

UNCLES Working Group on Ocean Observatory Facility Needs

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Charge to Committee

Identify major observatory-related ship and submergence needs and describe the process that will be used to address these issues. Provide this as input to the NRC Observatory Committee prior to their final meeting on February 18, 2003.

Identify the requirements for facility support of ocean observatory systems. This should include requirements for both ships and submergence vehicles.

What requirements can be met with currently available academic assets (vessels and submergence vehicles), and what modifications or augmentation may be suggested including efficiencies that may be gained through contracts to industry?

What are the changes in demand for facilities resulting from observatory initiatives?

- . Identify the specific observatory needs that cannot be met by currently available academic facilities.
- . For those observatory facility needs that cannot be met by currently available facilities, the working group should:
 - a) Identify what facilities should be added to the available suite of academic assets.
 - b) Identify commercially available assets that could be used to meet observatory needs.
 - c) Address the effectiveness, both in terms of cost and practicality, of adding academic assets, using commercial assets, or a combination of both.
- . When are the facilities needed for installation, operation, and maintenance of the observatories? Establish a timeline.
- . Provide suggestions for the management, scheduling and operations of facilities related to observatory infrastructure. The ships will likely fall under the UNOLS system, but coordination of vehicles such as, AUVs and ROVs will need to be considered. It is assumed that the operation of the actual observing system will be managed by the organization that established the system.

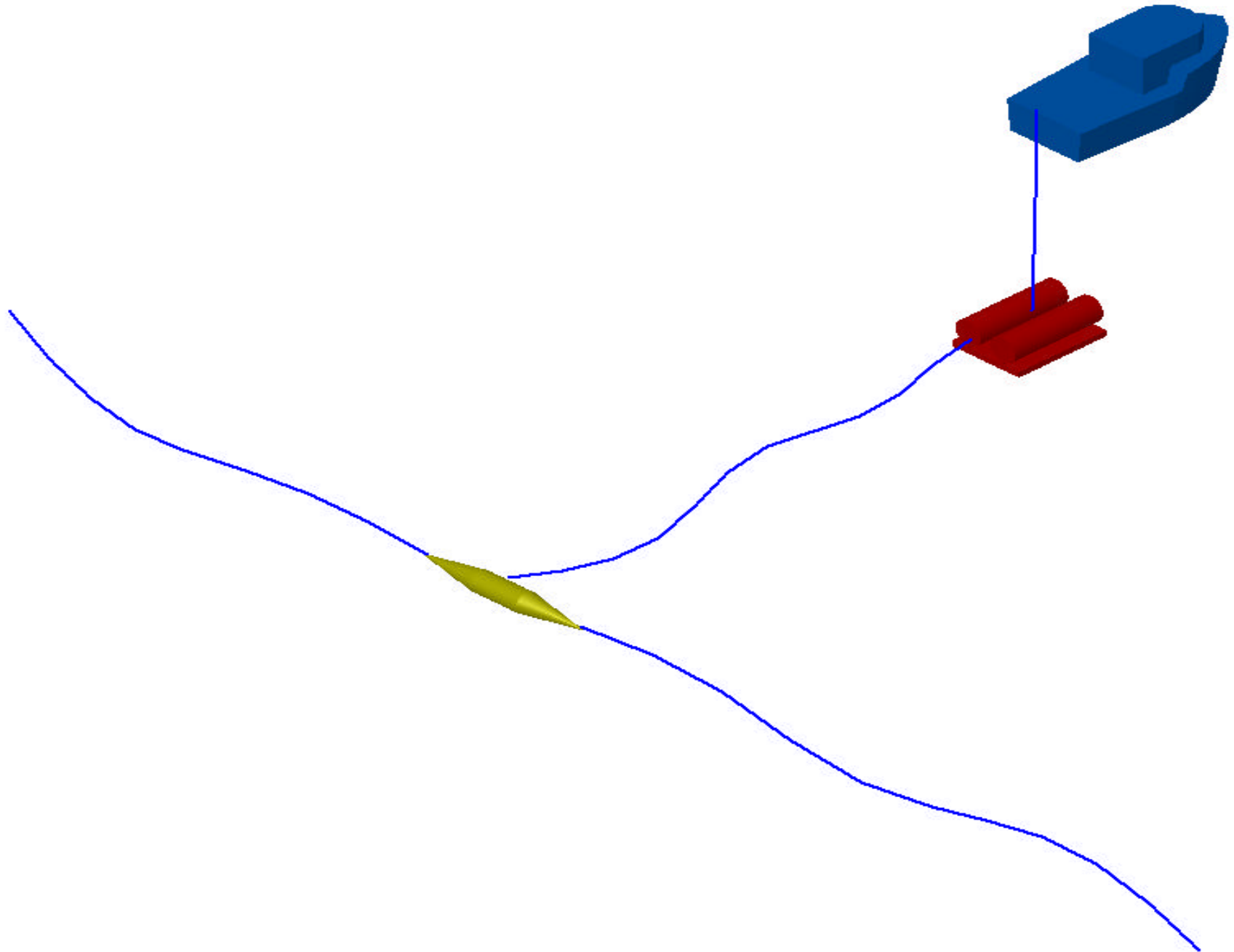
Deep Water Requirements

Heavy lift capability (20000 lbf or more), including both equipment and trained personnel

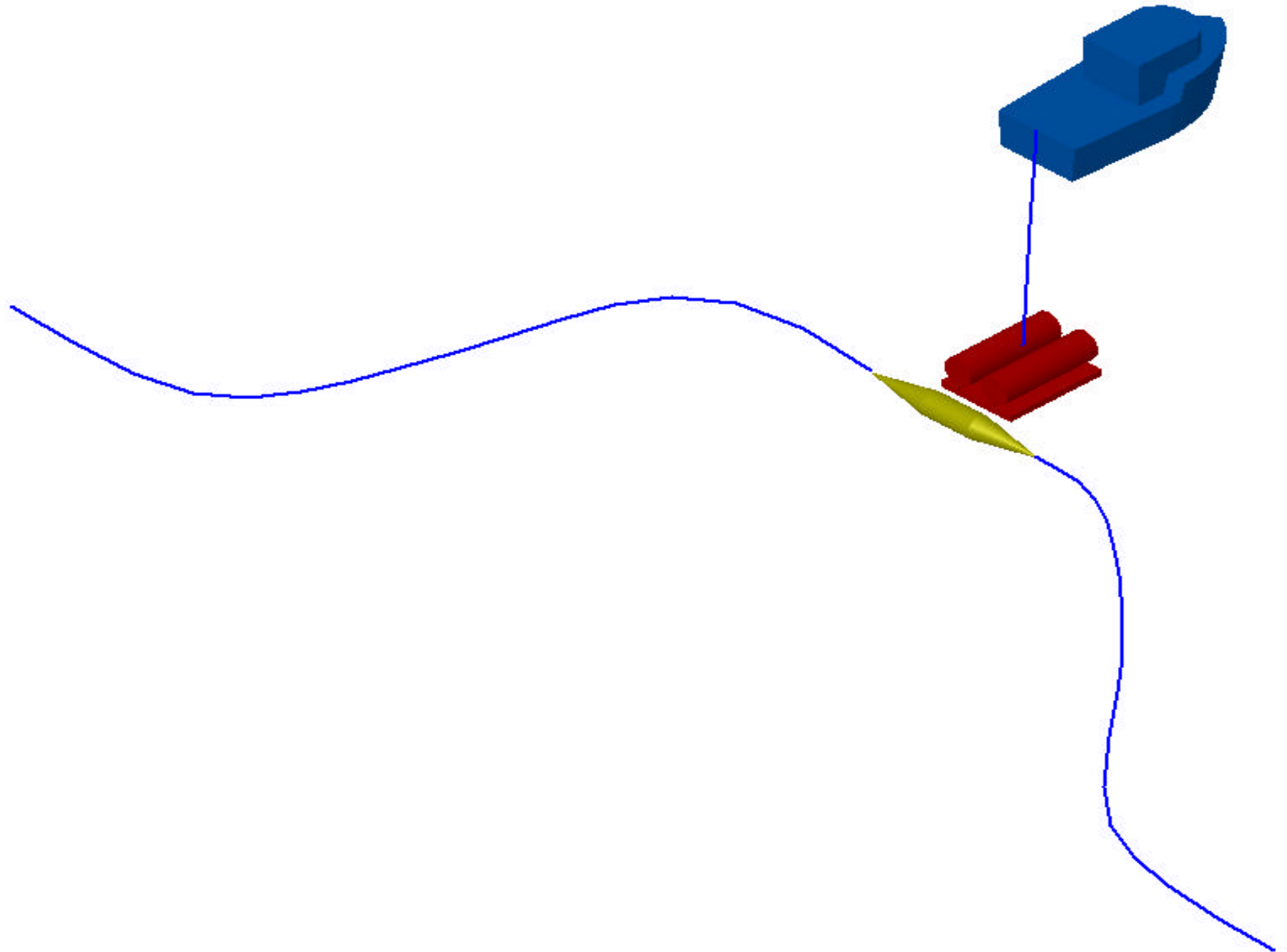
Better DP capability in higher sea states

Routine access to ROVs for all observatory ops

BASELINE REPAIR SCENARIO



ALTERNATE SCHEME



HANDLING EQUIPMENT POSSIBILITIES

MINIMAL HANDLING EQUIPMENT

CHUTE, 20000 LBF SWL WINCH AND 2 CAPSTANS (10000 LBF EACH FOR HANDLING SOFT LINE) AND STOPPERS APPLIED ON DECK.

BETTER HANDLING EQUIPMENT

ABOVE PLUS 20000 LBF SWL (WHILE ROTATING) A-FRAME. PROBABLY REQUIRED FOR DOUBLE ENDED NODE

BEST HANDLING SYSTEM

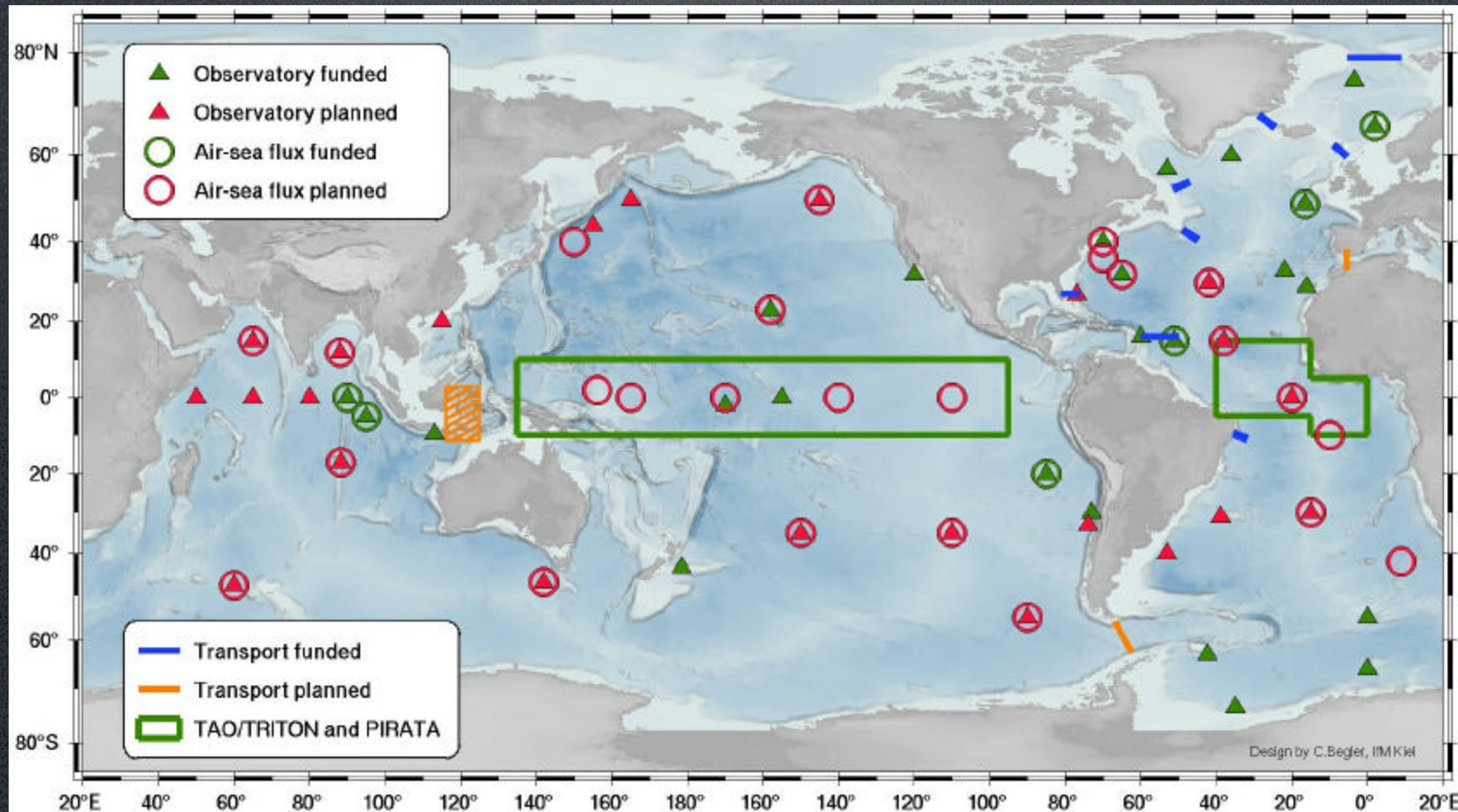
ABOVE PLUS EITHER 2 LCEs OR 2 CABLE DRUMS (2-3M DIAMETER, 3M REQUIRED FOR ROUTINE PASSAGE OF A JOINT)

GENERIC EQUIPMENT

CAPSTANS/TUGGERS, GRAPPLING GEAR, HARD/SOFT STOPPERS, CABLE SPLICING GEAR (SEVERAL TRANSPORTAINERS), DECK SPACE

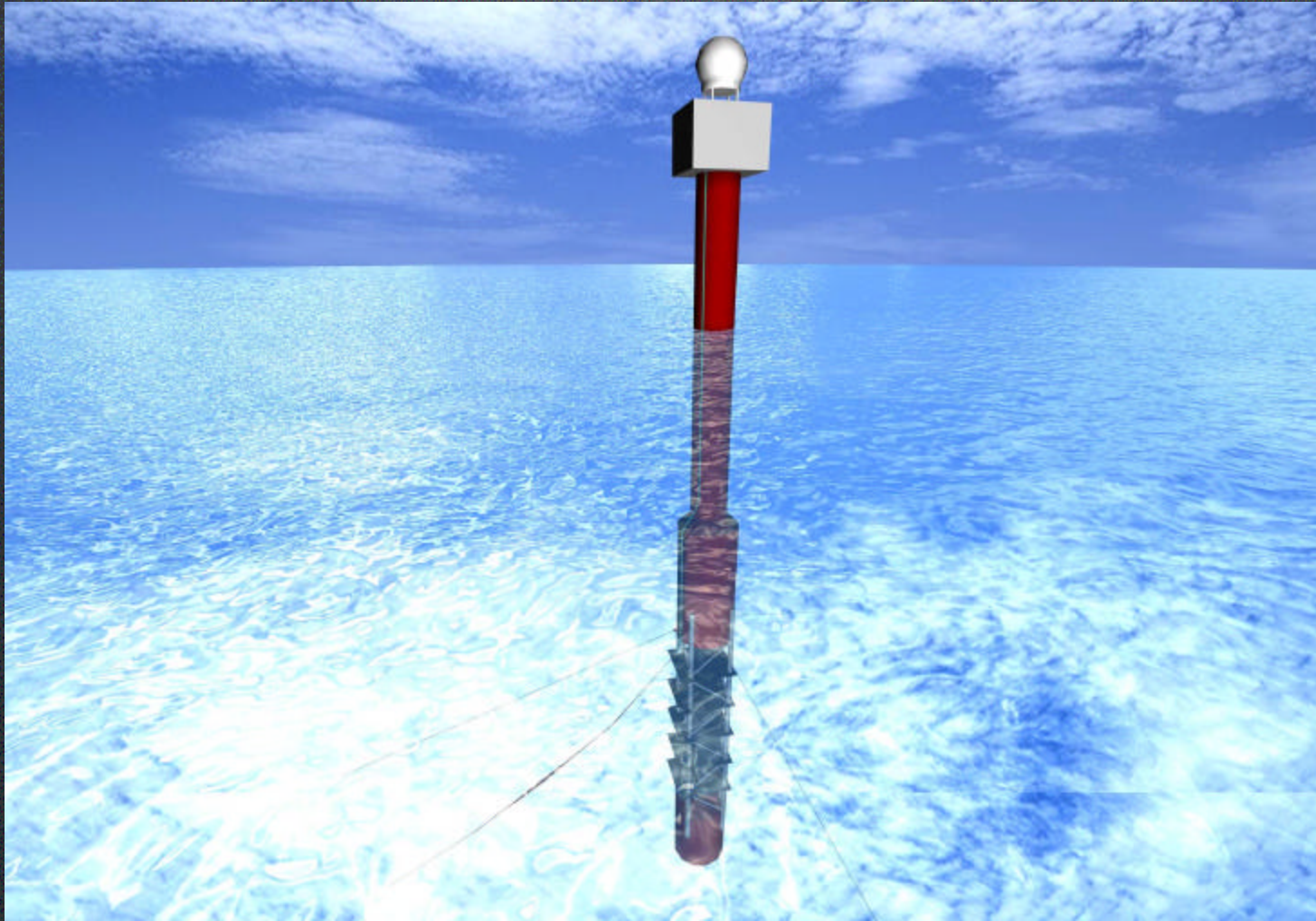


Locations of Moored-Buoy Observatories



Green: sites that are currently operating or funded.
Red: Sites to be implemented during pilot phase.

Conceptual drawing of DEOS spar buoy design



The radome and payload module are gray.
The hull is red. The spar is 40 m long.

Possible Solutions

Modify Class I vessel(s) to increase deckspace, enhance size of deck gear, improve DP capability

Acquire (either purchase or long term lease) a multipurpose heavy lift vessel into UNOLS system

- 2000
- Denmark
- 105.8m
- 20m
- 8.5m
- equipped to deploy a variety of subsea vehicles
- Maximum : 14.5 knots
- Estimated service speed : 13.5 - 14 knots
- 1 off S Band Radar, 1 off X Band Radar, 2 off DGPS, 3 off Gyro Compasses, 1 off Auto pilot, 2 off Echo sounders, 1 off DP System, 1 off Independent Joystick system, 1 off Navigational system, 1 off Navtex, 1 off Weather fax and 1 off ECDIS
- Main engine : 2 x 3240 kW
- Shaft generator : 2 x 3000kW
- Auxillary generators : 2 x 760kW
- Emergency generator : 1 x 184kW
- Propellers : 2 x 4-blade Controllable Pitch (CPP)
- Thrusters
 - 2 x 1200kw Aft Tunnels Thrusters
 - 1 x 1200kW Fwd Tunnel Thrusters
 - 1 x 1000kW Fwd Retractable Azimuth
- 1 off (port) Electric 25 tonne SWL 4m-diameter cable drum with hydraulic cable diverter
- 1 off (port) Electric 4WP Draw Off/Hold Back (DOHB)
- 2 off (P&S) 2WP Electric Drive Cable Transporters
- 1 off (Stbd) 20WP 20 tonne SWL Linear Cable Engine
- 60 tonne SWL 'A' frame
- 35 tonne SWL double telescopic swinging beam
- 35 tonne SWL hoisting
- 60 tonne SWL tow winch
- 45 tonne SWL auxillary winch
- deck crane aft port
- deck crane amidships stbd
- deck crane fwd port
- 2 off Inmarsat B
- 2 off Inmarsat B Fax
- 1 off GMDSS A1, A2, A3
- 1 off Satcom C
- 1 off MF/HF Station
- Portable VHF's
- 1 off Aircraft Radion System
- 3 off single Captain Class cabins
- 6 off single Officer Class cabins
- 27 off single Crew Class cabins
- 12 off double Crew Class cabins
- Hospital : 1 x 2 beds
- Total number of berths : 60



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ability

ROV Usage

Intervention tasks related to the infrastructure should be predictable and well-defined, therefore could be appropriate for commercial contracts

Observatories will generate much work similar to conventional vehicle science ops, and are probably best suited to a facility such as presently exists



ROV Issues

- Is our present facility capability sufficient for both observatory and non-observatory needs?
- If not, how should the facility be expanded?

Ocean Observatory Mapping Requirements

Regional Context

Cable Route Survey

Site Selection

Mapping Needs

- Existing commercial mapping tools are adequate
- Better access via UNOLS vessels may be needed

Coastal Observatory Requirements

- Major requirements can be met with present facility types
- Enhancement of coastal RVs required

Low water operations O(10m)

our operations (including Marine Techs)

ined operations for several days

ard sensor suites

t, ADCP, CTD, Bio-optics, Acoustic Mapping

ler bandwidth communications with shore

nd data back in real time

ccess observatory datasets of websites

outer Lab

onics Shop

ab

space for a portable Lab van

ng Capabilities (Outside the wake, both sides

-cut at Locations

Gulf of Maine

Middle Atlantic Bight

South Atlantic Bight

Eastern Gulf of Mexico

Western Gulf of Mexico

Southern California

Northern California

Oregon

Washington

Southern Gulf of Alaska

Northern Gulf of Alaska

Chukchi Sea