UNOLS Working Group on Ocean Observatory Facility Needs

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Charge to Committee

Identify the requirements for facility support of ocean observatory systems - ships and submergence vehicles.

What requirements can be met with currently available academic assets 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?

When are the facilities needed for installation, operation, and maintenance of the observatories?

UNOLS Ship/vehicle O&M Time Requirements

NRC OOI estimates

- Global buoy component: 20 ship-months/y (10 with ROV)
- Regional cabled observatory: 4-8 ship-months/y (wi ROV)
- Coastal observatories: 6 ship-months/y

Global estimate is appropriate for 20 mooring system

RCO estimate of 4 months is appropriate

RECOMMENDATIONS FOR DEEP WATER OBSERVATORY OPERATIONS

- A heavy lift capability (routine ops with 20,000 lb loads, occasional ops with 40,000 lb loads, limited cable handling and repair) will be required

- Large (~1/2 ship length) open deck space will be required for many ops

- Some modification of Thompson-class vessels to improve their utility for observatory ops should be implemented

- UNOLS should consider the acquisition or long term lease of a heavy lift vessel (cable repair or equivalent)

DEOS Spar Buoy

- 40 m long spar buoy with diesel generators and radome
- Three point mooring with electro-optical link to j-box
- Installation and instrument maintenance will require an ROV
- Installation and buoy maintenance not feasible with largest UNOLS vessels

Shroud Z-drive nozzles to protect props from cables

Slight increase in fuel consumption, improvement in low speed/DP efficiency

Install redundant DP systems to improve reliability during critical ops Expense is about 50% of DP system cost

Remove part or all of the hangar on Thompson class ships to increase deck space (simple option)

Remove all of superstructure aft of hydrolab to really increase deck space (requires naval architect study)

ACQUISITION OF HEAVY LIFT VESSEL

Thompson-class vessels were designed for large expeditionary science programs (e.g., WOCE, JGOFS)

Maximize fuel efficiency at cost of station keeping above SS4/5

Maximize lab space at expense of deck space

Z-drives were installed in place of conventional screws, so are too far aft

Ability to modify vessels after construction will be limited (cost, naval architecture, other user class

ACQUISITION OF HEAVY LIFT VESSEL

Applications

- Cabled observatory maintenance and modification
- Cable reuse (H2O as prototype)
- Large buoy installation and maintenance
- Long coring operations

RECOMMENDATIONS FOR DEEP WATER OBSERVATORY OPERATIONS

- Routine access to ROVs will be required for all observatory operations
- 1 additional vehicle will be required when the OOI is implemented (2-3 y from now)
- 1 more vehicle will be required when OOI facilities are fully operational (5-7 y from now)
- Commercial ROVs are not suitable for most science operations but may be usable for routine maintenance tasks

New requirement for support of 30-40 coastal moorings

- One vessel-year at Regional class_
- Frequent access to ROVs will be required

Better access to mid-size vessels for research

- 10 Local to Regional vessels distributed on east and west coast

Need for coordination of multiple vessel operations

Need for rapid response capability

Long duration glider-type AUV will be key observation

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