboard!

In order to make your stay aboard more enjoyable and productive scientifically, you are requested to observe the following guidelines:

1. The Coast Guard requires that Fire and Abandon Ship drills be conducted every week at sea. During these drills and in the event of an actual emergency you are to wear your life jacket, hard-soled shoes, long-sleeved shirt, long pants, and some form of head covering. This is for your protection. Your muster and duty stations are found on the station card attached to your bunk. Drills are taken seriously. Listen carefully to the deck officers' instructions.
2. Safety is of the utmost importance. Please wear a work vest, hard hat, and work suit as appropriate when working on deck with gear over the side. Wear adequate foot protection on deck. The deck officer will point out any unsafe practices, but don't hesitate to act if you see an unsafe condition. Do not go out on deck at night alone, or in bad weather, without first notifying the bridge. Request permission from the bridge before turning on deck lights.
3. The possession of drugs or alcohol is strictly forbidden by University regulations.
4. Conserve fresh water at all times; we do not have a limitless supply. Do a full load of laundry rather than a partial one. Take short showers.
5. Meals are cafeteria style. Watch standers have priority in line. Bus your dishes and silverware to the scullery. Cups and glasses are numbered and correspond to your bunk number. There will usually be more than one sitting to feed all aboard; please vacate the mess hall once you have finished to make room for others. Meal times and other information are posted. Shirt and shoes are required at meals.
6. Clean linens are available in the linen locker on the foc'sle deck.
7. If you wish to visit the bridge or engine room, please request permission from the watch officer. These are busy places, so you may be asked to come back another time, depending on the current operation.

If you have any questions, please don't hesitate to ask. We are here solely for the purpose of accomplishing the scientific mission. This requires the cooperation of all personnel aboard.

Thank you.

T.J. Desjardins
Captain, R/V *Sally Ride*

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Preface

INTRODUCTION - The purpose of this handbook is to acquaint personnel with the characteristics and capabilities of R/V *Sally Ride*. It provides a good review of what can and cannot be done on the ship, and lists sources of more detailed information. It directs your attention to a number of important safety matters. We hope that by reading it well in advance of your cruise, you will spot problems in time to seek out satisfactory solutions, see how to prepare more smoothly and efficiently, and perhaps discover new or better ways to accomplish a certain task.

REVISIONS - The handbook is subject to ongoing revisions. We want it to represent the best information available from the experience of personnel at sea, and so we welcome comments or corrections, suggestions for better arrangement of material, additions, etc. Please send any such input directly to the Ship Scheduling Office.

A CAUTIONARY NOTE ON ACCURACY - While reasonable efforts are made to update the handbook as needed and to issue new versions in the wake of significant changes on the ship, it is impossible to assure complete accuracy at all times. In all cases, make your particular research equipment needs known on the Ship Time Request Form and contact relevant technical support groups to ensure that critical gear is ready for your work.

OTHER SOURCES OF INFORMATION - Please refer to the Scripps Cruise Planning Portal for more information. In addition, please review the UNOLS RVOC Safety Training Manual, Research Party Supplement and the UNOLS Research Vessel Safety Standards:

http://www.unols.org/document/rvoc-safety-training-manual-chapter-1-research-party-supplement

http://www.unols.org/document/research-vessel-safety-standards-rvss-2009

Schedules, ship layouts, and other ship-related information are available via the Scripps web pages.

Most scientific cruises will wish to make use of the technical support, equipment, or advice of one or more of the technician groups at SIO. In all cases, a timely and clear explanation of your needs is to your advantage. The principal groups are listed in the next section. Most of these groups perform recharge activities.

Section 1. History of R/V *Sally Ride*

R/V *Sally Ride* (AGOR 28) is an Ocean Class Auxiliary General Oceanographic Research (AGOR) vessel designed to perform multidisciplinary oceanographic research worldwide. Owned by the U.S. Navy, R/V *Sally Ride* is operated by Scripps Institution of Oceanography (SIO) under a charter agreement with the Office of Naval Research. The National Science Foundation provides additional substantial support for scientific equipment and instrumentation. Part of America's Academic Research Fleet, *Sally Ride* is managed by SIO as a shared-use research facility within the University-National Oceanographic Laboratory System (UNOLS), serving scientists and students from across the United States.

R/V *Sally Ride* was delivered to Scripps on 01 July 2016, following a four-year design/build process by shipbuilder Dakota Creek Industries (Anacortes, WA) and naval architect Guido Perla and Associates (Seattle WA). *Sally Ride* is the second of the Navy's Ocean AGOR class of research ships (the *Neil Armstrong* class). SIO was competitively awarded the operation of AGOR 28 in May 2010, and participated in an advisory role to the construction manager (Naval Sea Systems Command) during the final design and construction. Following delivery, *Sally Ride* underwent shakedown and science verification activities, and was accepted by UNOLS for scientific service in the U.S. Academic Fleet on October 28, 2016.

NAMESAKE: DR. SALLY K. RIDE

Dr. Sally K. Ride (1951-2012) was the first American woman to travel into space. She graduated from Stanford University with a B.S. in physics and a B.A. in English, and then went on to achieve an M.S. and Ph.D in physics while applying for the NASA shuttle program. She became one of the first six female astronauts in NASA history, and flew aboard space shuttle Challenger twice, in 1983 and 1984. After retiring, she joined the faculty at University of California, San Diego as a professor in the physics department and director of the California Space Institute. In 2001 she founded *Sally Ride* Science, a program designed to keep kids, especially girls, interested in science. She co-authored multiple books about space aimed at kids.

Her 343 hours in space inspired her life's work to encourage learning and engagement in children, and to work to protect the planet. A quote from Sally Ride about seeing the Earth from the space shuttle -

"I remember the first time that I looked towards the horizon. I saw the blackness of space, and then the bright blue Earth. And then I noticed right along the horizon it looked as if someone had taken a royal blue crayon and just traced along the Earth's horizon. And then I realized that that blue line, that really thin royal blue line, was Earth's atmosphere, and that was all there was of it. And it's so clear from that perspective how fragile our existence is. It makes you appreciate how important it is to take care of that atmosphere."

Sally Ride won many awards during her lifetime, and continues to be honored. Her life and business partner, Tam O'Shaughnessy, was named the christening sponsor of the ship and broke a bottle of champagne across her bow on August 9, 2014. The ship was handed over for operation by Scripps Institution of Oceanography on July 1, 2016.

SIO is honored to continue Dr. Sally Ride's legacy aboard R/V *Sally Ride*, which will engage a generation of scientists in learning about our planet in order to protect it.

Section 2: Specifications

COMMUNICATIONS: HiSeasNet C-band satellite system, FleetBroadBand back-up system, cellular, VHF, HF radio, SSB voice, GMDSS. Please see our contacts web page for current phone numbers.

HiSeasNet and FleetBroadBand systems provide limited bandwidth Internet to the ship. Some websites and high-bandwidth functionality are disabled to maximize the usefulness of the connection. FleetBroadBand provides a satellite phone service available for business or emergency needs.

NAVIGATION CAPABILITIES: JRC JLR-4341 x 2 DGPS as primary navigation and inputs to dynamic positioning, JRC Doppler speed log. Kongsberg DPS-112 DGPS, JRC 3 and 10 cm radars, Kongsberg dynamic positioning system, Kongsberg HiPAP USBL system, scientific MRUs (Seapath 330+, IXSEA Hydrins), and 2 Sperry gyros.

SCIENTIFIC EQUIPMENT: 12 kHz Kongsberg EM122 multibeam echosounder that can record depths up to 11,000 meters, providing bathymetry and sidescan imagery. 40-100 kHz Kongsberg EM712 for shallow (<1,000 m) water multibeam surveys. Knudsen Engineering 3260 3.5/12 kHz singlebeam echosounder sub-bottom profiler. Turo Devil XBT system used with Sippican Fast Deep XBTs. Currents are measured by Teledyne RDI 38 kHz, 150 kHz, and 300 kHz broadband/narrowband ADCP. A Kongsberg Simrad EK80 fisheries research sonar with five frequencies (split beam transducers at 18, 38, 70, 120, and 200 kHz). A Kongsberg K-Sync acoustic synchronization unit with 8 channels. Kongsberg Seapath 330+ motion sensor. Kongsberg HiPAP 501 (30 kHz, range to 4,000 m). A comprehensive MET system has several sensors on the forward and main masts for meteorological data, and sensors in the Bow Thruster Room and Main Lab for underway seawater data. (See more in the INFORMATION SYSTEMS AND DATA ACQUISITION in Section 4.)

Wired and wireless ethernet as well as a point-to-point serial network (SIS - Science Information System) exists. Ethernet and serial feeds are available in the science laboratory spaces.

For computer capabilities, see INFORMATION SYSTEMS AND DATA ACQUISITION in Section 4.

The ship has a fine-adjust temperature-controlled laboratory to facilitate chemical analyses, and two temperature-controlled walk-in chambers for sample storage/preparation.

Use of isotopes is prohibited in ship's laboratories. Isotope isolation vans are available by request.

An extensive inventory of instrumentation and technical services is available; see Section 5. A user fee to recover expenses for operating supplies, calibration, maintenance and repair is typically charged for each of these.

SUPPORT EQUIPMENT: Main crane, Allied TK70-70 on 01 deck. Telescoping knuckleboom, 10,000 lbs at 70 feet extension (sea state 4), 22,000 lbs at 70 feet (sheltered ops). Portable crane, Allied TK4-30 telescoping knuckleboom, 2,000 lbs at 30 feet extension. Normally carried on 01 deck forward, other locations possible to suit mission. Rescue boat davit is an Allied D6700FCTS located on the 02 deck.

Extensive bolt-down fittings for securing removable equipment on the main deck and inside laboratories (2' X 2' pattern). 1" sockets outside, 1/2" sockets inside.

Uncontaminated seawater supply to Main Lab and Wet Lab.

Through-hull instrument well just aft of the outer stairwell from the main deck to the foc'sle deck, nominal 24" diam. tube.

VANS: Up to 4 vans can be carried, on the port side main deck, 2 across. The other 2 could be stacked, with access from the foc'sle deck. Up to 3 vans can be carried on the bow of the ship, on the 01 deck. The 7 vans listed use the acorn securing method. The ship is capable of holding more vans, but would need to consider other securing methods.

WINCHES: CTD/hydro winches: Dual Markey CAST6 with motion compensation and render & recover modes, each with rated full drum capacity of 14,000 m 0.322" electro-mechanical (EM) cable, 12,000 m 0.375" 3x19 torque-balanced wire rope, or 10,000 m 0.393" electro-optical-mechanical (EOM) cable. Usually there's 10,000 m of 0.322" EM cable on the CTD winch (forward) and 10,000 m of ⅜" 3x19 wire on the hydro winch (aft). Wires lead over starboard side via Allied crane articulating booms.

Markey traction winch with rated line pull 25,000 lbs at 45 m.min and dual storage drums, each with rated full capacity of 12,000 m 9/16" 3x19 torque-balanced wire rope, 10,000 m 0.680" EM cable, or 10,000 m 0.681" EOM cable. Capable of fiber optic cable through A-frame. Normally there's 0.681" fiber optic cable on one drum and 9/16" 3x19 trawl wire on the other. Wires lead to A-frame.

Assorted portable winch and wire combinations available for cruise-specific requirements.

Section 3: Vessel Layout Description

Vessel Layout Description

This section is intended as an abbreviated tour of important spaces and equipment, in conjunction with ship arrangement diagrams. Most spaces and equipment of interest to scientists have fuller descriptions in Sections 4 - 6.

Bridge Deck

BRIDGE OR PILOTHOUSE - This is the nerve center of a ship. From this area, the ship is navigated, conned, maneuvered, and otherwise operated in such a manner as to accomplish the goals of the cruise safely and effectively. Additionally, operational aspects of the engineering department and the scientific party are monitored by the bridge watch officer. The watch officer maintains a log which records the date, time, and position of all scientific events. A copy of this log is given to chief scientists and others who request it at the end of the cruise. Visitors to the bridge are generally welcome. There will be times, though, such as when entering or leaving a harbor, when visitors are not permitted; check with the officer of the watch. Equipment, controls, and instruments on the bridge are operated only by the crew. Communication with the bridge is by ship's interior-dial or sound-power telephone systems.

CHART/RADIO ROOM - The chart room is located aft of the pilot house. The progress of the ship is plotted on charts in this room. It is also where the ship's inventory of charts and navigational publications are stowed and maintained. Some important texts on navigation, seamanship, meteorology, and nautical information in general are stowed here. Check with the mate on watch before borrowing any of these items.

Communications equipment is located in the chart room; the mate on watch will operate it and/or assist you to do so. R/V *Sally Ride* is capable of voice, data, and fax communications through various modes. Persons wishing to use the FleetBroadBand system must be aware that this is a commercial system and that they are responsible for charges incurred.

02 Deck

LIFE RAFTS - All four of the ship's life rafts are located on the 02 level forward.

MARINE MAMMAL OBSERVATION AREA - Deck forward of the bridge. Table and bench space on the port side. Power and an IMCOS data port, and ability to mount two big-eye binoculars.

RESCUE BOAT - The ship's rescue boat, a semi-rigid type, is located on the 02 deck, port side, and is attached to an Allied D6700FCTS crane.

01 Deck

CAPTAIN'S STATEROOM - The captain's room and office is on the forward starboard side of this deck.

CONFERENCE ROOM/LIBRARY - This area is designated as a quiet space on the ship for reading or studying. Good place for meetings. Food and drink are not allowed in this space, to keep carpeting and upholstery clean.

CRANE - Main crane, Allied TK70-70 on 01 deck. Telescoping knuckleboom, 10,000 lbs at 70 feet extension (sea state 4), 22,000 lbs at 70 feet (sheltered ops).

Portable crane, Allied TK4-30 telescoping knuckleboom, 2,000 lbs at 30 feet extension. Normally carried on 01 deck forward, other locations possible to suit mission.

HYDROGRAPHIC WINCHES - Two Markey CAST6 winches are on the starboard side of this deck. Wires lead over starboard side via Allied crane articulating booms. See WINCHES in Section 2 for more details.

STATEROOMS - There are eleven single-occupancy staterooms for ship's crew members on this level, plus one double stateroom reserved for ship technicians. (See Section 9 for specifics.)

WINCH CONTROL - Windowed winch shack is the site of primary control for CTD, hydro, and trawl winches. It is located on the 01 level, with good view of all winches and the starboard-side and aft water entry points. Can also be controlled from a console forward of the winches on the 01 deck, and from a console aft in the Main Lab.

Foc'sle Deck

BOATSWAIN LOCKER - The ship's boatswain locker is located all the way forward on the foc'sle deck.

CHIEF SCIENTIST'S STATEROOM - The chief scientist's room has two bunks plus ample bookshelf, file, and desk space to serve as an office. The room has computer network connections and a shipboard telephone.

(D)AMAGE (C)ONTROL LOCKERS - Amidships on foc'sle level, contains emergency and fire fighting equipment. This equipment is for emergency use only and should never be removed.

HAZMAT LOCKERS - Two lockers are located amidships just aft of the house. One is for science purposes, and one is for ship supplies such as paint.

INCINERATOR ROOM - The ship normally burns trash once a day, to keep ahead of the accumulation. If your science operations will be compromised by trash burning, please consult with the Research Technician well in advance of your cruise. Depending on the amount of interference and the amounts of trash generated, it may prove necessary to carry an extra van to hold trash until it can be burned or otherwise disposed. No trash is thrown overboard in accordance with international regulations.

STATEROOMS - Nine crew single staterooms are on the foc'sle deck. Ten science staterooms, all with bunk beds, are also on this level, including the chief scientist's stateroom. (See Section 9: Scientific Berthing Plan for specifics.)

MAIN DECK

A-FRAME - Located at the stern. A principal means of overboard handling or towing of instruments. Capacity 30,000 lbs dynamic. Capable of lowering to deck for maintenance and accessing sheaves (not for operations).

CAPSTAN - The ship normally carries a portable capstan on the main deck, principally used for mooring lines, available for other line-hauling tasks. Specifics available upon request. It can be situated to mesh with other space constraints and operational requirements.

CLIMATE CONTROL CHAMBER - There are two walk-in temperature-controlled chambers, one accessible from the Main Lab and one from the Wet Lab.

DECK - There is approximately 3,036 sq ft of open deck space. See ship schematics for more details.

All main deck areas are fitted with a standard 2' x 2', 1" NC thread bolt-down pattern.

ELECTRICAL/ELECTRONICS SHOP - Forward of the Wet Lab is a shop and tool/parts storage area for the ship's electrician.

COMPUTER LAB - On the port side, forward of the Main Lab, is the site of the deck electronics, ship servers, satellite control, and acquisition computers. Only technicians and authorized crew members are permitted in this space.

GALLEY & CAFETERIA - The mess hall is located on the port side. For safety and public health reasons only the cooks and other authorized crew members are permitted in the galley food preparation area. Food is served cafeteria style. (See Section 8 for more details on mess hall hours and practices.)

HOSPITAL - There is 1 bunk and various medical supplies. (See Section 7 for more on medical matters.)

LAUNDRY - All the way forward amidships, there are two washers and two dryers. Also storeroom for toilet paper, soap, etc.

MAIN LAB - (See LABORATORY SPACES in Section 4). The wall of monitors is located in the forward part of the Main Lab, and this lab usually where scientific parties set up their watch station spaces. Hazmat locker available for smaller quantities. Permanent starboard tables line the walls of the lab, fitted with a standard 1' x 1’ thread securing pattern.

MUD ROOM - Just forward of the Wet Lab are lockers for foul weather gear, boots, work vests, and hard hats. Emergency shower and eye wash station. Access to a head.

SHIP'S LOUNGE - Located amidships, forward of the Main Lab is the lounge. This space contains a TV, DVD player, and a selection of DVDs and board games.

STAGING BAY - A high-overhead sheltered (not weatherproof) work space with roll-down doors starboard and aft.

STATEROOM (ADA) - Forward of the hospital, on the starboard side. One bunk bed and one single. Head.

WET LAB - (See LABORATORY SPACES in Section 4).

WORK BOAT - Depending on how many vans are carried, and in what locations, the ship's work boat in its relocatable cradle may be situated on the 01 level aft, port side. The cradle is difficult to relocate at sea. Please pre-plan. (See BOATS in Section 4.)

1ST PLATFORM

ENGINEERING SPACES AND SERVICES - These are off-limits to scientific party members except by permission of the chief engineer or the duty engineer, especially when cruising. They can be dangerous at any time, due to the possible hazard of noise, oil, grease, or lubricants underfoot.

All questions of an engineering nature and requests for services or help should go to the chief engineer or engineer on watch in port; at sea requests for assistance should go via the bridge. Engineers are helpful and knowledgeable, but they can assist scientists only after completion of their regular duties.

MACHINERY CONTROL ROOM - Propulsion machinery and electrical plant controls.

SCIENCE STOREROOM - Starboard side, hatch just outside staging bay on main deck.

TRANSCEIVER ROOM - Accessed from the forward stairwell, this room houses deck boxes and acquisition systems from various scientific instrumentation, as well as the multibeam receivers. See a Computing Resources technician if adjustments or integrations with these systems are necessary. Only technicians and authorized crew members are permitted in this space.

TRAWL WINCH ROOM - This room contains the Markey two-drum main traction winch system, and fairleads by which wires can be led to the A-frame.

Section 4: Ship's and Scientific Equipment Description

A-FRAME - The A-frame is located at the stern. It has a safe working load of 30,000 lbs when in motion (hydraulically driven). It is the only means to lead larger diameter (9/16”) wire or 0.680" EM or 0.681” EOM cable overboard.

ACOUSTIC DOPPLER CURRENT PROFILER (ADCP) - (See SONAR in this section.)

ACQUISITION SYSTEMS- (See INFORMATION SYSTEMS AND DATA ACQUISITION in this section.)

AIR, COMPRESSED - (See COMPRESSED AIR in this section.)

AIR CONDITIONING AND HEATING - The ship's air conditioning system is extensive and complex, with zone-by-zone and even room-by-room control. If the ventilation or air conditioning in your room or working space seems not to be operating correctly or not to be controlled properly by the pertinent thermostat, please ask the engineer on watch for help. Do not resort to system-defeating measures such as blocking vents, etc.

BOATS - A 19-ft Work skiff aluminum boat is normally carried by *Sally Ride* as a work boat. Specific requests should be made to the marine superintendent prior to departure of the ship from San Diego to ensure that a boat meeting your requirements is available. At sea, the crew controls launching, operation and recovery of boat using the main ship’s crane.

BOATSWAIN LOCKER - The primary boatswain's locker for rigging and deck supplies used by the crew is located at the extreme forward end of the foc’sle deck. Auxiliary lockers are located at other places on the weather decks. They also contain rigging/securing items, such as cleats and eyebolts, for use with the 2' deck bolt-down pattern. The Research Technician or a crew member will assist you in their use if necessary.

BULWARKS - Bulwarks on the main deck aft are capable of being removed in sections, to permit loading and handling of large and/or heavy objects. Requirements for the removal of bulwark sections should be discussed in advance with the marine superintendent or the captain. Bulwarks are personnel safety devices, their removal is not treated lightly. They are not normally removed or installed at sea.

CABLE RACEWAYS - Raceways and cable pass-through run between labs, from labs to bow, from the labs to the fantail and staging bay, and up to the pilot house and mast. The unistrut network throughout the labs affords additional ways to route and secure scientific cables. As a consequence, it should almost never be necessary to route scientific cables in the overheads, and use of the overheads for this purpose is discouraged. If you do not see immediately how to route your cable outside the overheads where you want it to go, consult any STS technician. Do not disturb existing wiring and remember to remove yours at the end of your cruise.

CAPSTANS - There is normally a large capstan on the fantail. (See MAIN DECK in Section 3.)

CHEMICALS - Use care in storage, handling, and disposal of toxic chemicals, particularly inside laboratories. All chemicals brought on board should be accompanied by a Material Safety Data Sheet (MSDS) provided by the chemical manufacturer. Plastic bottles are safer at sea and should be used unless specific chemicals must be stored in glass. Disposal of chemicals is regulated by University policy and international laws. The ship's captain must know what chemicals you are carrying. A chemical storage locker is available and is the only safe way to carry most chemicals aboard ship. Please make arrangements with the Research Technician in advance for proper stowage and for appropriate disposal at the end of your cruise.

Working supplies of hazardous chemicals may be kept beneath fume hoods. Stocks/reserve supplies are to be kept in the appropriate storage.

CLEAN POWER - (See ELECTRICAL SYSTEM in this section.)

COMPUTER SYSTEMS - (See Information Systems and Data Acquisition in this section.)

COMPRESSED AIR - Ship's service air is 100 psi at 12 cfm. The upper limit cannot be used continuously. It is suitable for running pneumatic tools, but may not be dry or clean enough for laboratory use. Users should plan to supply their own filters if the air is intended for any lab use. There are numerous outlets in the labs.

CRANES - Permission to operate cranes is strictly limited to authorized personnel. These cranes are operated at sea only by permission of the captain.

Main crane, Allied TK70-70 on 01 deck. Telescoping knuckleboom, 10,000 lbs at 70 feet extension (sea state 4), 22,000 lbs at 70 feet (sheltered ops). Portable crane, Allied TK4-30 telescoping knuckleboom, 2,000 lbs at 30 feet extension. Normally carried on 01 deck forward, other locations possible to suit mission.

DECK LOADING - Ship stability is ultimately the responsibility of the captain. The responsibility of scientists is to consult the Nimitz Marine Facility or the Research Technician early to describe loading plans and requirements so that any necessary adjustments can be made. The more complex and heavy your equipment the more advance notice is needed. Our goal is to resolve loading problems and incompatibilities well before sailing day, so that it will not be necessary to leave scientific gear on the dock in order to assure a safe ship.

DECK TIE-DOWNS - No welding is permitted directly to any deck. All installations must use the 2’ x 2’ grid of tie-downs (welding may be done to “ears” or plates, which in turn are bolted to the deck). Bolt holes are 1" NC thread on main deck, 1/2" NC thread in labs and storerooms. Bolt holes in equipment should be made oversize, to allow for deck grid irregularities.

DEPTH RECORDING - (See SONAR in this section.)

DISTILLED WATER - (See FRESH WATER in this section.)

DOPPLER LOG - (See SONAR in this section.)

DRAINS - (See also CHEMICALS in this section.) Main Lab sinks drain directly overboard, or into the sewage holding tanks. Ship's engineers control the drain routing and should be consulted in advance.

The under-sink areas in the lab should (1) be carefully inspected before using the sinks to ensure that connections are in fact connected and open, (2) be kept clear of stored items capable of damaging PVC pipes or blocking drains, and (3) be kept clear of lab trash and debris.

ECHOSOUNDING - (See SONAR in this section.)

ELECTRICAL SYSTEM - The permanently-installed lab power systems include 120, 208, and 240 volt receptacles. The ship has the following power plant elements:

- 4 Cummins diesel generators, 690VAC @ 998 kW for propulsion and or ship service power
- 2 each 1,500 kVA transformers 690vac to 480vac
- 120VAC 20A receptacles throughout Main and Wet Labs. Each Lab fed by 45kVA transformer.
- 2 each 240VAC 3 phase 50amp receptacles in Main and Wet Labs.
- 2 each 208VAC 3 phase 50amp receptacles in Main and Wet Labs.
- 1 240VAC and 1 208VAC 3 phase 50 amp receptacles in Computer Lab.
- 1 each 400 amp 480VAC 3 phase connection in the Staging bay
- 3 each 100 amp 480VAC 3 phase deck receptacles, 1 Portside fantail, 1 in the Staging bay, 1 Stbd side working deck.
- 10 each 60 amp 480VAC 3 phase deck receptacles, 1 01 deck fwd. Stbd, 1 port fantail, 2 Stbd fantail, 1 working deck port, 3 in staging bay, 1 working deck stbd. and 1 Stbd quarter dk.
- 3 each 20 amp 480VAC 3 phase deck receptacles, 1 Foc'sle deck aft, 2 main deck aft.
- 9 each 60 amp 240VAC 3 phase deck receptacles, 1 Foc'sle deck aft, 1 Port fantail, 1 Stbd fantail, 2 in staging bay, 2 Stbd working deck, 2 portside main deck aft midship
- 3 each 60 amp 208VAC single phase deck receptacles, 1 Foc'sle deck aft, 2 portside main deck aft midship.
- 3 each 60 amp 120VAC single phase deck receptacles, 1 Foc'sle deck aft, 2 portside main deck aft midship.

EMAIL/INTERNET - (See also INFORMATION SYSTEMS AND DATA ACQUISITION in this section, and SATELLITE COMMUNICATIONS in Section 6.) Internet access is available to all users, but is limited by a daily data quota system. All scientists are required to log in to individual ship accounts to access the Internet and server-based science data. These accounts are temporary, and will be removed at the conclusion of each project.

Access to the Internet and science data is available via two public terminals and personal devices.

Because of the satellite service's limited bandwidth, mindfulness in Internet usage is advised. Be conservative, keep uploads and downloads small, and ask the Computing Resources technician if you need to transfer larger files over the Internet. When accessing email, use webmail if possible, and not standalone email clients.

FLOOD LIGHTS - Working lights on deck are controlled by the bridge. Consider the night vision of the crew and use only the lights you need, turning them off when finished.

Hand lamps, flashlights, etc. can be obtained through the Research Technician. Supply is limited; large scientific parties should provide their own units. Consult Bridge Watchstander prior to use of any lights on deck at night.

FREEZER - (See REFRIGERATION AND FREEZING in this section.)

FRESH WATER - Fresh water generation capacity is about 5,600 gals/day. The ship also has an evaporation distiller which puts out very pure water that can be used to fill carboys. Potable water tank capacity is about 14,000 gals. A Milli-Q Advantage system is installed in the Main Lab to provide pure water for lab use.

Fresh water should not be used for washdown purposes, except if necessary and then by consultation with the Research Technician. In personal use, conserve. Take short showers; do only full laundry loads. (See Section 8: SHIP ORGANIZATION.)

GASES - There are four gas cylinder storage braces in the Main Lab. Other hardware can be secured as necessary. These are the responsibility of the individual requiring gases for shipboard use. Any gas under pressure is dangerous; consult the captain or the Research Technician for safe stowage methods and locations.

GASOLINE - Inspected vessels are severely limited by law in the amount of gasoline they can carry, unless they have approved built-in tanks, which R/V *Sally Ride* does not. Small amounts of gasoline for outboard motor use at sea are carried in USCG-approved containers. If larger amounts of gasoline are needed, a special "portable" tank can be placed aboard--but it must be requested in advance from the Research Technician.

GENERATORS - (See ELECTRICAL SYSTEM in this section.)

GEOLOGICAL SAMPLING EQUIPMENT - Gravity coring equipment, a box corer, a multicorer, a glass corer, and rock dredges are maintained by the Research Marine Technician Group. A researcher planning use of any of the above equipment during an expedition should make this need known during the pre-cruise conference or before. The size and weight of geologic sampling gear make it expensive or impossible to ship commercially.

PVC tubing liners are used with both gravity and piston corers. This liner deteriorates during long storage. Each researcher should determine their needs. The Research Marine Technician Group can buy a liner, on a recharge basis, gauge it for size, and load it on board before an expedition.

Detailed plans for projected use should be submitted with the longest possible lead time to allow for assured supply of critical items, such as pipe liner for core barrels, and dredging supplies. (See "Sampling Equipment maintained by Research Marine Technicians" in Section 5.)

GYRO - Seapath 330+ and IXSEA Hydrins are the two main MRUs used for the various scientific sensors aboard the vessel. MRU and gyro data can be made available in lab spaces.

HATCHES - Hatches and watertight doors are heavy and dangerous if not secured correctly. Careful use of all doors and hatches, especially at sea, is very important. Carelessness can easily lead to severe injury. All doors and hatches should be positively latched either open or closed at all times, never left to swing free.

HOLD - (See description of storerooms under LABORATORY SPACES in this section.)

HOODS - There are three fume hoods, two in the Main Lab and one in the Wet Lab.

HYDRAULIC SYSTEM - (See also A-FRAME and CRANES in this section.) The A-frame is hydraulically operated, as are all cranes. Operating controls for the frame are located on the starboard side of the frame.

Questions regarding user applications of excess hydraulic capacity should be directed to Nimitz Marine Facility (the marine superintendent, the port engineer, or the chief engineer of *Sally Ride*) well in advance.

HYDROWINCH - (See WINCHES in this section.)

INFORMATION SYSTEMS AND DATA ACQUISITION – UPS-protected shipboard computer systems provide data acquisition, NAS services, and networking services.

Windows- and Linux-based computers perform a standard set of acquisition, archiving, and processing functions on permanently-installed data collection systems. Instrument data is archived in 15-minute intervals to the NAS server aboard. This archived data may be accessed at any time during the cruise via Samba.

Scientists requiring EK80 or WaMoS data, which may exceed 150GB per day, should provide USB hard drives for data downloading.

The permanently-installed data acquisition systems include (see also separate entries for these systems):

- RD Instruments acoustic doppler current profilers (ADCP), used with University of Hawaii's UHDAS software
- Kongsberg Simrad EK80 fisheries sonar system
- Kongsberg EM122 and EM712 bathymetric mapping systems
- Knudsen Engineering 3260 3.5 and 12 kHz singlebeam echosounder sub-bottom survey system
- Kongsberg Seapath 330+ and IXSEA Hydrins MRUs
- Trimble BD982 GPS receiver
- MET meteorological and underway seawater system
- Turo Devil XBT system, used with Sippican Fast Deep probes
- BGM-3 gravimeter
- Rutter Sigma S6 WaMoS II VV X-band radar system

Real-time data from the acquisition devices can be viewed on a display array in the Main Lab.

Specialized real-time data acquisition can be arranged by prior arrangement with the Computing Resources Group.

Serial feeds (DE9) and/or UDP feeds of GPS, MET, and MRU data can be made available in the lab spaces, and are configured by the Computer Resources technician.

Internet access is via HiSeasNet and/or FleetBroadBand, and shore cellular network (3G, 4G/LTE) as available. The Internet connection at sea will be slow (see also SATELLITE COMMUNICATIONS in Section 6), and subject to restrictions. Internet access is available through two Windows-based terminals, or personal devices, which are subject to a daily data quota.

For connecting to the intranet, there is Wi-Fi access public areas of the ship, and ethernet ports in the lab and stateroom spaces.

A color laser printer and a large-format plotter are available in the Main Lab.

A computer technician from Computing Resources operates and maintains the information systems and the standard data acquisition equipment. He or she will be able to assist in ship account creation, general IT services, science equipment operation, interfacing with acquisition equipment, and data downloading. At the end of a cruise, he or she will provide the chief scientist with a copy of the shipboard scientific data collected on the NAS server.

ISOTOPES - (See RADIOACTIVE MATERIAL in this section.)

IMCOS - Integrates shipboard communications, including the public address and alarm systems, CCTV, VoIP, LAN, and TV signal.

INTERCOM - (See INTERNAL COMMUNICATIONS, Section 6.)

LABORATORY SPACES - Please refer to the deck plans for dimensions and layouts of the laboratories and other science spaces. Virtually all scientific spaces are on the main deck. The approximate sizes of the labs and other science spaces are as follows. These are the areas that are clear and unencumbered by such uses as passageways through the space, ship equipment, etc. They therefore may not correspond to areas of the spaces shown on general arrangement drawings.

Both labs and storeroom are fitted with the standard 2' x 2' 1/2" NC bolt-down pattern on deck, accepting bolts which are 1/2" deep. Unistrut mounting channels are on the bulkheads and overheads. An inventory of unistrut hardware and fasteners is maintained on board by the Research Technician.

In sequence from bow to stern, and main deck to 1st platform, these spaces are:

Computer Lab 311 sq. ft.

This is the location of most of the deck electronics for permanent scientific electronics - multibeam, 3.5/12 kHz system, ADCP, etc. The primary work site for the Computer Resources Group technician is here, as are the hubs of the data and video networks and science information system.

Main Lab 1,109 sq. ft.

This is largely flexible general lab space, with extensive utility connections and unistrut capability, configurable to suit the onboard project(s). Permanent starboard tables line the walls of the lab, fitted with ¼”-20 threaded sockets in a 6” x 12” securing pattern. Multiple wooden tables are available to shift around within the lab. There are two fume hoods. The lab has a secondary control station for lab control of trawl winch, needs prior arrangements.

Climate control chambers (2) 50 sq. ft. each

A walk-in chamber, one accessible from the Main Lab, the other from the Wet Lab; the temperature may be controlled from -18C low and +/- 1 C from ambient.; see the Research Technician for temperature setting. There are adjustable shelving units in each.

Wet Lab 372 sq. ft.

With direct access to the staging bay aft, this lab is the site for wet work, wet sample preservation, etc. The lab has a fume hood.

Staging bay 303 sq. ft.

A sheltered workspace. Clearance from overhead to deck is 15 ft. It has a telephone and outlets for compressed air and electricity. Roll down doors, starboard and aft, offer limited protection against weather. Padeye lifting points in the overhead exist. Overhead hoist is installed; 6,000 lb capacity.

Science storeroom 347 sq. ft.

Science storeroom, forward of the winch room on the 1st platform. A pallet-sized (85”x92” hatch to the storeroom opens to the main deck just outboard of the starboard roll-up door of the staging bay.

MAGNETOMETER - - R/V *Sally Ride* does not routinely carry a Marine Magnetics magnetometer, but the use of this equipment can be arranged. Contact Research Technician in advance.

MASTS - *Sally Ride* has a main mast, and a jackstaff. The main mast, above the pilot house, carries radar antennas, navigation lights, various antennas, the ship's anemometers, and flag halyards.

A suite of scientific meteorological sensors (see MET in this section) is on the bow of the ship, on a science mast.

MET - The Shipboard Meteorological Acquisition System (MetAcq) acquires, filters, averages, corrects, displays and distributes meteorological sensor data from a wide variety of sensor types and data input devices.

Meteorological sensors such as ones made by RM Young, Vaisala, Alden, Coastal Environmental Systems, Sea-Bird, FSI, and Omega, and most sensors that have an RS485, RS422, or RS232 digital interface, or any analog sensor that can output a voltage, frequency, or 4-20ma current can be accommodated.

A typical system measures air temperature, barometric pressure, wind speed/direction, relative humidity, shortwave radiation, longwave radiation, seawater temperature, and seawater conductivity. Sensor information is combined with time and GPS position information and displayed on the local video display or web server and written to data files. The main acquisition device is a Linux-based computer. Data can be acquired simultaneously on all enabled ports via a Rocketport serial distribution unit. One or more ports can be configured to support RS485 communications through RS232-to-RS485 converters. Sensors that have analog outputs are first connected to signal conditioning modules that are physically located near the sensor. These modules then convert the analog signal to RS485 that is then routed to the lab. Collected data is stored on data files at user-selected intervals. This interval is typically once every 30 seconds. Acquired data that has been collected from the sensors (uncalibrated) is stored in an uncorrected data file (YYMMDD.UCR). Data that has been corrected by applying the most recent pre-cruise calibration data is stored in corrected data files (YYMMDD.MET, YYMMDD .COR).

Atmospheric meteorological sensors are generally located on either the forward part of the ship on the MET mast (jackstaff) and/or above the ship's upper bridge deck. Sensors that measure seawater properties are generally located near the uncontaminated seawater intake area or in one of the ship's laboratories that has a connection to the uncontaminated seawater line.

At least once a year all sensors are removed from the vessel, refurbished, and calibrated at an appropriate shore-based maintenance/calibration facility. Calibration data for each sensor is kept onboard each vessel and entered into the shipboard acquisition/setup file that is used by the acquisition program to correct sensor data for display and storage.

More information about each individual sensor, and documentation of the software is available in the docs directory inside the provided MET’s data directory.

MULTIBEAM - (See SONAR in this section.)

PRINTERS - There are two networked printers available in the Main Lab:

- HP LaserJet Enterprise M750dn (duplexing color laser printer)
- HP DesignJet 510 42” (large-format plotter)

Printer drivers should ideally be loaded on computers before they are brought aboard the ship, as downloading large files over satellite connections will not be feasible. Inform the Computing Resources Group ahead of time if extensive use of the large-format plotter is required.

PROPULSION - *Sally Ride* is equipped with variable pitch propellers connected to the motor via electric direct drive. A White-Gill azimuthing water-pump bow thruster and Schottel stern tunnel thruster are used for precision maneuvering, dynamic positioning, station-keeping, etc. Thrusters can be controlled independently or integrated through a Kongsberg dynamic positioning/maneuvering system. Dynamic positioning is driven by inputs from GPS or the HiPAP system. *Sally Ride* is capable of accurate station

holding, positioning and track line following in most wind and sea conditions. For fuller details of handling and maneuvering characteristics, consult the captain.

RADIOACTIVE MATERIAL - The use of radioisotopes, or other isotopes in concentrations not found in nature, is strictly controlled aboard *Sally Ride*. Permission to use radioisotopes must be obtained from the SIO Ship Scheduling Office in writing, following written application (which is reviewed by the Radioisotope Committee) describing aims of the work and the isotopes, quantities, and procedures to be employed. Such usage must be consistent with strict precautions for safety and to prevent contamination of the ship. All handling of isotopes must be done within a designated portable isolation van. Vans are available upon request to the Research Technicians. Cleanup costs of any isotope spills will be charged to the persons responsible.

REFRIGERATION AND FREEZING - (See also "Climate Control Chamber" under LABORATORY SPACES in this section.) There are two walk-in lab refrigerators on the ship, one each in the Main Lab and Wet Lab. The ship's cold food storage is NOT available for scientific use. Walk-in refrigerators can be adjusted as low as -18□ Celsius and as high as 1□ from ambient temperatures. A 25-cu. ft. -80 freezer is installed in the science hold and a 3.3-cu. ft -80 Freezer is installed in the main lab.

SCUBA DIVING - All diving from SIO vessels is controlled by the diving officer. Each diver must have a valid University of California Certified Diver Card or have been approved by the diving officer prior to every diving operation. Please obtain a Diving Form from the SIO Ship Scheduling Office. Your dive plan, submitted on this form, must be received and reviewed for approval well in advance of the voyage.

There is no decompression chamber on R/V *Sally Ride*. Arrangements can be made with STS to have a portable scuba air compressor, tanks, and weights put on board.

SEAWATER - There are multiple bibs for seawater incubations on the weather decks. Checking with the deck watch officer is appropriate before hooking up and using any hoses. Seawater for wash-down is available on request. For quantity, flow rate, etc., check with the engineer.

See UNCONTAMINATED SEAWATER in this section for more on feeds to the labs.

SHEAVES & BLOCKS - Use of various winches and wires implies use of certain combinations of sheaves and blocks. In addition, your scientific operation may have particular requirements for fair-leading wires to certain locations. Be sure to check with the ResearchTechnician group

well in advance to explain all your wire rigging ideas and needs. Technicians will know how to best accomplish your task. Never use a sheave that is too small in diameter for the wire.

SHIPPING - Limited stowage on board R/V *Sally Ride* often necessitates shipping equipment and samples. Commercial containers are arranged by the Research Technician Group. Shipments can be made to the ship's agent in ports other than San Diego; contact the Nimitz Marine Facility for the agent's addresses. Agents charge for every service they provide. Please try to consolidate dealings with the agent through either the captain or the Research Technician. Agents should be advised of waybill numbers so they can arrange for transportation, storage and customs. (See also CUSTOMS in this section.)

SONAR - The placement of transducers on the ship’s hull was designed for minimal bubble sweepdown interference.

ACOUSTIC DOPPLER CURRENT PROFILER (ADCP) - *Sally Ride* has a Teledyne RD Instruments 38 kHz, 150 kHz, and 300 kHz ADCP installed which provides vertical profiles of ocean current speed and direction. The system utilizes the doppler effect to measure currents in the water column. When the bottom is within range, an earth-referenced vessel velocity can be obtained which allows for the measurement of absolute currents. Data are processed and current profiles are displayed in real-time on

a color monitor in the Main Lab. Data processing and recording are done on a Linux (Xubuntu) system using UHDAS software. Heading corrections are derived from the ship's motion reference and GPS systems -- these corrections are applied to the data in real-time. Deck boxes are located in the Transceiver Room.

DOPPLER LOG - A JRC NKF-772 doppler speed log is installed in the chart room for ship speed measurements.

FISHERIES RESEARCH - Simrad EK80 with five frequencies - 18, 38, 70, 120 and 200 kHz. Deck boxes are located in the Transceiver Room.

HiPAP - Kongsberg 501 (30 kHz, range to 4,000 m) acoustic positioning system. Kongsberg cNODE and MST (30 kHz) remote transponders can be placed on deployed equipment such as an ROV or net in order to provide the position of that gear in the water column. Deck box is located in the Computer Lab; transceivers are located in the HiPAP room, inboard of the Computer Lab.

K-SYNC - Kongsberg unit with 8 channels, located in the Computer Lab. Increases data quality by reducing interference from multiple echosounding instrumentation outputs. All echosounders onboard are interfaced, and can be set up in a configuration best suited to the scientific goals of each cruise. Consult a Computing Resources technician in advance to optimize the setup.

MULTIBEAM - Deck boxes and other units are located in the Transceiver Room.

- Kongsberg EM122 12 kHz, 150-degree swath mapping system, max depth 11,000 m
- Kongsberg EM712 40-100 kHz, 140-degree swath coverage sector, max depth 3,500 m
- Beams map up to 6 times the water depth (up to 30 km swath widths in deep water)
- Turo Devil Expendable Bathythermograph System (XBT) (one probe launched per day, or as needed, for SVPs)
- Software: Kongsberg SIS (Seafloor Information System) provides a proprietary real-time processed 3D visual data. Scientific parties are welcome to bring their own computers preloaded with relevant software (e.g., MB-System, QPS, Caris, or ParaView) to process and/or visualize the multibeam data.

SINGLEBEAM - There is an array of 16 Massa TR-1075 transducers which operate at 3.5 kHz, and an Airmar CS229 that operates at 12 kHz, both connected to a Knudsen 3260 deck unit for sub-bottom profiling and/or singlebeam depth sounding. The deck units for these transducers are in server racks in the Transceiver Room. The data is digitized and may be stored in SEG-Y format. Data is graphically displayed on the display array in the Main Lab. The 12 kHz transducer can optionally be connected to scientific parties' own deck boxes via a junction box in the Main Lab.

STORAGE - (See entries in this section under LABORATORY SPACES for scientific storeroom, GASES for storage of gas cylinders, and CHEMICALS for storage and use of lab chemicals and hazardous materials.)

SUPPLIES AND EQUIPMENT - On board R/V *Sally Ride* the Research Technician maintains a tool locker from which the scientific party can borrow tools. Return of all tools is a must. In addition, the Research Technicians maintain a stock of office supplies from which scientific parties can draw. Both the tool collection and the office supply stock are modest and limited to commonly used items.

It is not possible to stock everything anyone might conceivably wish to have at sea. Researchers anticipating the use of, for example, an extensive inventory of chemical lab equipment, should consult with the Research Technician ian and plan to supply most of their own needs. Stocking of the ship prior to the beginning of an expedition is done with the expectation of more or less steady use of the items

stocked and, it is hoped, in sufficient quantity to forestall the need to re-equip in overseas ports - an unsatisfactory experience in almost every instance.

A list of inventoried supplies is available from the Research Technician upon request. Local purchase of extra quantities of particular items can be arranged through him/her and should be done as far in advance of departure as possible. Supplies purchased will be recharged to the account of the requestor.

The ship does not carry a standard suite of analytical or special-use equipment. The planned use of equipment such as water sampling bottles, reversing thermometers, box corers, bottom trawls, centrifuges or ovens should be indicated on the Ship Time Request Form, and should be checked in consultation with the Research Technician well in advance. (See also Section 5.)

UNCONTAMINATED SEAWATER - Uncontaminated seawater is provided via a 2-pump system in the bow thruster room connected to the Main Lab via plastic piping. There is also an incubator pump connected to the deck for use in incubations and wash downs. Please check with duty engineer for hookups of supply and drainage.

VANS - *Sally Ride* can carry multiple laboratory, refrigeration, and storage vans. Two vans can be sited aft of the Main Lab. Two more vans can be stacked atop those, with access from the foc'sle deck, port side. Three vans can be placed on the bow of the ship on the 01 deck.

Plans to use any vans should be indicated on the Ship Time Request Form and details should be discussed with the Research Technician well in advance of departure.

WINCHES - The Markey traction winch with rated line pull 25,000 lbs at 45 m/min is located in the winch room on the 1st platform level. Two stowage drums can carry up to 12,000 m 9/16" 3x19 torque-balanced wire rope, 10,000 m 0.680" EM cable, or 10,000 m 0.681" EOM cable. Fiber optic cable can also be used. Wire is led overboard through the A-frame aft.

CTD/hydro winches: Dual Markey CAST6 with motion compensation and rend & recover modes, each with rated full drum capacity of 14,000 m 0.322" electro-mechanical (EM) cable, 12,000 m 0.375" 3x19 torque-balanced wire rope, or 10,000 m 0.393" electro-optical-mechanical (EOM) cable. Wires lead over starboard side via Allied crane articulating booms.

A towed magnetometer with winch can be carried on the fantail; see MAGNETOMETER for details.

Assorted portable winch and wire combinations available for cruise-specific requirements.

WIND & SPEED DIRECTION INDICATORS - (See MASTS in this section.)

WIRE - A log is maintained by the chief engineer documenting the actual wire on each winch at any given time. The working end of every wire is occasionally cut off and the termination replaced, and this can sometimes amount to 100 meters or more, if damage has been sustained by the wire.

It is important that expected water depths of planned operations be made known to the Research Technician and the marine superintendent as far in advance of these operations as possible, to ensure that adequate wire is available. Lead times on the purchase of new wires can amount to a year.

XBT - A Turo Devil XBT system used with Sippican Fast Deep probes is permanently installed. It is available for general use, but stocks of XBT probes beyond the one per day budgeted for calibration of the multibeam system must be user-supplied.

Section 5: Technical Services and Special Equipment

Shipboard Technical Support (STS)

STS provides science support services and general use equipment for the Scripps research vessels. Levels of services and facilities depend on the mission, capabilities and requirements of each cruise and are negotiated with the manager of STS in advance. The specific capabilities and services of the 5 groups within STS are as follows:

Electronics Technicians Group (SEG)

Electronics technicians maintain, troubleshoot and repair oceanographic equipment such as oceanographic electronic instrumentation, CTDs, environmental sensors, equipment frames, water sampling systems, underwater vehicles, shipboard data acquisition systems, and meteorological sensors. They assist with loading and installing equipment on-board ships. They also assist in deploying recovering equipment over the side and assist in data collection operations as well as participate in laboratory analysis. While ashore, they prepare equipment and spare components for use on oceanographic expeditions, maintain inventory of spare parts, and provide electronic support to ships in port and technical support to ships at sea via satellite. In addition, they participate in the design, construction, and testing of oceanographic projects.

RESEARCH MARINE TECHNICIANS GROUP (RESTECHS)

ResTechs serve as liaison between our mariners and seagoing scientists. The Research Technician who is assigned to R/V *Sally Ride* for a particular cruise contacts the chief scientist during the planning stage of the cruise to provide ship-specific information and to determine the needs of the scientific party. During this first contact the Research Technician offers the ship's handbook, drawings, and inventory of shared-use equipment, and describes features and equipment of the ship. Also, the technician explains the group's function and responsibilities as they relate to the scientific party's requirements to launch and recover over-the-side equipment.

The RMTG is the point-of-contact for scientific logistics. They work with the scientists and research groups to provide Port and Agent details for the ship to assist with the shipping and receiving of equipment and supplies. It is the science party's responsibility to get their required equipment to the ship in timely manner, then to work with the Research Technician to have an acceptable plan for loading and securing this equipment on the ship.

These technicians assist with planning the deck load and laboratory setup. They operate forklifts on docks and the cranes on all ships, and supervise loading and unloading of scientific equipment and supplies. They report the load plan with weights of large items to the ship's captain for stability calculations.

Sampling Equipment maintained by Research Technician:

- giant gravity corer
- rock glass corer
- IKMT mid-water trawl
- portable labs
- inflatable boats & motors
- chest freezer
- bench crimpers
- meter plankton net
- neuston net
- multicorer

- box corer
- lab refrigerator
- isotope isolation
- MOCNESS Sampling System with Single 1m square frames
- CTD with water sampling rosette and auxiliary sensors

BIOLOGICAL SAMPLING - A limited suite of biological sampling equipment can be provided on board *Sally Ride*. This includes an Isaacs-Kidd midwater trawl (10' mouth), a 1 m plankton net, a 1 m neuston net, and assorted dip nets. Contact the Research Technician regarding this equipment.

Sample storage bottles, labels, preservatives, sorting apparatus, microscopes, etc. are not stocked, and are the responsibility of interested investigators.

COMPUTING RESOURCES (STS-CR)

During normal operations at sea, members of Computing Resources on R/V *Sally Ride* perform maintenance, repair, and calibration on the installed computer systems and the peripheral equipment attached to the computers. They also perform the same functions on all scientific electronics and instrumentation interfacing with the computer systems. These systems include the magnetometer, CTD, meteorological and underway water sensors, MRUs, GPS receivers, XBT, 3.5 kHz and 12 kHz echosounder systems, EM122 and EM712 multibeams, EK80, RDI Acoustic Doppler Current Profiler, BGM-3, WaMoS, K-Sync, and HiPAP.

Other tasks performed by members of Computing Resources at sea include the setup of cruise-specific hardware and software applications, and continuing work on the development and improvement of the hardware and software systems. They also monitor data collection systems to verify the accuracy of data, and instruct the scientific party and ship's crew in the use of computer-generated navigational aids and other computer-related equipment. They maintain the data display systems, and archive data for distribution via a central NAS server on the ship, and to national repositories ashore. On transit cruises, this group is responsible for acquiring and archiving underway scientific data. (See also INFORMATION SYSTEMS AND DATA ACQUISITION, Section 4.)

SHIPBOARD GEOPHYSICAL GROUP (SGG)

The Shipboard Geophysical Group (SGG) maintains a High Resolution Portable Multi-Channel Seismic (MCS) system. The seismic system includes all accessories required for deployment and acquisition, including portable computers and displays. SGG also maintains specialized Big-Eye binoculars, night vision devices, and other accessories required for Protected Species Observation (PSO) efforts during MCS cruises. The portable MCS system is typically supported by 3-4 technicians and a dedicated compressor technician when air guns are in use. More details for geophysical equipment are available upon request.

Geophysical Equipment

Deck Equipment

- 48 channel solid GeoEel streamer (6.125m group spacing)
- 48 channel liquid GeoEel streamer (12.5m group spacing)
- 2 GI 210 cu. in. Sercel acoustic sources
- Digicourse Bird Streamer Level system
- 2 Streamer winches

- 2 GI winches
- Hydraulic Power Unit (HPU)
- Air line control panels
- Compressor fuel tank

Lab Equipment

- 2 portable computer racks
- GeoEel Controller
- Digicourse Bird Controller
- HotShot Source Controller
- Navigation Controller
- Doodlebug Data QC Controller

PSO Equipment

- Big-eye binoculars
- Reticule binoculars
- Night vision binoculars

OCEANOGRAPHIC DATA FACILITY (ODF)

The Scripps Oceanographic Data Facility supports expeditions of SIO and other institutions' scientists with CTD, rosette, and bottle sampling (2-250 liter); measurements of salinity, dissolved oxygen, and nutrients; thermometry; calibration; and full data processing and merging services. ODF is unique among STS groups in that a significant portion of its activity is in support of investigations on non-SIO vessels. Hence ODF is in part an SIO facility (and wholly an SIO facility in a business sense), but also in part a de facto national facility.

ODF resources include a chemistry laboratory, an electronics shop, a CTD laboratory, and a data processing and computer facility which supports both shipboard and shore-based processing, including real-time processing of CTD data. Electronics design work for many different applications is a routine activity. ODF has access to the facilities of the Scripps laboratories and shops, including the Hydraulics Laboratory and the Scripps Marine Science Development Facility, where we have constructed numerous 12- 48-place rosette frames and sample bottles from 2 to 10 liter capacity.

Major pieces of equipment and equipment systems are:

- Sea-Bird 6,000m CTD
- Multiple rosette systems, from 6 to 36 sampling bottles
- 1.7- to 30-liter sampling bottles
- Seapoint fluorometers
- Shore-based data processing and archiving systems
- Automated oxygen titration systems
- AA3 4-channel nutrient analyzers for PO4, SiO3, NO2, NO3
- Full ocean depth electronic package and spares
- Shore-based laboratories, shop, and calibration facilities

Section 6: Navigation and Communications Capability

Sally Ride is equipped with an extensive suite of navigation and communications instruments and devices. This equipment allows precise navigation and control of the ship and worldwide communications in voice and data. A number of the more prominent systems and devices are listed below and described.

CELLULAR TELEPHONE - The captain is equipped with a cellular telephone, but R/V *Sally Ride* normally operates beyond the range of cellular networks. While in port, the Computing Resources technician will explore options to provide 3G/4G LTE for the ship to use as the main source of Internet.

DATA COMMUNICATIONS - (See SATELLITE COMMUNICATIONS in this section.)

DEPTH RECORDING - There is a fathometer on the bridge. Maximum reliable soundings are ~300 meters.

Deep sea soundings are accomplished with the EM122 or EM712 Multibeam, or the 3.5/12 kHz echosounder system. (See SONAR in Section 4.)

DIRECTION FINDING EQUIPMENT - A direction finder is installed in the pilot house. It is primarily used for locating beacons from moorings, AUVs, etc at sea. Transmitters for use with this system are provided by the scientific group or arrangements for the appropriate equipment can be made with the Research Technicians.

GYRO COMPASS - *Sally Ride* carries two Sperry Mark 37 gyro compasses. A number of electronic devices, including ship's navigation systems, use inputs from the gyro compass. Science acquisition primarily uses the Seapath 330+ and IXSEA Hydrins MRUs.

HAND-HELD RADIOS - The ship normally carries portable VHF and UHF marine radios. They are used for internal communications and small boat operations.

INTERNAL COMMUNICATIONS - Three installed systems facilitate internal communications around the ship - a household-type dial telephone, a sound-powered phone system and a mission announcement system. The directory for the dial phone system is posted next to each phone. The sound-powered phone has no external power supply. A list of stations is posted on each phone. To call using the sound-powered phone select the desired station. Crank the handle two or three times to ring the phone, press the button on the handset and talk. The button on the handset must be pressed both to talk and to listen. A public-address system is operated from the bridge. It is used to make urgent pages and for emergencies. Instructions are posted by the various units.

NAVIGATION EQUIPMENT - *Sally Ride* navigates primarily by JRC JLR-4341 DGPS. A doppler log is utilized for speeds. A full set of traditional navigation equipment is maintained onboard.

RADAR - Two JRC marine radar are carried: an S-band (10 cm) and an X-band (3 cm). Radar consoles are located on the bridge. Do not touch this equipment without permission of the mate on watch. A WaMoS X-band wave radar with 1.5 nautical mile range is also installed.

HF/SSB COMMUNICATIONS - GMDSS radio suite carried aboard.

SATELLITE COMMUNICATIONS - HiSeasNet C- and Ku-band-capable is the primary satellite communications system on board. In the best-case scenario, it is capable of 2Mbit/s download (burst), and 512kbit/s upload (sustained). This connection is shared with other UNOLS vessels in the same ocean region. Additional bandwidth can be purchased, but must be arranged months before a cruise, and usually requested during the pre-cruise meeting. A dual Inmarsat FleetBroadBand L-band satellite system is the backup. There is global coverage for HiSeasNet and FleetBroadBand.

This ship has Internet, but it's not like the Internet you have at home. We make our Internet connection using multiple satellite and cellular systems, none of which are as fast as you're used to. We're making every effort to provide the best Internet experience possible for everyone aboard sharing our connection.

We've implemented the following measures to make Internet usage equitable for everyone on the ship:

- Each user on the ship receives a network account with a daily data quota.
- To access the Internet, log in to a captive portal webpage.
- You can also check your daily data usage from a webpage.
- Connect to the Internet on one device at a time. Log out from the device before logging in with another.
- Log out from the Internet when you aren't using it to reduce unintentional background usage.

Certain websites and services that use a lot of bandwidth may not be available, and should not be accessed:

- Streaming audio/video (e.g., YouTube, Vimeo, Pandora, Spotify, Facebook Video)
- VoIP applications (Skype, other audio/video phoning applications)
- Cloud-based services (iCloud, DropBox, GoogleDrive, Microsoft OneDrive)
- Software auto-updating and device backups (Windows Update, Apple Software Update, CrashPlan, Photos)

Webmail is more efficient than standalone IMAP or POP email clients. Keep attachments small.

We recommend that you do the following before you reach the ship:

- Download and bring with you large files (manuals, software, drivers), including drivers for shipboard printers.
- Install and test critical software on the computers you're bringing to the ship, ahead of time.
- Ensure that your applications do not require a persistent Internet connection (Office 365, some MatLab licenses).
- Sync your email archives to your local device, and limit the size of messages to download.
- Download a web browser plug-in that allows you to turn off images when they're not necessary.

When you're aboard the ship:

- Ensure that your devices do not auto-update or auto-backup to off-ship servers.
- Use low-bandwidth mobile websites instead of the full sites.

Don't worry if you don't know how to do this; we can help: sts-cr@ucsd.edu .

SEARCH LIGHTS - There are two installed search lights to facilitate certain operations at night.

SPEED LOG - (See SONAR, DOPPLER LOG in Section 4.)

VHF COMMUNICATIONS - (See HAND-HELD RADIOS in this section.)

Section 7: Safety

BOATS AND LIFERAFTS - The ship carries four automatic-release, self-inflating life rafts. They are in cradles on the 02 deck forward, two on each side, each with a capacity of 35 persons each. The rafts are

numbered 1-4 with the even numbers on the port side and the odd on the starboard. All personnel aboard are assigned to one of the life rafts (see station card attached to your bunk for raft assignment).

There is a rescue boat located on the port side 02 deck. This boat can be quickly deployed and would be used by the Rescue Squad in an emergency, such as "man overboard." Please do not tamper with this or any other safety equipment. If you have questions about any of the equipment ask a crew member.

EMERGENCY DRILLS - A fire and abandon ship drill must be held within 24 hours of leaving port and once every seven days thereafter, by Coast Guard regulation. Fire and abandon ship station bills are posted throughout the ship. Individual billet numbers and responsibilities are posted on small cards near each bunk. For convenience, individual billet numbers also correspond to cup and mug numbers. There are two U.S. Coast Guard-approved "personal flotation devices" (lifejackets) in each stateroom for the occupants. Upon room assignment, all scientists should familiarize themselves with their fire and boat stations, memorize their billet numbers, and learn where their lifejackets are stored and how to wear them properly. Lifejackets are to be worn during all drills.

With the captain's permission, the chief scientist may assign a "skeleton watch" to remain in the lab during fire and boat drills. Proper dress (i.e., long pants, hats, shoes, shirt, etc.) is required at all drills. Bare feet, flip-flops, and shower shoes are unsafe on deck.

Life rafts are for emergency use only. *Sally Ride* carries cold water survival suits for all people onboard, which are in the staterooms.

MEDICAL MATTERS - The ability of the ship to handle medical emergencies is limited. There are first aid kits, a stocked sick bay, officers have limited first aid training and help can be summoned by Internet. The best course of action is to prevent emergencies.

To this end:

- Do not try to disguise or pass over any abnormal conditions you may have, especially any which might manifest suddenly and require treatment.
- Prevent injuries by thinking safety all the time. Watch for dangerous situations - fix them or bring them to the attention of someone who can.

Sally Ride currently has Medical Advisory Systems contracted to provide medical assistance via Internet.

PERSONAL FLOTATION DEVICES - You will find your lifejacket in your assigned room. It should be equipped with a whistle on a lanyard and a waterproof light. All lifejackets also have reflective patches attached front and back near the shoulders. Lifejackets are important safety devices; they should not be left about the ship, used as cushions or pillows, etc. If there is a problem with your lifejacket or it is missing, notify the mate on watch who will make arrangements to take care of the problem. Work vests are provided by the ship and are located in a locker in the mud room forward of the Wet Lab. These vests must be worn when the safety lines are down or if you are involved in over-the-side handling of equipment.

SHIPBOARD SAFETY - Seagoing operations are by nature hazardous. Strict compliance with safety at-sea precautions is necessary to prevent injury to personnel and damage to the ship.

There should be someone in the lab whenever deck operations are being conducted to maintain the communications link between the lab, work site on deck, and bridge. Deck operations should be discussed well in advance whenever possible with safety and efficiency foremost. The bridge should be informed of all deployments before anything is put over the side and then deployed only from the designated place. At night or during heavy weather no one should go out on the working deck without informing the bridge. Permission must be obtained from the bridge prior to turning on any deck lights or

operating any equipment on deck. Work vests shall be worn by everyone on the working deck whenever the lifelines are down. Safety is everyone's business.

Hard hats are required for any overhead operations (e.g., crane lifts, over-the-side deployments, etc.). These are provided by the ship and are stored in the mud room forward of the Wet Lab.

Due to vessel motion in heavy seas, the scientific party members should insure that all of their equipment is securely lashed down and properly stowed. It is the chief scientist's responsibility to insure that this task has been accomplished. If you see any items not secured properly and are in doubt as to how to stow or lash it down, ask the Research Technician or any crew member for assistance.

A shipboard fire is the most dangerous and most prevalent hazard encountered at sea. It is also a hazard that can be easily prevented by common sense and simple precautions. Careless smoking habits are responsible for the majority of shipboard fires. Remember: while at sea, you can't run away from a burning ship.

Keep all doors and hatches secure at all times. Either latch it open with the hook supplied or close it tight. Never allow doors or hatches to swing freely with the roll of the ship. Be aware of air conditioning boundaries and leave these doors shut at all times. When opening and closing doors, be courteous to sleeping shipmates and do not let the door slam shut.

Stand clear of all wires, ropes and blocks which are under stress. Do not handle any moving wire or rope.

Pick up, clean up, and securely stow all loose gear after each use. Do not walk away from any piece of loose equipment-- even if it is not yours, tie it down.

Wear proper shoes when working on deck. Sandals or other flip-flop type of footwear which cannot be securely fastened to one's feet are unsafe and will not be tolerated for deck work.

MAN OVERBOARD - If someone has the misfortune to fall overboard, first pass the word to the bridge, "MAN OVERBOARD," designating which side if possible. Next throw one of the strategically located life rings over the side to mark the spot and provide flotation. At all times, you should keep your eyes on the person; it helps if you point to the victim. This assists the bridge and other watchers in keeping the person in sight. If underway, the bridge watch will maneuver to keep the props clear and recover the person, or if circumstances permit, launch the rescue boat. The sound signals for MAN OVERBOARD are 3 long blasts on the general alarm and ship's whistle.

Section 8: Ship Organization

HOUSEKEEPING - Clean towels and linens are available at the beginning of the voyage. At the end of the cruise, bunks should be stripped and soiled linen taken to the place designated, usually the laundry room.

Public heads and passageways are cleaned by the crew. The scientific party is responsible for cleaning science staterooms and heads and the laboratories. The responsibility of regularly sweeping out the laboratories is assigned by the chief scientist. All laboratories and scientific party rooms should be thoroughly cleaned before departing the vessel at cruise end. Cleaning gear is available throughout the vessel in cleaning gear lockers; if you can't find it, ask. Common courtesy calls for the scientific party members to pick up after themselves. Good shipmates leave their quarters or work areas cleaner than they found them.

Fresh water is a precious commodity at sea and must not be wasted. In ports, foul harbor water may prevent operation of desalinators, and the local fresh water may be unsafe to take aboard. Conservation of freshwater is therefore a must. Salt water should be used on deck when possible. "Navy" showers (i.e.,

rinse-soap-rinse, turning off water between times) should be practiced. Full washer loads make best use of water.

Washing machines, laundry soap, bleach, and dryers are available. They are used on a first-come-first-served basis. The only request is for users to do full loads of laundry so as to conserve fresh water. A laundry sack is stationed in this area to collect soiled sheets and towels from the ship's supply.

The ship's sanitary system cannot handle cigar and cigarette butts, sanitary napkins, etc. Please dispose of such items properly.

Although there is no standard for dress aboard, mature judgement and decorum are expected.

MESS HALL - The mess deck has seating for 24. This is about half of the full ship's complement, so personnel should not loiter during or immediately after meals. Watchstanders are customarily served first. Meal hours must be respected. Shirts and foot coverings are required at all times in the mess hall.

Meal hours at sea are:

- Breakfast: 0730-0815
- Lunch: 1130-1215
- Dinner: 1700-1800

The mess hall is cleared 45 minutes prior to and after meal hours to allow for setup and cleanup. Messing is cafeteria style. It is most important that all persons bus their own dishes and clean up after themselves. When stores arrive at the ship, all hands help load.

Except in extraordinary circumstances, meals are to be eaten in the mess, not in labs. If it is necessary to bring food into labs for important science operational reasons, bus the dirty dishes and scraps back to the mess area afterward; do not use the lab trash containers.

Cups and mugs disappear at sea. Therefore, everyone is assigned a coffee cup and a drinking cup, marked with their berth number. Use your own, only. If yours disappears, please look for it before asking for a replacement; there may not be one. The chief scientist should work out with the captain any special eating schedules for scientific watchstanders and station times.

SHIP'S CREW - The complement of 20 is the captain, 3 mates, the boatswain, 3 able seamen, 1 ordinary seaman, the chief engineer, 3 assistant engineers, 1 electrician, 4 oilers, and 2 cooks.

The mates are the officers of the watch. The duty station for all operations, including station work, is the bridge, since fantail and other weather decks may be monitored from the bridge wings.

The assistant engineers and the electrician, if necessary, man the watch in the engine room. When winches are required for station work, call the bridge to arrange for a winch operator.

The electrician is primarily a "day-worker," unless included in the engine room watch rotation.

The boatswain also is a "day-worker," responsible for general ship upkeep. The able seaman on watch assists him/her or the officer of the watch, as required, and the A.B.s and ordinary seaman are primarily responsible for daily cleaning of the ship.

The boatswain will operate the ship's heavy cranes if requested. Otherwise, the Research Technician performs this task.

If assistance from any crew member is needed by the scientific party, it is recommended that such requests be routed through the officer of the watch. Requests for a winch operator should always go to the bridge.

It should be kept in mind that requests for after-hours work by any of the crew are treated as overtime, and should not be placed unless urgently needed, and then through the captain or chief engineer as appropriate.

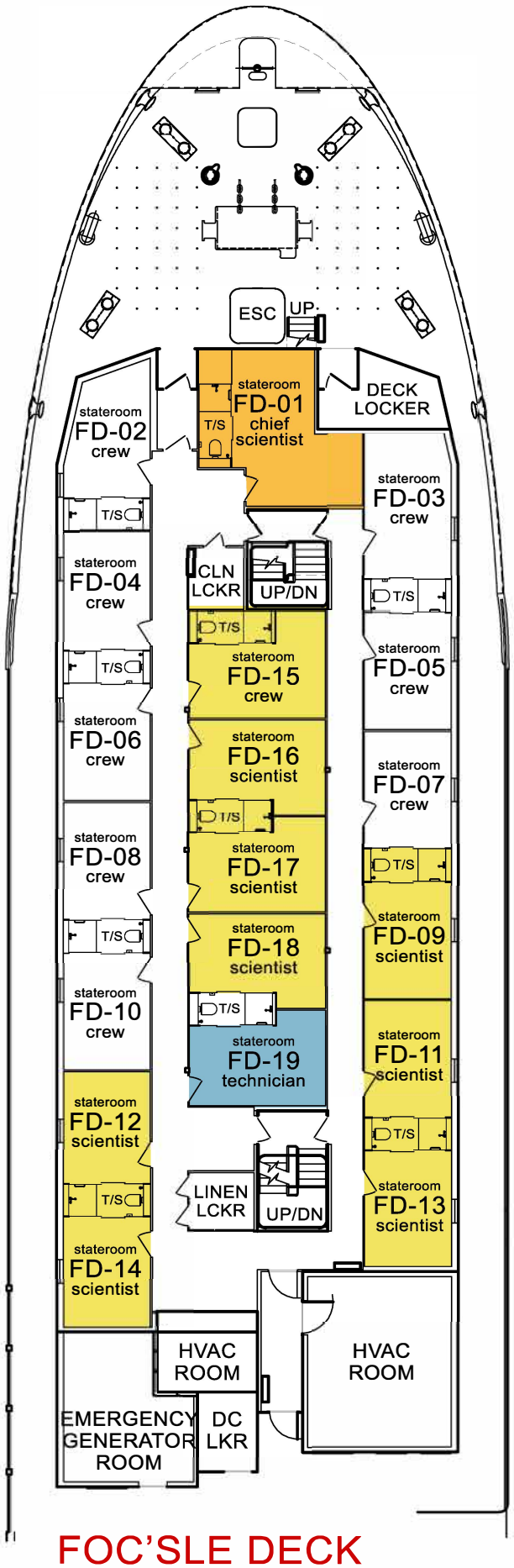
Section 9: Scientific Berthing Plan

Sally Ride has berthing for twenty-five scientists. Two of these berths are reserved for Scripps marine technicians who sail aboard every cruise, and are included as members of the science party. The remaining twenty-three scientist berths are assignable by the Chief Scientist for members of the science party.

Berthing for most scientists is located on the fo'c'sle deck (one deck above the main deck). Staterooms are double-occupancy and share a head with an adjacent two-person stateroom, except for the Chief Scientist Stateroom, which has its own head.

Our spacious three-person stateroom on the main deck is designed to accommodate wheelchair access. This room has a bunk bed plus a single bed, and has its own large head.

R/V Sally Ride's marine technicians are berthed in designated staterooms. In the event of a full ship, the upper bunks in these rooms may be assigned to scientists number 22 and 23, once all other bunks have been filled.



FOC'SLE DECK

Research Vessel

SALLY RIDE

• AGOR 28 •

FO'C'SLE DECK SCIENTIFIC BERTHING

Eighteen (18) scientists in double staterooms

One (1) scientist in a double stateroom shared with marine technician

FD-01 Upper _____
Tel: 301 ID number: 24 Lifeboat: port #2
Lower _____
ID number: 22 Lifeboat: starboard #1

FD-09 Upper _____
Tel: 309 ID number: 41 Lifeboat: starboard #3
Lower _____
ID number: 42 Lifeboat: port #4

FD-11 Upper _____
Tel: 311 ID number: 39 Lifeboat: starboard #1
Lower _____
ID number: 40 Lifeboat: port #2

FD-12 Upper _____
Tel: 312 ID number: 33 Lifeboat: starboard #3
Lower _____
ID number: 34 Lifeboat: port #4

FD-13 Upper _____
Tel: 313 ID number: 37 Lifeboat: starboard #3
Lower _____
ID number: 38 Lifeboat: port #4

FD-14 Upper _____
Tel: 314 ID number: 35 Lifeboat: starboard #1
Lower _____
ID number: 36 Lifeboat: port #2

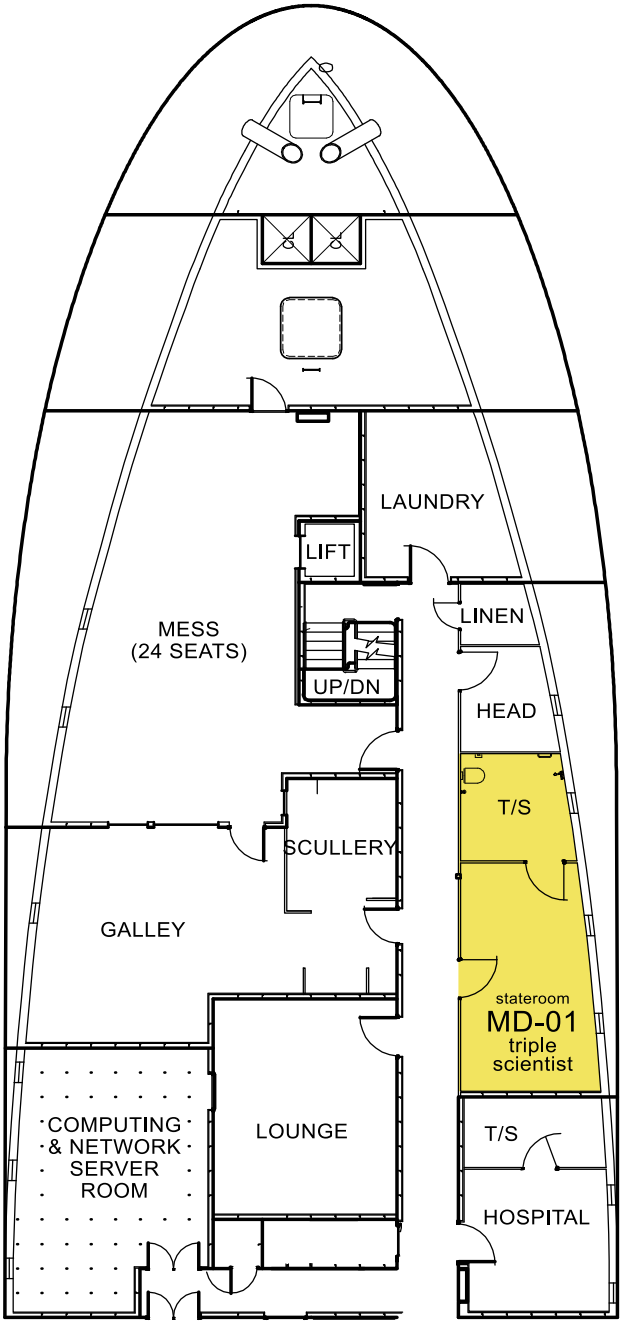
FD-16 Upper _____
Tel: 316 ID number: 25 Lifeboat: starboard #3
Lower _____
ID number: 26 Lifeboat: port #4

FD-17 Upper _____
Tel: 317 ID number: 27 Lifeboat: starboard #1
Lower _____
ID number: 28 Lifeboat: port #2

FD-18 Upper _____
Tel: 318 ID number: 29 Lifeboat: starboard #3
Lower _____
ID number: 30 Lifeboat: port #4

FD-19 Upper Fill only if all other bunks full
Tel: 319 ID number: 31 Lifeboat: starboard #1
Lower Computer Technician
ID number: 32 Lifeboat: port #2

Research Vessel
SALLY RIDE
• AGOR 28 •



MAIN DECK SCIENTIFIC BERTHING

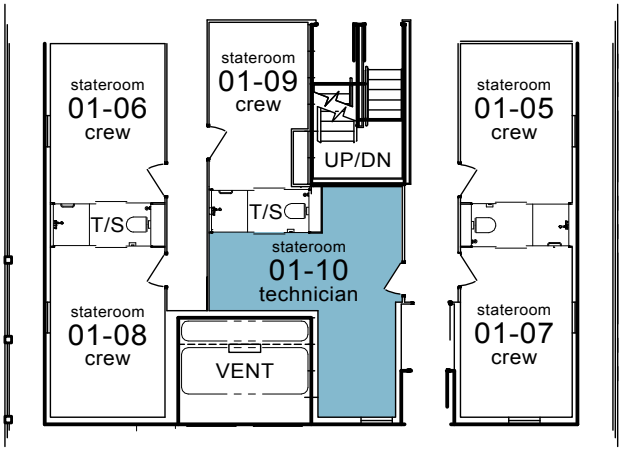
Three (3) scientists in spacious triple stateroom

MD-01 Upper _____
Tel: 402
ID number: 43 Lifeboat: starboard #3

Lower _____
ID number: 44 Lifeboat: port #4

Single _____
ID number: 45 Lifeboat: starboard #1

MAIN DECK



01 DECK SCIENTIFIC BERTHING

One (1) scientist in a double stateroom shared with marine technician

01-10 Upper Fill only if all other bunks full
Tel: 210
ID number: 23 Lifeboat: starboard #1

Lower Reserved for ResTech
ID number: 21 Lifeboat: starboard #1

01 DECK