



BENTHIC EXPERIMENT PACKAGE: LOGISTICS, OPERATIONS & REFURBISHMENT PLAN

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Coastal and Global Scale Nodes
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Revision History

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Engineering Reports require the signature of Paul Matthias (Chief Engineer) prior to release.

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Signature: _____

Date: 2013/01/15

Signed: Paul K. Matthias

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1 Background

1.1 Purpose

The Endurance BEP Logistics, Operations, and Refurbishment Plan establishes the planning, processes and methods to be used for safe and efficient BEP operations and maintenance along the Endurance Array of the Ocean Observatories Initiative (OOI) under the purview of Oregon State University (OSU).

1.2 Scope

The scope of work described in this document conveys a concept of operations. This plan outlines possible objectives and activities in conjunction with BEP preparation, deployments, recoveries and maintenance.

The Benthic Experiment Package (BEP) is a CGSN-designed instrument platform to be deployed at the Endurance Array Shelf and Offshore locations. Instruments are attached to instrument frames within the BEP with custom-fabricated brackets.

The BEP derives power and communications from the Regional Scale Nodes (RSN) 48V/100 BaseT cabled infrastructure through the RSN Low Power Junction Box (LPJBox). Nominal deployment method is to place it on the sea floor with the assistance of an ROV. The ROV will then carry the wet-mate end of a cable (dry-mated to the BEP) to the RSN node for connection.

Prior to deployment, the BEP will be fully assembled, including all electronics, pressure housings, and cables. An immersion tank and crane capable of accommodating the BEP is available at the University of Washington, if measurement of wet weight is desired. The crane is fitted with a strain gauge to measure load.

2 Mission Planning

put it on a truck

drive the truck to Newport

load it on the boat

cruise out to the site

throw it in the water

check comms

come back to Newport

drink mass quantities

3 Staffing

Minimum staffing for assembly, maintenance, deployment, mission monitoring, and recovery of the BEP consist of the following.

3.1 Assembly

Assembly drawings for the BEP are under project Engineering Change control. See drawings:

3715-28000 BEP SH ASM (and related subassemblies)

3715-29000 BEP OS ASM (and related subassemblies)

3715-XXXX BEP SPECIAL ASSEMBLY INSTRUCTIONS

Physical assembly of the BEP and its associated instrument cages and instruments requires:

Mechanical Tech: 1

Instrumentation Tech: 1

3.2 Maintenance

Includes actions taken to the BEP (not including instruments) so that the unit has had all required maintenance such that it is ready to accept instruments and be deployed.

Mechanical Tech: 1

3.3 Deployment

Includes all actions taken beginning with transport of the BEP from the OOC to final placement on the sea floor and attachment to applicable nodes

Mechanical Tech: 1

Instrumentation Tech: 1

Cruise Supervisor: 1

Scientist: 1

3.4 Mission Monitoring

Includes

3.5 Recovery

Includes

4 Asset Management

xxx

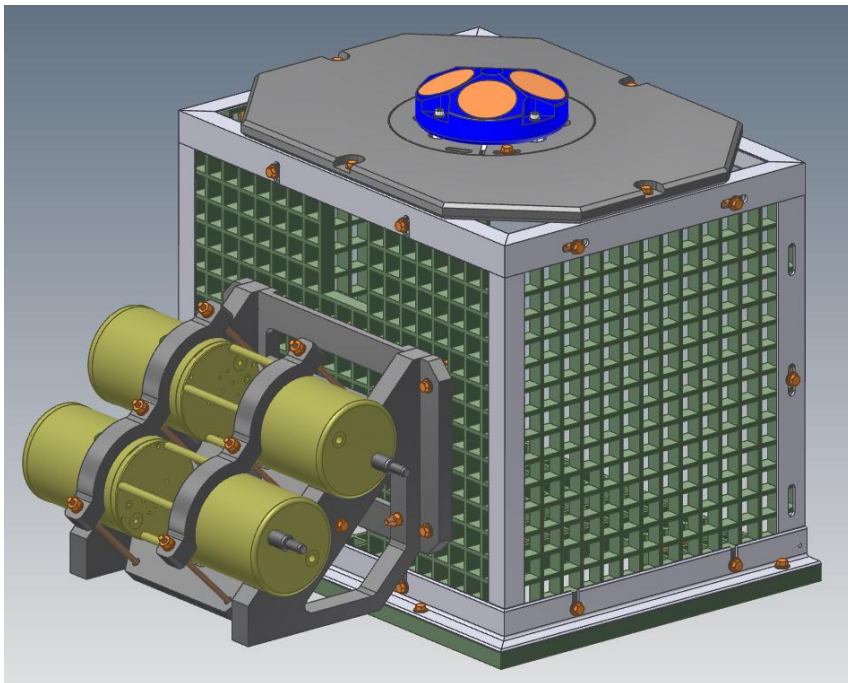
5 Facilities

5.1 Lab Overview



Assembly of the non-instrumentation sections of the BEP will take place in the high bay area of the OOC. The Wooden Transport Cart will aid in that process.

Fig x-x: BEP Wooden Transport Cart



Assembly of the BEP's instrument cages will take place on benches inside the OOC's labs.

Fig x-x: BEP Instrument Cage (shown: BEP INSTRUMENT CAGE ASM C, 3715-21030-00001)

5.2 Staging and Storage

5.3 Tools

6 Deployment

xxx

6.1 Pre Deployment Operations

6.1.1 Scheduling and Cruise Planning

xxx

6.1.2 Documentation

xxx

6.1.3 Assembly

Mechanical

Electrical

Instrumentation

6.1.4 Preparation

6.2 Deployment Operations

6.2.1 Transportation

xxx

6.2.2 Loading

xx

6.2.3 Deploying from the Vessel

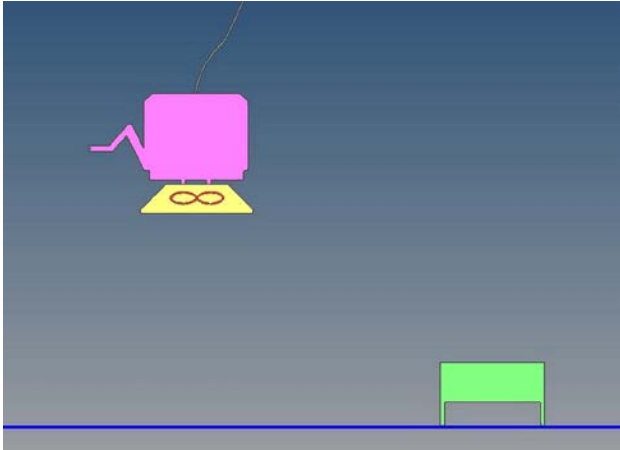


Figure 1a: ROV carries BEP to the sea floor. Cable is dry-mated to BEP and figure-8 mounted to BEP's outside surface via removable "horns".

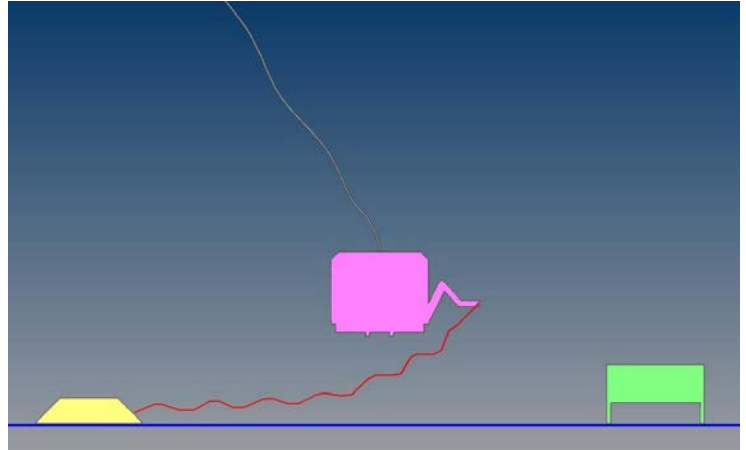


Figure 1b: ROV pulls cable from BEP and travels to RSN Node

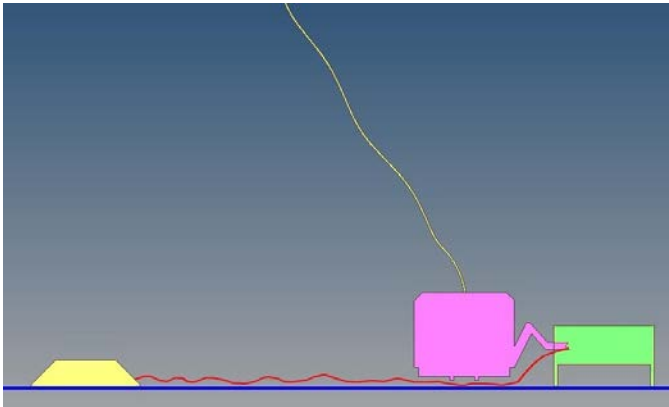


Figure 2c: ROV makes wetmate connection to RSN Node.

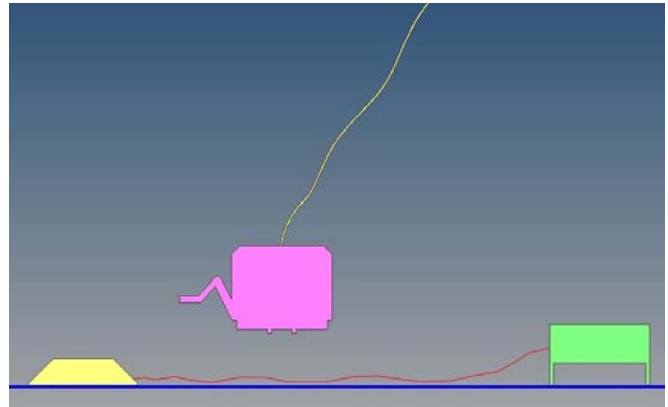


Figure 1d: ROV returns to BEP, retrieves horn assemblies, closes doors, surfaces.

7 Mission Monitoring

xxx

8 Recovery

xxx

8.1 Pre-Recovery Operations

Benthic Experiment Package: Logistics, Operations, and Refurbishment Plan

8.1.1 Scheduling and Cruise Planning

Ship

ROV

8.2 Recovery Operations

i. Recovery onto the Vessel

ii. Transportation

8.3 Post-Recovery Operations

8.3.1 Cleaning

8.3.2 Disassembly and Storage

8.3.3 xxx

9 Reporting

9.1 Pre-deployment

9.2 Post-recovery

10 Decommissioning

xxx

11 Reference Information

Table 1-1: Acronyms

Acronym	Definition
ADCP	Acoustic Doppler Current Profiler
ASM	Assembly
BEP	Benthic Experiments Package
BEPT1	Benthic Experiments Package Test 1
CAD	Computer Aided Design
CGSN	Coastal and Global Scale Nodes
CTD	Conductivity Temperature Depth
DCL	Data Concentrator-Logger

Benthic Experiment Package: Logistics, Operations, and Refurbishment Plan

Acronym	Definition
DT	Developmental Test
E/M	Electrical-Mechanical
FRP	Fiberglass reinforced plastic
HDPE	High Density Polyethylene
IO	Implementing Organization
ISMT2	Inshore Mooring Test 2
OOI	Ocean Observatories Initiative
OSU	Oregon State University
PVC	Polyvinyl chloride (a common thermoplastic)
ROV	Remotely Operated Vehicle
RSN	Regional Scale Nodes
TRR	Test Readiness Review

11.1 Documents

The following documents are listed for guidance and reference. The only "official" version of any document is the most recent CCB approved version. Documents are maintained in the OOI Document Management System (DMS).

Document Identifier	Document Title
3167-40102	Benthic Experiment Package Interface Verification
3205-00007	CGSN Site Characterization: Endurance Array
3315-00001	Benthic Experiments Package Trade Study
3315-00003	BEPT1 Developmental Test (DT) Plan
3315-00005	BEPT1 Dockside Deployment Simulation Procedure
3315-00006	BEPT1 Popup Buoy CO Procedure
3315-00007	BEP Predeployment Quick Look Report
3315-00009	Benthic Experiment Package Developmental Test 1 (BEPT1) Recovery Cruise Plan
3315-00010	BEPT1 deployment Quick Look Report
3208-00013	BEP Deployment & ISMT II Recovery, 6 August 2011 Cruise Plan R/V Wecoma
3315-00011	Evaluation Report Cover-panel Securing Options
(Powerpoint presentation)	BEPT1 Test Readiness Review (TRR) August 4, 2011

Spare parts kit

PRE-DEPLOYMENT CHECKLIST

- * Check PHSEN and CTD inlet ports
- * Check doors locked in open position
- * Cut off Hydrophone Cap tie wraps
- *

DEPLOYMENT (after touchdown)

1. ROPOS separation from BEP
2. Connection to LV NODE
 - a. Cut cord restraints on 50m cable
 - b. While holding free Wetmate, ROPOS backs away at 10 deg angle from bottom
 - c. Attach wetmate to LV Node
 - d. Return to BEP
3. Deployment of Hydrophone Frame (HYDRO)
 - a. Approach BEP at FWD STB corner
 - b. Cut cord restraints on HYDRO cable (help fall away if needed)
 - c. Cut HYDRO-BEP strap. Return strap handles (if possible)
 - d. Right manipulator hand (RH) holds HYDRO handle "A" while left manipulator hand (LH) grasps BEP Capture Bar Handle
 - e. Capture Bar Handle is moved up, thus allowing HYDRO to rotate
 - f. LH grasps HYDRO handle "B"
 - g. Lift HYDRO up and away from BEP
 - h. Back away from BEP and stop before cable is taut.
 - i. Place HYDRO on bottom
 - j. Remove protective cap and place in ROPOS basket
 - k. Return to BEP
4. Remove and stow cable horns
4. Unlock and close BEP Doors
5. Terminate mission

