Royal Netherlands Institute for Sea Research

Specification of a Deep-Sea Vertical Microstructure Profiler (VMP) for Royal NIOZ

1. Introduction

NWO-I / Royal Netherlands Institute for Sea Research (NIOZ) is the national oceanographic institute and principally performs and promotes academically excellent multidisciplinary fundamental and frontier applied marine research addressing important scientific and societal questions pertinent to the functioning of oceans and seas. NIOZ serves as national marine research facilitator (NMF) for The Netherlands scientific community.

Ocean turbulence influences the uptake and storage of for example heat, carbon, and nutrients, and significantly impacts ocean chemistry, marine biology, and ecosystem dynamics. Even though turbulence is a fundamental physical process that occurs on the smallest of scales, it influences our climate on global scales. Observational studies combining ocean biogeochemistry and turbulent processes are currently frontier research activities. The foundation of this work is the ability to measure ocean turbulence, for which a Vertical Microstructure Profiler is needed.

2. Abbreviations

CTD	Conductivity Temperature Depth
VMP	Vertical Microstructure Profiler

3. Application and intended use

The VMP will be used to perform marine research in seas, oceans, fjords and possibly lakes at a maximum of 6,000 meters depth rating.

4. One VMP with a depth rating of 6,000 m.

We expect the VMP to be a full ocean-depth profiling system for measurement of turbulence and microstructure, CTD and other oceanographic parameters. The depth rating of all options and sensors will at least have a similar depth rating as the VMP.

4.1 The VMP will be equipped with the following items or of better or equivalent quality:

a. Rechargeable battery package.
b. Up to 6 turbulence sensors (shear probes, thermistors, micro conductivity).
b. WOCE accuracy CTD.
c. High grade accelerometers (3x).
d. Internal data acquisition.
e. Ballast release mechanism.
f. Geo-electro magnetic current meter for fine-scale shear measurements.
g. RF beacon, ARGO transmitter and Xenon flasher.
h. Standard spares and tools set. Please specify parts included.

4.2 The following sensors should be quoted as optional:

a. SBE7 Micro-Conductivity Sensor.
b. Seapoint Deep Sea Turbidity Sensor.

4.3 Please indicate

a. Accuracy of the measured turbulence at 6,000 m depth.
b. Recharging time of the batteries.
c. Number of profiles possible with a fully charged battery pack.
d. The dimensions and the weight in air of the VMP using all the sensors mentioned in § 4.1 and § 4.2 of this specification document.
e. Please describe the vessel requirements for deployment and recovery of the VMP.
f. Which sensors/instruments are fixed and which are easy to remove. An easy to remove sensor can easily be removed, by using the manual, by the user or an electronics technician with minimal effort, without soldering, glue or factory re-calibration needed afterwards.
g. Which sensors/instruments exclude the use of which other sensors during a mission.
h. Please specify possible future updates on the hardware that are planned the next 2 years after delivery of the VMP including a cost estimate and possible discounts.

5. Miscellaneous

- The VMP should be fully ready for operation, including tests and calibrations.
- The supplier will propose a launch and recovery method for the VMP using a crane or an A-frame, without using a MOB-boat, from NIOZ research vessels Pelagia and successor Anna Weber-van Bosse.
- Including an operational training and maintenance training for 4 NIOZ employees.
- CIP transport to NIOZ in the Netherlands or an equivalent location in Europe to be decided by NIOZ.
- Please specify possible on-site trouble shooting possibilities in response time, location and day rates (in EURO).

6. Maintenance and operational costs

Please quote as an option:

- If necessary, a regular preventive maintenance inspection and/or calibration at your service centre. Please specify the scope of a regular maintenance inspection.
- Calibration costs of the sensors that are mentioned in § 4.1 and § 4.2.
- Software maintenance and new software releases after the warranty period.

Please indicate if you have an VMP service centre in Europe. If so, where is this centre located?

The quotation shall also specify the lead time for spares and consumables.

7. Warranty

The standard warranty period is one year after successful delivery and acceptance of the VMP.

The warranty will comprise:

- Repair or replacement of defective components. Please indicate respond time including delivery of component(s) to a location in Europe.
- Technical support service (phone/email) for assistance in solving problems during operation of the VMP.
- Software maintenance and new software releases.

A 2-year extended warranty, so 3 years in total, should be quoted as an option.

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8. Purchase conditions

The attached Appendix B General Government purchasing conditions 2018 (ARIV 2018) apply to this request for quotation.

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