



# **REQUEST FOR INFORMATION (RFI)**

## **In-Situ Dissolved-Gas Mass Spectrometer**

**Version 1-0**

Prepared by  
University of Washington  
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## 1. SCOPE AND PURPOSE

This Request for Information (RFI) is being issued to solicit comments and information from potential providers of a Dissolved-Gas Mass Spectrometer Instrument (MASSP). The University of Washington may acquire such an instrument for use on the Regional Scale Nodes (RSN) component of the Ocean Observatories Initiative (OOI) network. This device, installed at the summit of Southern Hydrate Ridge and at the caldera of an active submarine volcano (Axial Seamount) in the Northeast Pacific Ocean, will make in situ measurements of dissolved gases such as hydrogen, oxygen, carbon dioxide, nitrogen, carbon monoxide, hydrogen sulfide, methane, and other higher molecular weight hydrocarbons in hydrothermal and methane seep environments.

Information gathered from this Request for Information will be used to identify potential providers of MASSP instruments and possible revisions of instrument specifications and requirements. Should the University determine a competitive marketplace exists, a Request for Proposal (RFP) will be issued. Responses to this notice are not offers and cannot be accepted by University of Washington Purchasing to form a binding contract. Respondents are solely responsible for all expenses associated with responding to this RFI.

All documents submitted as part of this process are considered part of the public record and thus available for any party's review upon request. If a request is made to view information the University will comply according to appropriate Public Disclosure statutes.

Supplier should clearly identify any material such as, but not restricted to, valuable formulae, design, drawing, and research data claimed to be exempt from public records request, as allowable by law (RCW 42.56.270), along with a statement of the basis for such claim of exemption. The University will give notice to the supplier of any request for disclosure of such information. Failure to so label such materials or to timely respond after notice of request for public disclosure has been given shall be deemed a waiver by the submitting supplier of any claim that such materials are, in fact, exempt.

## 2. BACKGROUND

### 2.1 Ocean Observatories Initiative (OOI) Overview

Although the ocean is central to the habitability of our planet, it is largely unexplored. Biological, chemical, physical, and geological processes interact in complex ways in the ocean, at the seafloor, and at the air-sea interface. Our ability to learn more about these processes is severely limited by technical infrastructure, and developing a more fundamental scientific understanding of these relationships requires new and transformational approaches to ocean observation and experimentation.

The OOI will lay the foundation for future ocean science observations. OOI will enable powerful new scientific approaches by transforming the community's focus from expedition-based data gathering to persistent, controllable observations from a suite of interconnected sensors. The OOI's networked sensor grid will collect ocean and seafloor data at high sampling rates over years to decades. Researchers will make simultaneous, interdisciplinary measurements to investigate a spectrum of phenomena including episodic, short-lived events (tectonic, volcanic, oceanographic, biological, and meteorological), and more subtle, longer-term changes and emergent phenomena in ocean systems (circulation patterns, climate change, ocean acidity, and ecosystem trends).

The OOI will enable multiple scales of marine observations that are integrated into one observing system via common design elements and an overarching, interactive cyberinfrastructure. Coastal-scale assets of the OOI



will expand existing observations off both U.S. coasts, creating focused, configurable observing regions. Regional cabled observing platforms will ‘wire’ a single region in the Northeast Pacific Ocean with a high speed optical and high power grid. Global components address planetary-scale changes via moored open-ocean buoys linked to shore via satellite. Through a unifying cyberinfrastructure, researchers will control sampling strategies of experiments deployed on one part of the system in response to remote detection of events by other parts of the system.

A more detailed discussion of the Oceans Observatories Initiative can be found in the OOI Final Network Design (FND). (Consortium for Ocean Leadership, Inc. 2010, “Final Network Design”, Washington, DC. [Online] Available: <http://www.oceanleadership.org/programs-and-partnerships/ocean-observing/ooi/network-design/>)

## 2.2 Instrument Deployment Locations and Conditions

The MASSP Instruments will be deployed on the seafloor at boundaries of the Juan de Fuca Plate, specifically at the summit of Southern Hydrate Ridge and at the caldera of Axial Seamount. Instruments will be connected to the Regional cabled portion of the OOI, which will provide power, bandwidth and near-real-time communications/data retrieval. The lengths of deployment, before servicing and maintenance, will be 12-13 months and will depend on system maintenance schedules and weather conditions.

Deployment at the Axial Seamount site will be at a water depth of 1500 –1600 meters with ambient seawater temperatures of 2 – 3 °C. While the area is a hydrothermal vent field with high temperature (>300 °C) fluids discharging from discrete orifices of hydrothermal chimneys, the fluids targeted for dissolved gas measurements using the MASSP Instrument will likely be limited to those from more diffuse flow regimes spatially removed from the high-temperature fluids/edifices. The temperatures of the fluids of interest from these diffuse flows at the seabed will normally be within the range of 20 – 30 °C, although temperatures exceeding 50 °C have been also been observed at diffuse flows nearest the hydrothermal chimneys.

The Hydrate Ridge deployment will be at a water depth of 800 – 825 meters with ambient seawater temperatures of 4 – 5 °C. Measurements of dissolved gases with the MASSP will focus on fluids near or at the seabed and influenced by methane seeps associated with extensive hydrate deposits below the seafloor. While the monitoring emphasis and deployment plan will attempt to limit sampling to dissolved gases, gas bubbles emanating from the seabed may also be entrained into the sampled and monitored fluids.

Additional details and descriptions of the deployment locations can be found in the FND.

## 3. DESCRIPTION OF INFORMATION REQUESTED

### 3.1 Evaluation of General Hardware and Operational Requirements

**Attachment A** is a tabulation of the **General Hardware and Operational Requirements** for instruments on the RSN cabled observatory network.

- For each of the listed items in the form, please indicate the ability of your current technology for the MASSP to meet and/or exceed the threshold “shall” and objective “should” requirements. For those requirements that cannot be met, you may offer an alternative (other\*) capability and/or comment on the suitability of the requirement.



- In the space for Additional Comments, you may expand your responses with general comments on the appropriateness of the requirements and/or whether there might be *specific* and *significant cost-drivers* associated with them.

### 3.2 Evaluation of MASSP-Specific Instrument Hardware & Performance Requirements

**Section 1 of Attachment B** contains **Instrument Hardware Requirements** specific to the MASSP Instrument on the RSN cabled observatory network.

- For each of the listed items in the form, please indicate the ability of your current technology for the MASSP to meet and/or exceed the “shall” and objective “should” requirements. For those requirements that cannot be met, you may offer an alternative capability and/or comment on the suitability of the requirement.
- In the space for Additional Comments, you are requested to describe the factors (e.g. waste gas) that may limit the frequency of measurements with your instrumentation over a 12-13 month deployment period and what techniques you utilize to mitigate those limitations. Please expand your responses with general comments on the appropriateness of the requirements and/or whether there might be *specific* and *significant cost-drivers* associated with them.

**Section 2 of Attachment B** addresses the MASSP **Measurement Performance Requirements** with a tabulation of specific suites of dissolved gases that are prioritized by scientific interest.

- Please provide the detection and quantification limits and performance metrics (i.e. accuracy, precision) of your instrumentation for those dissolved gas analytes.
- In the space for Additional Comments, you are requested to expand upon or add clarifications to the performance metrics listed. You may also expand your responses with general comments on the appropriateness of the performance requirements and/or whether there might be *specific* and *significant cost-drivers* associated with them.
- The Additional Comments may also include a discussion of optional technologies that you are able to suggest and provide for quantification of the specific suites of required and desired target analytes and/or subsets thereof.

**Section 3 of Attachment B** addresses the MASSP **Calibration Methodologies**.

- Please provide a description of the Calibration Methods that you recommend for the quantification of the suites of target analytes listed in Section 2. If you can also provide the Calibration Instrumentation please include a detailed summary of this option and the *specific* and *significant cost-drivers* associated with such calibration instrumentation and protocols.

### 3.3 System Recommendation, Cost and Delivery Estimates

No specific form is required for the System Recommendation, Cost and Delivery Estimates. Respondents may use whatever format\* is most applicable for their instrumentation and documentation thereof.



- Please recommend a system that is capable of making in situ measurements in the Instrument Deployment Locations and Conditions described in section 2.2 of this RFI, and that enables calibration of the results. To the greatest extent possible, the recommended system should meet the requirements stated in attachments A and B.
- Please provide a cost estimate for the recommended system. You may list specific options, e.g. calibration instrumentation, separately.
- Please indicate specific hardware and/or performance requirements which may be driving significantly higher costs and recommend appropriate alternatives.
- Please provide a Delivery Estimate for the instrumentation and accessories as recommended.

\* Respondents are encouraged to provide specification documents, data sheets or manuals for instruments in the respondent's existing format(s).

## 4. HOW TO RESPOND

### 4.1 Questions and Answers Regarding RFI

Please submit any questions/comments you have regarding this RFI by **5:00 PM PDT, July 20<sup>th</sup>, 2011** to:

**Kassy Ellefson, Senior Buyer**  
**University of Washington Purchasing Services**  
**Ellefson@uw.edu**

Questions and responses will be posted by **5:00 PM PDT, July 25<sup>th</sup>, 2011** on the website at:  
<https://fortress.wa.gov/ga/webs/>

### 4.2 Final Response to RFI

Please submit your final response to this RFI by **5:00 PM PDT, July 29<sup>th</sup>, 2011** to:

**Kassy Ellefson, Senior Buyer**  
**University of Washington Purchasing Services**  
**Ellefson@uw.edu**

The University's email server time stamp will be the official time stamp on all proposals submitted by email. Suppliers are encouraged not to wait to the last minute to submit in case of differences between the Supplier's email time and the University's email time.