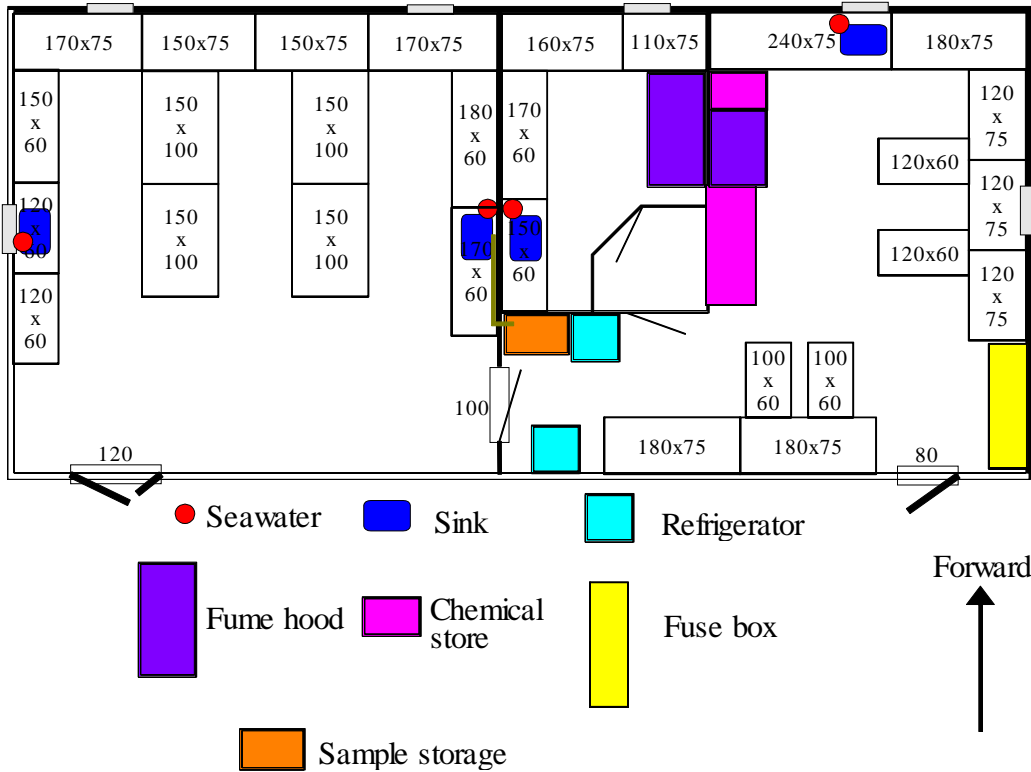


**ODEN Science Capabilities  
For USAP ORW**  
21 December 2007  
Karl Newyear

## Laboratory and Deck Space

Main Laboratory (dimensions in centimeters)



### Laboratory Space

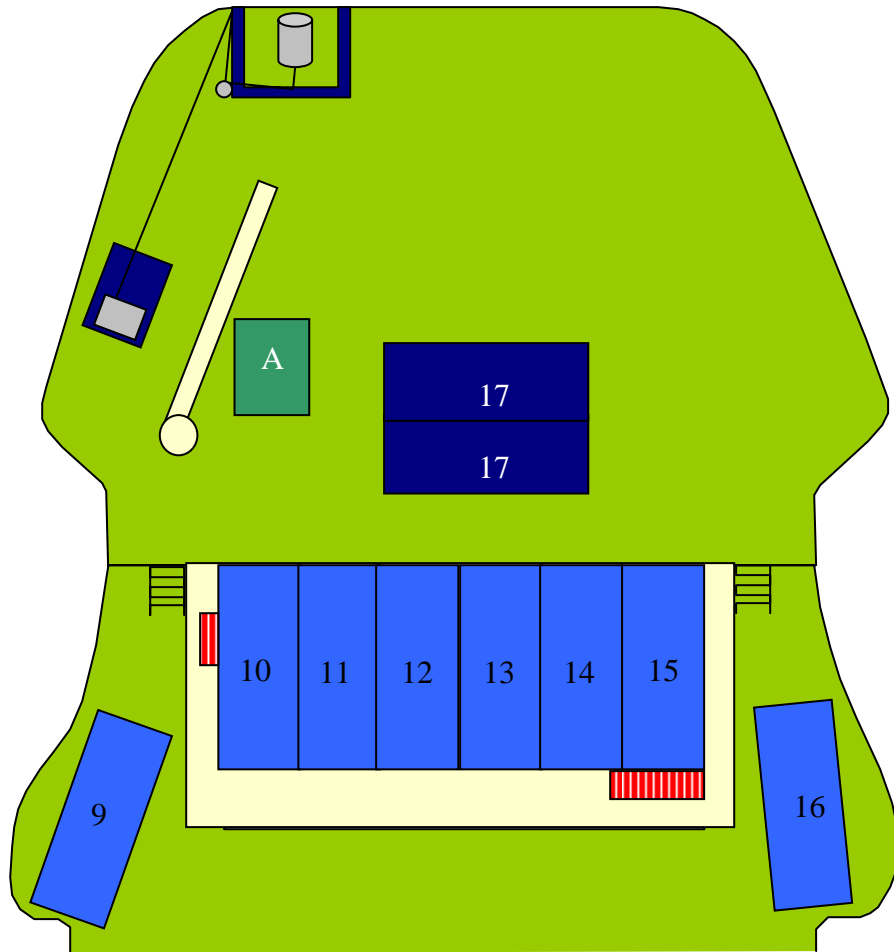
The Wet Lab is on the port side, the Dry Lab is on the starboard. These labs and the Environmental Room occupy 90m<sup>2</sup> of floor space. 230V/50Hz/2Ø (no neutral) electrical power is available in all labs and lab vans. Plugs are European Standard. The Environmental Room is a HEPA filtered, positive pressure room containing benchtops, uncontaminated seawater feed, sink, and laminar flow hood. It is not refrigerated.

### Science Sea Water System

There are two uncontaminated seawater systems running to the main lab. One has PVDF piping and one has stainless steel. Each system can deliver up to 40 liters/minute. There are 4 outlets for each pipe in the main lab as shown above. The intake is at the deepest part of the hull, approximately 8.5 meters below waterline, and can be backflushed if it becomes clogged with ice. There is no de-bubbling system. There is a temperature probe at the intake and a thermosalinograph in the Main Lab. Grantee-provided sensors can be added to the 8 outlets. Plumbing connections of various diameters are available aboard the ship but hoses and specialty hardware for connections to the instruments must be brought onboard by the scientists.

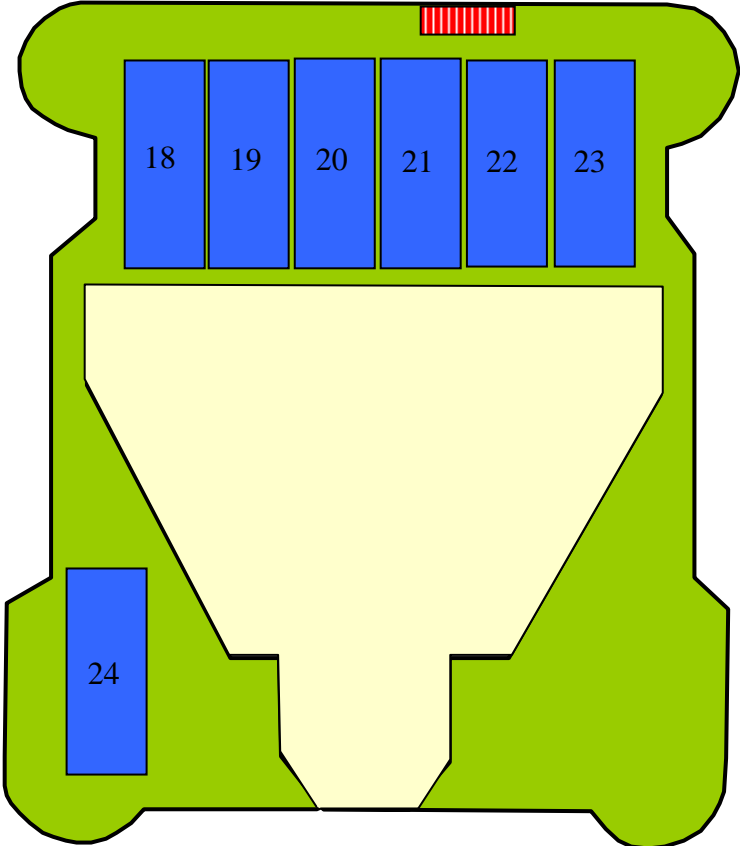
## Foredeck

Numbered boxes are locations for 20' lab containers. #17 is the double-wide CTD garage. #10 through #15 are on top of the Main Laboratory. #9 and #16 are on the Main Deck level. Moon pool (approx. 1 meter diameter) with davit available on starboard side, aft of van position #16. The CTD A-frame is removable from the deck. "A" indicates a footprint for a 10' container.



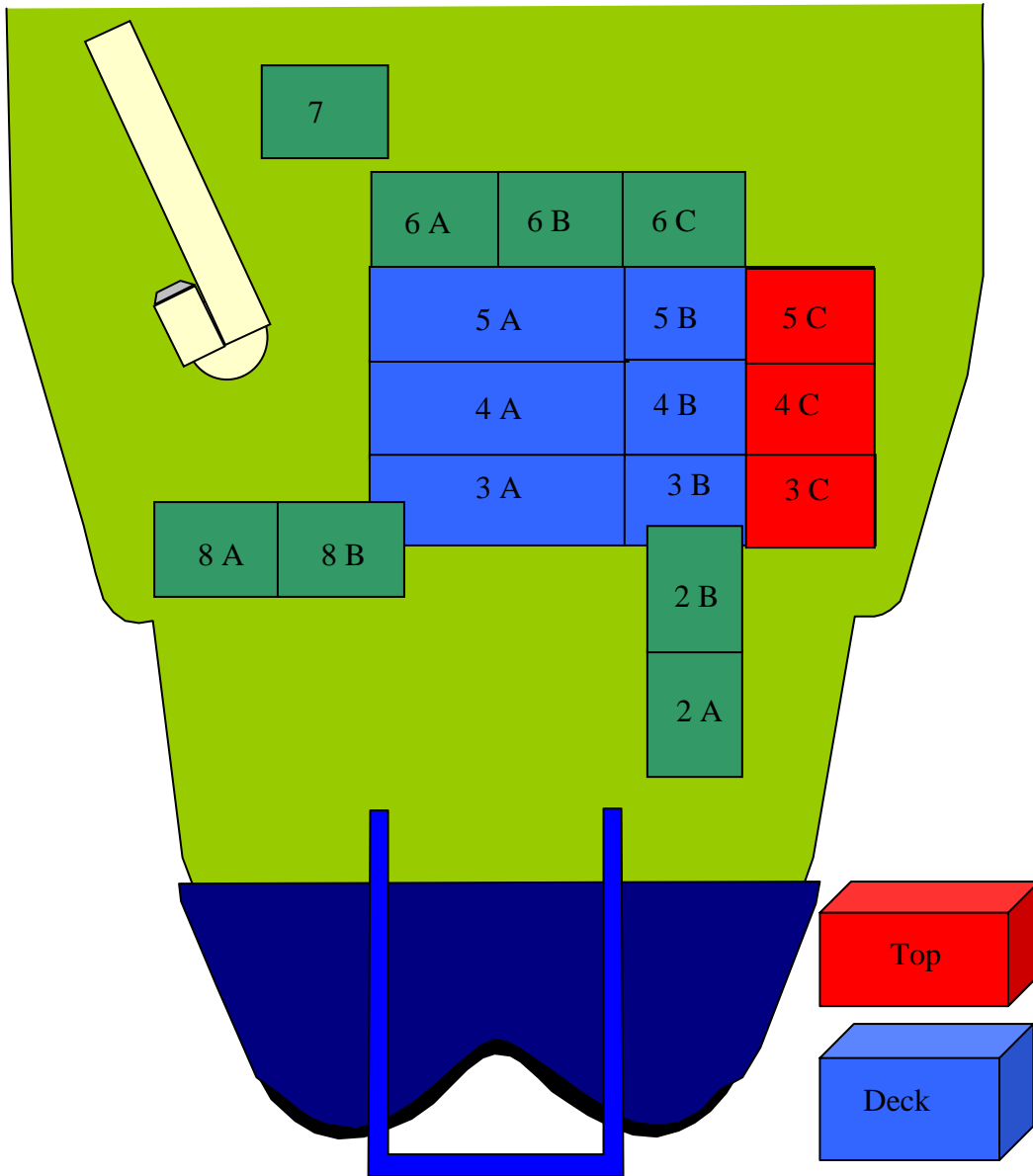
# 04 Deck

Numbered boxes are locations for 20' lab containers.



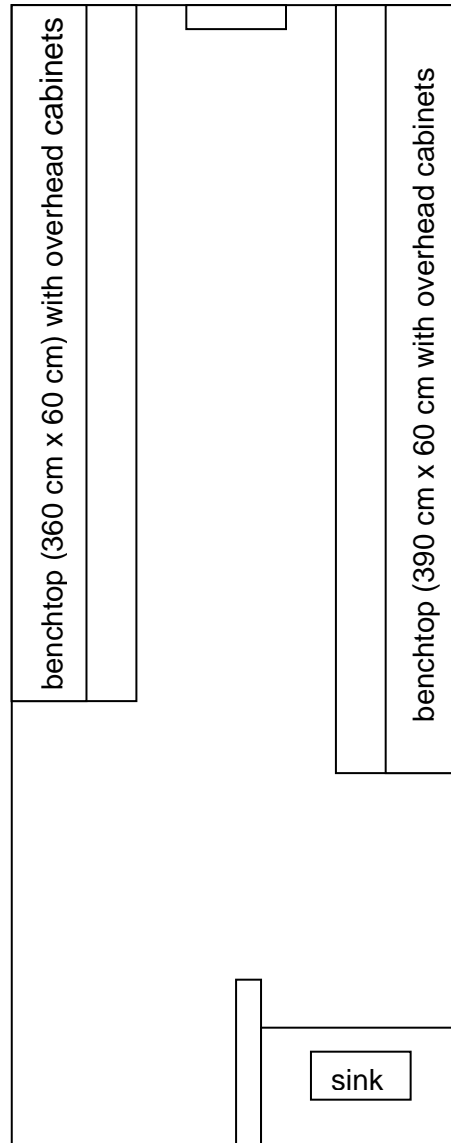
## Aft Deck

Numbered boxes are locations for lab containers. Green indicates 10' containers, Red and Blue indicate 20' containers.



## Laboratory Container

Plan view of standard 20' Swedish laboratory van. Swedish lab vans are equipped with 220V/50Hz electrical power, shipboard computer network, telephone, hot and cold water, and pressured air.



Laboratory Vans available from the USAP include:

- Radioisotope Van

- Refrigerated Lab Van

- Lighted/Refrigerated Incubator Van

- Motor-Generator Van (to convert ship's 380V/50Hz electricity to US 220V/60Hz and 440V/60 Hz)

# Major Systems, Instruments, and Equipment

## Electricity

- Ship's electricity is 380V/50Hz/3Ø (floating ground).
- USAP can provide Motor-Generator van to convert to 110V/60Hz/1Ø, 220V/60Hz/3Ø, and 440V/60Hz/3Ø power. This van requires one laboratory van footprint.
- Benchtop transformers can be provided by USAP to convert voltage, but not frequency.

## Underway Systems and DAS

- Thermosalinograph, SeaBird model 45, in Main Lab
- External temperature, at uncontaminated seawater intake
- Ship position, speed, and course (GLL, GGA)
- Ship heading (HDT)
- Relative wind speed and direction
- True wind speed and direction
- UV radiometer
- Water depth
- Barometric pressure
- Air temperature
- Relative humidity

## Water Sampling

- CTD garage van, including cart to move CTD package from A-frame to garage.
- A-frame, extendible, on foredeck, SWL 1.6 tonnes.
- CTD winch, Seaproof Solutions, with remote control.
- CTD wire, electromechanical, 8.15 mm, 2-conductor, 6000 meters.
- Metering block, for use on foredeck A-frame with CTD system.

## Uncontaminated Seawater System

- Stainless steel line, 40 liters/min, available in port and starboard Main Lab and Environmental Room.
- PVDF line, 40 liters/min, available in port and starboard Main Lab and Environmental Room.
- No uncontaminated seawater feed to decks.

## Purified Water

- Millipore Direct-Q3 (3 liters/hour).

## Temperature-Controlled Storage

- -80°C chest freezer, 50 liter volume
- -20°C chest freezer, 200 liter volume
- -20°C upright freezer, 30 liter volume, 4 each
- +4°C upright refrigerator, 60 liter volume, available in lab vans

## Hoods

- Fume hood, in starboard Main Lab
- Fume hood, in Environmental Room
- Laminar flow hoods

## Scientific Sonars

- Multibeam, Kongsberg-Simrad EM-120

## Radioisotopes

- Supportable using USAP Rad Van.
- Requires both USAP Radioisotope Use Permit and approval of Swedish National Radiation Protection Authority.

## Other

- Drying ovens, 60°C, approx. 200 liter volume, 4 each
- Compressed gas distribution system available in labs and most lab vans. Lines are stainless steel, with 6 mm Swagelok fittings.

# Communications and IT

## IT Systems

### Servers

A central server is available for general use. It is protected by antivirus software and has an Active Directory for all cruise participants. Each participant will receive a home directory for data storage. A central email server running MS Exchange Server 2003 is available and uses a web-based interface reachable from most computers on the ship. The Active Directory address book is available through this system.

### Network

The ship's network uses WLAN IEEE 802.11a and 802.11b/g protocols. The a-standard is more robust inside the ship's superstructure and its use is encouraged throughout the ship. With a few exceptions such as lab vans, the network is entirely wireless. Available network services include DHCP, DNS, Active Directory, full Ethernet and IP, file storage via SMB/CIFS, print services via SMB, and email services via MS Exchange Server (POP3, IMAP4, MS RPC, SMTP, Outlook Web Access).

### Anti-virus Protection

The ODEN's servers are protected with state of the art antivirus software. All computers wishing to connect to the shipboard network must be scanned first.

## Communications

### Iridium

The ODEN uses Iridium as the primary means of communication with the outside world, including both voice and email transmissions. There are several lines available including an Expedition line for business purposes and a Public one for personal phone calls made using a pre-paid phone card (available for sale on the ship). Phone cards cost approximately US\$1.40/minute but exact costs depend on the exchange rate with Swedish kroner.

### Email

All cruise participants will receive an email account that is used for both intra-ship and extra-ship communications.

- Within the Ship: There are no bandwidth limitations for email traffic within the ship's party.
- Off the Ship: Individual messages, both incoming and outgoing, are limited to 50 kb each including attachments. Email traffic sent to an address outside the ship's domain will be screened for size and then forwarded to an Iridium-based email transmission system. Incoming emails will be handled in a similar manner using a shore-based server. Email is transferred at least twice per day. Please DO NOT have email forwarded from your home account to the ODEN due to bandwidth constraints. This system can transfer a maximum of 850 kb/hr at a cost of approximately US\$80/hr.
- Oversized messages: If there is a special need for oversized messages such as ice imagery or other cruise-related business then larger files can be accommodated by the email system. Please contact the shipboard technician for details.

## Shipboard Web

The ODEN's network includes a web site which provides general information and safety messages. This information is also broadcast to monitors throughout the ship. Please pay attention to this system as it is the primary means of communicating the Plan of the Day, weather closures of the deck, schedule changes, and other important information.

## Cruise Data Distribution

NMEA data strings are available via the shipboard network. Data available include:

- ship's position, speed, and course over ground (GLL, GGA)
- ship's heading (HDT)
- relative wind
- water depth

To utilize NMEA strings, client software for virtual com-ports from TCP may be required.

An SQL Server database with real-time updates is available through ODBC, MS SQL. Data available at 5 second resolution includes:

- ship's position, speed, course over ground, and heading
- water depth
- relative wind speed and direction
- true wind speed and direction
- water temperature (measured at uncontaminated seawater intake)
- water temperature (measured in Main Lab)
- salinity
- barometric pressure
- air temperature

The ODEN staff does not provide end-of-cruise data reports. All cruise data is archived on the ship's network and scientists should copy the data they wish to use to the recording media of their choice prior to departing from the ship.