SPECIAL NOTICE 12-SN-0014

ONR Industry Day & Technology Showcase

Hypoxia Monitoring, Alert and Mitigation System

General Information:
Classification Code: A – Research and Development
NAICS Code: 541712

DESCRIPTION: The Office of Naval Research (ONR) will be holding an Industry Day on **Tuesday, July 31, 2012 at 8:30 am** at One Liberty Center, Office of Naval Research, 875 N. Randolph St., 14th Floor (MIC), Arlington, VA 22203. The objective of this conference is to enhance ONR-Industry collaboration in the planned development of a Hypoxia Monitoring, Alert and Mitigation System. Neither the Office of Naval Research (ONR) nor any other part of the federal government will be responsible for any cost incurred by traveling to or participating in this Industry Day.

The agenda will include introductory presentations by CDR Sheri Parker, Warfighter Protection and Application Division Deputy, Office of Naval Research; and Dr. Barry Shender, Chief Scientist, Naval Air Systems Command. Vendors will be provided the opportunity to have 20-minute closed-door sessions with a technical panel following the introductory presentations. Presentation can be in contractor format. Vendors must RSVP to CDR Parker (contact information is at the end of this notice) by 24 July 2012 in order to be scheduled for a closed-door session. Time slots are limited. Sessions will continue to be scheduled until all time slots are filled. The day will conclude with a Summary and Closing Remarks.

BACKGROUND: The Office of Naval Research, Code 34, Warfighter Performance Department is seeking information regarding development, evaluation, and delivery of scientifically proven methodologies and technologies that enable the cognitive and physical superiority of Navy and Marine warfighters. Specifically, this notice requests information (given during the 20-minute closed-door sessions) that will aid in the development a BAA/ solicitation in the FY13/14 timeframe for three versions of a hypoxia monitoring, alarm, and mitigation system. The three versions are a fixed wing tactical, a rotary wing (RW), and a ground. The hypoxia monitoring, alarm, and mitigation systems will predict/detect/warn warfighters of impending hypoxic events based on individual physiological, environmental, and cognitive monitoring. The tactical version shall account for both altitude and acceleration-induced hypoxia; the rotary wing and ground systems will include a mitigation component, e.g., supplemental oxygen. The goal is to provide optimal protection of military personnel and equipment through intelligent monitoring and adaptive modeling that accounts for individual differences in tolerance and provides timely notification/warning aids such that personnel can take corrective action before human/air vehicle assets are compromised or lost.

SPECIFIC GOVERNMENT INTEREST: The primary technology areas of interest are (1) sensing suite, (2) detection/prediction algorithm, (3) warning modalities, and (4) modes of mitigation. Physiologic sensors must be miniaturized sensors self-contained, low power, and unobtrusive, and must require minimal interaction with warfighters. These should be easy to maintain and calibrate without special tooling. Any person-borne system must not present an increased injury risk in the event of aircraft ejection or vehicle crash. Physiologic monitoring for tactical suites should include oxygen mask breathing air quality/expiration of O2, CO2, flow, and pressure. Other parameters should be monitored to detect the presence of toxins in breathing gas, such as CO, NO, and hydrocarbons. Tissue responses, such as blood oxygen saturation (SpO2), cerebral tissue oxygen content (rSO2), and blood dyshemoglobins (carboxyhemoglobin (COHb) and methemoglobin (MetHb)) should be considered. Respiratory rate and function, as well as physical workload are also key parameters. Consideration should be given for developing sensor suites that do not include a tightly sealed aviator mask as well. The system should include environmental measures, such as barometric pressure, acceleration, temperature and humidity. All recommended sensing transducers should specify the necessary calibration methods for error sources. An advanced adaptive monitoring algorithm should account for both the textbook predictions of hypoxia based on barometric pressure as well as individual variations in tolerance. It should predict physiologic state and how it changes over time and compute level of risk accordingly. The working environment will have multiple noise sources, including speaking, respiratory maneuvers, mask leaks, and data drop outs which must be considered. Predicted decrements in physiologic and cognitive / motor responses should factor into the decision algorithm to classify the type of warning issued. The responses (given during the 20-minute closed-door sessions) shall include a thorough description of the associated supporting power requirements, electronics, PPE and LSS integration details, safety-of-flight testing necessary to obtain a safe-to-fly status for at least initial testing, procedures for using the recommended system, and how such a system would impact the maintenance and life-cycle costs associated with a potential deployment of the system across specific aircraft types.. Technologies should demonstrate that they meet and ideally exceed the current state of the art in quantitative metrics such as (but not limited to) size, weight, efficiency, effectiveness, producibility, power and interface requirements, term of expected availability, suitability for the industrial and military marketplace, initial cost, and life-cycle costs.

QUESTIONS AND POINT OF CONTACT: Questions of a technical nature regarding this RFI may be sent to the following Technical Point of Contact: Name: CDR Sheri Parker, MSC, USN Address: Office of Naval Research 875 N Randolph St, Arlington, VA 22203 Email Address: sheri.parker@navy.mil

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