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SEA TECH INC.

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PROGRESS REPORT  
TO  
OFFICE OF NAVAL RESEARCH

CONTRACT NO: N00014-86-C-0784

TITLE: Development of an Optical Feedback Based  
High Accuracy Beam Transmissometer

ITEM NO: 0001AH

DATE: 15 APRIL 1989

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**PROGRESS REPORT: Development of Optical Feedback Based  
High Accuracy Beam Transmissometer**

Sea Tech Inc.

Contract No. N00014-86-C-0784

Item No. 0001AH, 89APR15

**INTRODUCTION**

Work during this period has concentrated on the design and fabrication of the optical bridge microprocessor, specifically the implementation of the hardware. Significant progress has been made toward the development of a versatile data processor that can be used to acquire transmissometer data.

**RESEARCH RESULTS**

A significant aspect of the design of the optical bridge is the temperature compensation of the two light sensors. At the blue wavelength used in the bridge, sensors have a more significant temperature coefficient than at red wavelengths. In this design, the two sensors will be physically separated, producing undesirable effects in the presence of temperature gradients.

One way of dealing with the temperature compensation problem is to do it numerically in a microprocessor-based system. Sea Tech has chosen this route. The vehicle for doing this is a versatile data recorder. The data recorder is microprocessor-based and uses battery-backed memory for data storage. The real power for application to the optical bridge is the inclusion of a full-featured BASIC language interpreter. BASIC will allow functional approximations to temperature sensor responses and the use of data tables filled during calibration for highest precision. (AW)

The data recorder is very near design completion. There are three major circuit boards in the recorder. The controller board includes the microprocessor, data memory and program memory. The second version of this board is in hand and ready for testing. The converter board includes analog signal processing circuitry and an analog/digital converter.

The second version of this board is also in hand and ready for testing. The power control board has been extensively revised from its first version and the board layout is nearly complete. An operational unit is expected by late May.

### CONTINUING WORK

Cree Research is making progress in the design and fabrication of custom blue LED's. Cree has supplied these LED's to Sea Tech for evaluation. These prototype chips have been tested by Sea Tech, they emit at 470 nm and have approximately 60 nm full width at half maximum bandwidth, output power was approximately one microwatt. Cree is trying to achieve six microwatts of output power and recently informed Sea Tech that blue chips have been fabricated that produce greater than three microwatts of power.

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