FY 2013 PHASE II AWARD WINNER

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AWARD:	$399,993
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PRINCIPAL INVESTIGATOR:	James C. Beck
TITLE OF PROJECT:	Development of a Long Term pH and pCO2 Lagrangian Drifter
SUBTOPIC NUMBER:	8.3.1C

TECHNICAL ABSTRACT:

Quantifying oceanic CO2 uptake and ocean acidification and understanding their impact on global climate and ocean ecology are key goals of NOAA's climate change research programs. NOAA's request for Development of a long-term Lagrangian pH and pCO2 drifter (SBIR Subtopic 8.3.1C) aims to address these goals by developing technology that measures both pCO2 and pH that can be widely deployed in the world's oceans.

Sunburst Sensors proposes to develop an innovative, reasonably priced pH and pCO2 measurement system for oceanic surface drifters. Indicatorbased opto-fluidic sensors have been designed and fabricated using microfluidic manufacturing techniques. Success in Phase I led to a prototype sensor that will be evaluated and refined. Alternative optical components will be tested and a final opto-fluidic cell will be designed. A modified circuit board, firmware and client software will be developed to control the system and interact with the drifter's satellite modem and strain gauge. The system will then be packaged to fit into a Global Drifter Program style drifter.

The total system will be pier tested for two weeks to evaluate performance and ultimately deployed in the ocean from a research vessel, with data collected for the sensor lifetime (~1 year) or until it ceases operation.

SUMMARY OF ANTICIPATED RESULTS:

This research will result in a new cost-effective sensor that can measure both pH and pCO2 with the required accuracy and precision for oceanographic carbon cycle research. The combined sensor will meet Global Drifter Program specifications to allow researchers to pursue integration of the sensor in the GDP. The product will lead to a significant market for Sunburst Sensors, with sales expected of 50-100 per year. Widespread surface measurements of pH and pCO2 will help fulfill several of NOAA's core objectives outlined in the U.S. Carbon Cycle science plan, i.e.

- "Provide clear and timely explanation of past and current variations observed in atmospheric CO2 and CH4 and the uncertainties surrounding them;