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**MFSTEP
E2-M3A BUOY****DETAILED DESIGN OF BOMA ADAPTATION
TO MFSTEP CONFIGURATION**

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DETAILED DESIGN OF BOMA
ADAPTATION TO MFSTEP
CONFIGURATION

1 SCOPE

Scope of this document is to describe in detail the mechanical and electrical (hardware and software) modification work that will be carried out on the existing buoy BOMA, to upgrade it to the configuration required by MFSTEP project.

2 REFERENCE DOCUMENTS

- [1] "E2-M3A buoy design" (Tecnomare document A1356-REL-W100-002.0)
- [2] "Automatic data dispatching procedure" (Tecnomare document A1356-REL-W200-004.0)
- [3] "Detailed design of Water detect and Acceleration monitoring Unit" (Tecnomare document A1356-REL-W100-006.0)
- [4] E2-M3A Data Book (draft issue)
- [5] "Minuta di meeting, Trieste 9/10/2003" (Tecnomare document A1356-VER-W200-003.0)

DETAILED DESIGN OF BOMA
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3 MECHANICAL MODIFICATIONS

Mechanical modifications include

a) Auxiliary hoist

Designed to handle heavy packages in buoy compartments 2 (battery packs) and 3 (pumping system).

Status: design complete (see Tecnomare drawing A1356-DIS-W200-M001); manufactured and installed onboard the buoy.

b) Conduits for additional cables

Designed to ensure adequate protection to the new cables arriving from the CTD chain.

Status: design complete; manufactured and installed onboard the buoy.

c) housing for Nutrient Analyser

Designed to keep the NAS-2E in water when installed inside the buoy compartment # 3 and connected to the pumping system, thus preventing excessive heating that might affect autonomy and duration of reagents.

Status: design complete (see Tecnomare drawing A1356-DIS-W200-M002); manufactured; to be mounted on the buoy during one of the next cruises.

d) support for the second TACS antenna

A second antenna has to be installed (close to the already available one) and connected to a new unit in the electronic compartment.

Status: support has to be designed and manufactured; antenna to be mounted on the buoy during one of the next cruises.

e) supports for the new electronic boxes

Four electronic boxes (described in paragraphs 4.1, 4.2, 4.3, 4.4) have to be mounted and connected inside compartment # 1.

Status: supports have to be designed and manufactured; boxes to be mounted on the buoy during one of the next cruises.



f) support for the refrigerator

A refrigerator will be mounted (to be confirmed) close to the Nutrient Analyser, to keep reagents at low temperature for the whole duration of the mission.

A refrigerator suitable for the application has been identified.

A support has to be designed and manufactured (if it will be decided to proceed with the purchase of the refrigerator); to be mounted on the buoy during one of the next cruises.

4 HARDWARE MODIFICATIONS

The new interconnection diagram is reported in Tecnomare document A1356-DIS-W200-I001.

This section describes the new hardware devices that have been developed and tested. They will be integrated in the buoy during the next maintenance interventions.

4.1 Water Detect and Acceleration Monitoring Unit

It is a new electronic unit developed by Tecnomare able to monitor the Buoy vertical acceleration (heave) and the presence of Water in the three Buoy compartments.

This unit has the following interfaces:

- 3 electrical pairs for the water detectors (one for each)
- 1 RS232 link (three wires: TX, RX, GND) + Power (two wires: 12 Vdc, 0 Vdc).

Power + RS232 link will be used to interface this unit to the DACS (Data Acquisition and Communication System) currently operating in BOMA.

A detailed description of this unit is reported in [3].

4.2 E-Tacs Link + IP-Module

This system is composed of the following units:

- Antenna
- E-TACS phone
- Telematic Unit making available a PSTN (Public Switched Telephone Network) interface



- Modem + Module-IP making available SMTP and FTP protocols

Power + RS232 link will be used to interface this unit to the DACS currently operating in BOMA.
A detailed description of this unit is reported in [2].

4.3 Inductive Modem

This unit will manage communication with the CTD chain.

It is composed of an electronic card (manufactured by SeaBird) having the following interfaces:

- connector for the inductive cable of the CTD chains;
- Power + RS232 link

Power + RS232 link will be used to interface this unit to the DACS currently operating in BOMA.

4.4 Refrigerator power switch

This unit will manage switch on/off of the refrigerator on command from the buoy DACS.

5 SOFTWARE MODIFICATIONS

The following software tasks have been implemented and tested in a electronic unit simulating the DACS installed in the BOMA buoy:

- Software driver to manage the *Water detect and Accelerometer monitoring Unit*
- Software driver to manage the *CTD chain*
- Software driver to manage the *Nutrient Analyser*
- Software task to monitor the position of the Buoy inside the Safety Circle
- Automatic expedition of the daily summary file via FTP
- Automatic daily expedition of a technical message via e-mail
- Automatic daily expedition of alarm messages via e-mail
- Switch on/off of the refrigerator