Ocean Class SMR Input
Other requirements & general comments

Robert Knox - SIO

1 Physical Oceanography	Ocean circulation - But I'm going to use this form mainly to insert some overall observations or workshop discussion items into the mill, based on my reading of inputs thus far (7/1/02)

Other Science Requirements

Some other input items to date that could be design drivers: (a) non-CFC lubricants in HVAC systems, (b) ease of small boat ops. (launch/recovery methods), (c) competing calls for low freeboard and safe deck work in bad weather (does some form of split-level deck make any sense?), (d) ice class selection.

Comments

We may want/have to play off SMRs against integral constraints such as (i) estimates of construction cost (if raw size creeps up) and (ii) estimated operations costs. A 30-40 year ship costs 3-4 times as much in annual ops. cost as in initial constructio

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Ed Carpenter - SFSU

Biology	phytoplankton ecology, nutrient cycling

Other Science Requirements

Each vessel should have a minus 80C freezer. Radvan should have an automated scintillation counter (not manual). MilliQ deionized water with redundancy in case of problems.

Comments

Ability to carry out lab work in rough seas is paramount. A ship with limited rock and roll is highly desirable.

Anthony Michaels - USC

Biology	Role of biological community structure in the cycling of biogenic elements in the ocean.

Other Science Requirements

small boats for blue water dive ops, easy deployment and recovery.

Comments

Paul Hargraves - URI

Biology	phytoplankton

Other Science Requirements

stable microscope platform

Comments

not a frequent seagoer, but availability is essential

Mary-Lynn Dickson - URI

Biology	Plankton ecology (primary and community production and respiration rate measurements)

Other Science Requirements

ice-strengthen hulls??

Comments

Grace Klein-MacPhee - URI

Biology	Fishery Science

Other Science Requirements

Deionized water, small boats (Zodiac with 40 hp motor) smaller inflatable with 15 hp motor, dive locker, temperature control room

Comments

Edward Durbin - URI

Biology	Zooplankton

Other Science Requirements

Plenty of clean, ambient temperature SW for deck incubations. Walk-in cold room would be nice but perhaps not feasible on a ship of this size.

Comments

Bob Campbell - URI

Biology	Zooplankton Ecology

Other Science Requirements

Large open area that can be used for deck incubations. Should be located on foredeck or on higher levels where shading from ship's structure is minimized. Hold downs on 2-ft centers for securing large incubators.□Need to supply and drain large volumes (50 gal/min) of uncontaminated ambient seawater (+/- 1C) for flow-through temperature control of incubators.

Comments

Bess Ward - Princeton University

Biology	microbial ecology/ biogeochemistry

Other Science Requirements

freezer space essential -- clean and separate from food!

Comments

Richard Barber - UNC/Duke

Biology	primary productivity regulation

Other Science Requirements

a good electronic repair shop is worth its weight in gold

Comments

on cruises I've participated on in the last few years, limiting factors were (1) large volumes of cooling water on the fantail to cool simulated in situ incubators, (2) wide bandwidth communication to receive satellite images and (3) electronic maintenance and repair capabilities

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William Cochlan - SFSU

Biology	Phytoplankton and bacterial productivity, nitrogenous nutrition

Other Science Requirements

Uncontaminated seawater system for continuous sampling in lab. Inlet must be located deep ehough on ship;s hull to minimize atmospheric comtamination when travelling through rough seas (i.e., no bubbles). Also ample flow in contunuous seawter system (needn't be as clean) for use in on-deck incubators. These seawater outlets must be seperate from ship's fire-fighting requirements and should be located near open-deck areas most likely to be used for shade-free incubator placement.

Comments

Ice-strengthen hulls would add significant flexibility for polar research cabilities

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Sharon Smith - RSMAS

Biology	zooplankton ecology

Other Science Requirements

Comments

much careful thought went into the class of ship that includes Thomas Thompson. In my 30 years of field work, I never experienced a better ship than the Thompson. Clone it; save money.

Elizabeth Venrick - SIO

Biology; Chemical	Physics, chemistry and biology of the California Current with emphasis on fishery oceanography, planktonic ecosystem structure and function and climate-ocean interactions

Other Science Requirements

The needs of the CalCOFI core program can be fairly well anticipated. However, we are being joined by an increasing number of ancillary programs with diverse requirements. Flexibility is probably the key to accommodating these.

Comments

James Meehan - NMFS

Biology/Other	Living Marine Resources life histories, population structures, and stock assessments. Ecology and dynamics of Large Marine Ecosystems. Identification and description of Essential Fish Habitats and endangered species Critical Habitats

Other Science Requirements

Scientific sounder (such SIMRAD EK-60)
Fish finder system (such as SIMRAD ES-60)
Scannning sonar (such as SIMRAD SD-570)
Thermosalinograpf with GPS interface (such as SEABIRD SBE-21)
Water column multibeam (such as SIMRAD SM2000FR)
Acoustic net mensuration system (such as SIMRAD ITI)
Hard wire net sonde system (such as SIMRAD FS-925 or WESMAR TCS 700E)
Trawl ramp
ADCP
Doppler speed log

Comments

Centerboard for transducer mountings
Self-noise hydraphones
Closed circuit TV system w control and display on the bridge. With view of the winches, water surface at side sampling station, fore and aft angle of cast wires, working decks, engine room.
Scientific Inertial Navogation System (POS/MV)
DGPS (can be combined with navigational GPS)
Entertainment system

Rana Fine - RSMAS

Chem. Oc.	Tracer Oceanography

Other Science Requirements

ship clean as possible as regards CFCs, e.g. in A/C, lubricants, etc

Comments

Frank Sansone - Hawaii

Chemical Oceanography	Hydrothermal plume biogeochemistry; trace gas biogeochemistry

Other Science Requirements

Easy access to shipboard network (including file sharing and access to CTD data) by PC and Mac notebooks brought aboard by scientists -- this includes having two ethernet jacks in each stateroom, and numerous jacks in each lab . Easy network access to laser and color printers.

Comments

Mark Altabet - Massachusetts

Chemical Oceanography	marine biogeochemistry; oceanic nitrogen cycling, N and C isotope biogeochemistry

Other Science Requirements

Walk-in environmental room (refridge), walk-in freezer, protected deck storage of compressed gas cylinders with conduits for gas supply lines to labs. Liquid N2 generator. Low-temp. freezer

Comments

I have found my time at sea to be most efficient when the ship operator provided a high level of technical support for over-the-side operations as well as basic data gathering (e.g. CTD).□Ship design should ease that role for the operator.

Stephen Miller - SIO

G & G	mid-ocean ridges seafloor mapping databases and archives

Other Science Requirements

Comments

The seafloor mapping community needs to make sure that the naval architecture takes advantage of lessons learned from hull design vs. bubble sweep down on other vessels with multibeams. Some of the newer designs are worse than older ones.

John Collins - WHOI

G & G	Seismology

Other Science Requirements

Dynamic Positioning with reference point at aft A-frame.

Comments

Modest-sized compressors for firing a small airgun array.

Fred Spiess - SIO

G & G	seafloor deformation measurement, seafloor work systems, plate tectonics, etc.

Other Science Requirements

well or trunk through to the water from the main deck for temporary installation of experimental acoustic equipment. Not too much superstructure - minimize GPS multipath effects. Stiff upper structure for mounting measuring eqquipment (e.g. GPS antennas)

Comments

simplicity, adaptable to many tasks, do not let one task (e. g. swath echo sounding) overly influence the design, modest crew size compatible with ship's maintenance. Sorry not to be at the meeting - celebrating 60th wedding anniversary.

Peter Lonsdale - SIO

G & G	structure and geomorphology of oceanic crust, defined by geophysical surveys

Other Science Requirements

Comments

There is a need for a modest-sized ship that is stable and acoustically quiet enough for wide-ranging geophysical surveys using a combination of CHIRP sonar, multibeam sonar,gravimeter,magnetometer, and modest-sized seismic profiling systems. A key improvement over existing vessels (even larger "global class" ones) is a hull design that has enough area for large multibeam sonar arrays (e.g.EM-120), free from the region vulnerable to bubble sweep-down in rough to very rough seas (or 'bubble diverters' built into the hull from the start, to shield sonars from bubble streams without increasing hull drag prohibitively

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Robert Ballard - URI

G & G; Other | Deepwater Archaeology

Other Science Requirements

support of television production crew

Comments

John Orcutt - Scripps Institution of Oceanography

G & G; other | Marine seismology

Other Science Requirements

Comments

A ship of this size and capability would be well-suited for exploration of continental margins and near-shore environments as well as associated science. The ship is likely to be limited for maintenance of observatories given limited size, likely modest ROV capability and limited fantail space. For exploration, a multibeam system would be a great addition.

John Bash - URI

Other | Research Vessel Management

Other Science Requirements

Comments

One design does not fit all. An Ocean Class ship designed for the North Atlantic/Pacific would not be the best design for the Mid Atlantic/Pacific. A compomise would be the worst of both worlds. Efficiency of design and operation is very important. These ships need to operate as inexpensively as possible. This means fuel efficiency, crew reduction, and hull/machinery maintainability. The ship should be able to operate with a crew of 9 surging to 12 when cruise demands require. Life cycle costs must be a major consideration. In addition the design must allow for future requirements including weight additions.

Joe Coburn - WHOI

Other | Research Vessel Management

Other Science Requirements

Work boat, like a 12' RIB, perhaps the newer version foam collar Al boat design.

Comments

Design to minimize operating costs, which may be incompatible with minimun construction cost.

Steve Poulos - Hawaii

Other | Instrumentation

Other Science Requirements

Anticipate that every place on vessel may be potentially a spot to place a sensor/instrument and collect data, so would need extensive network/fiber runs thru out- just about where ever power goes-so does the network. Along this line provide separate cable trays/runs from ship's power/controls thru out vessel - with own transit blocks etc. Again, where ever ship's power is run (and some places it doesn't) should have provision for science data & power & acoustic power cables.

Comments

Atmospheric studies will need unshadowed areas - This many times will run counter to what the Coast Guard requires in terms of masts & platforms and navigation lights. But none the less need to plan on having large deck areas or large platforms that can be used easily on temp basis for instrumentation looking skyward (clouds,precip,color,etc). Why not have a small lab area built over the bridge? All the analog,optic, etc signals would then have very short runs to a computer or network.

Richard Pittenger - WHOI	
Other	NA

Other Science Requirements

Ship must be responsive to unanticipated science needs. This will dictate a vessel that is flexible and adaptable. The important thing is to design into the ship this flexibility so that future operators and scientists are able to easily adapt it.

Comments

Ice and cold weather capability - able to operate independently in ice-infested water and in very cold weather. Able to withstand being beset. Able to operate safely at higher latitudes when accompanied by icebreakers.
More additional comments:
Cost of operations is an important factor and should be designed/built into the vessel (this is often/usually not done).
Major factors that affect cost of operation include:
· Manning.
· Ease of maintenance including cleaning, painting, repair, layout.
· Ease of operations - engineering systems as well as ship control and science support.

Paul Ljunggren - LDEO	
Other	Marine Operations

Other Science Requirements

Work boat

Comments

Thomas Rossby - URI	
Phys. Oc.	Ocean circulation with emphasis on the Gulf Stream and North Atlantic Current system. Perhaps work farther north in future.

Other Science Requirements

Consider having a lowered ADCP dome. Also give serious thought to a 38 kHz ADCP for greater range and a 150 kHz for high resolution closer to the surface.

Comments

Terrence Joyce - WHOI

Physical Oceanography	Ocean general circulation, mesoscale variability

Other Science Requirements

Ashtech GPS, 150 and 30 khz ADCPs, must be able to work near ice edge

Comments

capable of ROV work at full ocean depth on demand

James Ledwell - WHOI

Physical Oceanography	Tracer release experiments

Other Science Requirements

Comments

Please consider making the endurance greater than 40 days. 45 to 50 days would be good. A question of food stores, mostly. Tracer release experiments that I do, and also perturbation experiments that others will be doing much more require the ship to be with a patch of water for long periods of time, surveying and sitting doing experiments. It's not so much a matter of fuel as of food, I think. I would opt for the most commodious ship possible for a given crew size (11 or 12?). 11 or 12 knots is plenty, but a little more is welcome. 70 meters is much much better than 55 meters. Those extra 50 feet are all useable.

Bill Johns - RSMAS

Physical Oceanography	Large-scale Ocean Circulation, Western Boundary Currents and Mesoscale Processes

Other Science Requirements

Large stern A-frame, >= 20 ft height; high-quality, full redundancy Met package (including mutli-channel radiometers upward and downward looking); shipwide data archival system that records all underway data (NAV/MET/thermosalinograph/TOPO/etc.) in one place w/ multi-platform accessible data format and uniform time base) extensive clean power avaiability w/ UPS, shipwide network ports; modular wall/floor bench space system in labs - solid but easily reconfigurable

Comments

Tetsu Hara - URI

Physical Oceanography	Air-sea interaction

Other Science Requirements

Data/power connections to deck area instrumentation.

Comments

David Farmer - URI

Physical Oceanography	Upper Ocean Physics, Internal Waves, Coastal Processes

Other Science Requirements

Comments

I find the present Ocean class vessel ideal for my shipboard operations.□A smaller vessel would not be useful.□A significantly larger vessel would represent an inefficient use of resources.

Jack Barth - OSU

Physical Oceanography	coastal physical oceanography especially fronts and jets

Other Science Requirements

Comments

This vessel should be beamier than the existing intermediate class, hence more volume and stability. It should not be so large that going into and out of ports becomes cumbersome. It should also be capable of operating in shallow water, say a minimum of 30m. As more and more interdisciplinary projects go to sea in the coastal and adjacent deep waters, we need berths for 25 or so scientists and more lab space than the current intermediate class offers.

Mark Prater - URI

Physical Oceanography	mesoscale dynamics, Lagrangian (RAFOS) floats

Other Science Requirements

Comments

Most of my responses ranged about 10-50% larger than the URI's current ship, the Endeavor.□A Knorr-class ship is typically too large for our needs, but often the Endeavor/Oceanus/Wecoma is too small.

John Toole - WHOI

Physical Oceanography	observational physical oceanography

Other Science Requirements

capable crew

Comments

a viable sea-going capability is vital to my future research efforts

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Michael McCartney - WHOI

Physical Oceanography	Abyssal circulation, thermocline ventilation, convection, and climate change

Other Science Requirements

On WHOI ships we not support the SEABIRD acquisition system.□ would like to see the next level of post processing available on the shipboard computer.□n PO department here at WHOI we use a slightly modified version of a system developed at PMEL by Greg Johnson and Cristy McTaggert.□Having such a package on line would lead to an inprovement in the quality of data emerging (into the database!) from shipboard CTD operations.

Comments

Brian Guest - WHOI

Physical Oceanography	Neutrally Buoyant floats and subsurface moorings

Other Science Requirements

Comments

Ship speed should be considered not just a luxury but a safty nessecity. Red Sea pirates and medical emergencies have shown how important speed can be.
Comfort should also get more attention.
Networks have become indespensable so a top of the line system should be in place.

Charles Flagg - BNL

Physical Oceanography	Continental Shelf Processes, Shelf-ocean exchange, fronts

Other Science Requirements

A reasonably quiet and secluded library is a must for crew and science party use.

Comments

Control of the ship should be possible while overseeing deck operations. Enclosed bridge wings would be one approach.

Ruth Curry - WHOI

Physical Oceanography	Water mass properties and ocean circulation in the context of global and regional climate

Other Science Requirements

Wet labs for nutrient analyses and carbon chemistry

Comments

Over the next ten years, my research programs will require an Oceanus class vessel for subsurface moorings and CTD work in the subtropical No Atlantic. But to carry out similar work at higher latitudes -- where storms and heavy seas are frequent -- a larger vessel (such as Knorr) is essential. Past attempts to use smaller vessels in these regions have resulted in the loss of significant amounts of station time and (in hindsight) measurements that would have provided data critical to understanding ocean/climate extrema.

Randy Watts - URI

Physical Oceanography	dynamics of large scale current systems

Other Science Requirements

seek flexibility for follow-on developments of Sea-Soar-like vehicles with greater depth capability

Comments
