

Abstract

Project Title:	Acquisition of Laser Raman Spectrometer (Year 2)
Lead Scientist:	Peter Brewer
Lead Engineer:	George Malby
Project Manager:	George Malby

This is the continuation of the year 2000 effort under which the components of the spectrometer were defined and a purchase order was placed with Kaiser Optical Systems for the acquisition of the basic spectrometer. It is anticipated that by the end of year 2000, the spectrometer will be assembled at MBARI into a working bench top unit suitable for initial methods development activities to occur during the first quarter of year 2001. Final assembly and integration of the spectrometer into a pressure vessel will also occur during the first quarter of 2001. During the second quarter of 2001, the methods development tasks will continue, integration of the spectrometer hardware and software with an ROV and its associated control room will occur and in water engineering testing of the packaged unit will take place. During the third quarter of 2001, initial science testing of the spectrometer will take place in-situ in order to validate the applicability of the spectrometer to "real" science problems. The fourth quarter of 2001 will be devoted to documenting the engineering design of the spectrometer, documenting the science results obtained to that date, and defining ways that the spectrometer will be useful in further research applications.

In order to make the spectrometer useful for scientific research in the ocean, two additional capabilities above that provided by the basic instrument will be needed. First, a way to visualize the sample that is actually being analyzed is required. This function will be provided by the addition of a white light, "through the lens", illumination system and a companion CCD video imaging camera. White light is required for visualization rather than the already existing laser light because the coherent laser illumination creates images consisting largely of fringe patterns which are very hard to interpret when looking at a video monitor. Exactly where this function will be placed in the optical path of the spectrometer will depend on the, "as built", demonstrated sensitivity of the spectrometer and the resulting tolerance of light path signal losses which result from the addition of the required implementing optical elements (beam splitters, relay optics, etc).

Second, a precision optical head positioning capability is needed. The spectrometer will be capable of sampling both on the macro and micro scale depending on the optical head exit optics fitted (which will be able to be changed to meet mission specific needs). For, in water, year 2001 experiments, the optical head will be hard mounted to the ROV limiting the ability to make observations at the micro scale. To make the spectrometer truly useful, a stand alone, off vehicle deployable, remotely controllable, precision XYZ positioner will be designed and built.

Design work will begin on a sediment insertion probe for determining pore water geochemical signals. Realization of the hardware for this task will be proposed for year 2002

It is proposed that both the video visualization system and the precision XYZ positioner be designed and built as part of the year 2001 effort.

Continuing Projects *(Please answer the following questions)*

- 1. There are no significant deviations from our year 2000 proposal. However, the definition of the requirements for the performance of the spectrometer took longer than anticipated and as a result, the contract for the acquisition of the spectrometer was not placed as early as originally planned. In addition, the demand by other MBARI programs for engineering staff time will delay the start of some efforts (specifically in the software engineering area). It was anticipated that a fully functional spectrometer would be available by the end of December 2000. This milestone will now occur during the second quarter of 2001.*
- 2. We need all of the resources requested for year 2000.*
- 3. We do not need resources not requested for year 2000.*

4. Only anticipated problems are those associated with the availability of MBARI engineering resources.

Abstract Resource Requests

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Please check off which resources you expect to need for this project.

IAG

☐ Software Applications	☐ < 10 days	☒ > 10 days
☐ Software Engineer	☐ < 10 days	☐ > 10 days

ENGINEERING

☐ Electrical Engineer	☐ < 10 days	☒ > 10 days
☐ Mechanical Engineer	☐ < 10 days	☒ > 10 days
☐ Software Engineer	☐ < 10 days	☒ > 10 days
☐ Research Engineer	☐ < 10 days	☐ > 10 days
☐ Other: _____	☐ < 10 days	☐ > 10 days

ITD

☐ Video Lab Support	☒ < 10 days	☐ > 10 days
☐ Web support	☐ < 10 days	☐ > 10 days
☐ Documentation	☐ < 10 days	☐ > 10 days
☐ CTD Data Tech	☐ < 10 days	☐ > 10 days
☐ Tech Transfer	☐ < 10 days	☐ > 10 days
☐ Sample Archiving	☐ < 10 days	☐ > 10 days

DMO

☐ Director	☒ < 10 days	☐ > 10 days
☐ Deputy Director	☐ < 10 days	☐ > 10 days
☐ Ventana Pilot	☐ < 10 days	☐ > 10 days
☐ Tiburon Pilot	☐ < 10 days	☒ > 10 days
☐ Ocean Observatory Support	☐ < 10 days	☐ > 10 days
☐ Marine Ops Tech	☐ < 10 days	☒ > 10 days
☐ Ops/CTD Tech	☐ < 10 days	☐ > 10 days
☐ Model Shop	☒ < 10 days	☐ > 10 days
☐ Diver	☐ < 10 days	☐ > 10 days

TSD

☐ EE Tech	☐ < 10 days	☒ > 10 days
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☐ ME Tech
☐ Machine Shop
☐ Computer/IS Support

☐ < 10 days
☐ < 10 days
☒ < 10 days

☒ > 10 days
☒ > 10 days
☐ > 10 days