

Special Notice 11-SN-0026
Special Program Announcement for 2011 Office of Naval Research
Basic Research Opportunity:

“Integrated Hybrid Structural Management System”

I. INTRODUCTION:

This announcement describes a Future Naval Capability (FNC), entitled “Integrated Hybrid Structural Management System” to be launched under the Office of Naval Research (ONR) Long Range Broad Agency Announcement (BAA) for Navy and Marine Corps Science and Technology 11-001, which can be found at <http://www.onr.navy.mil/Contract-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>. The research opportunity described below in this Special Program Announcement specifically falls under numbered paragraph 1 of the “Naval Air Warfare & Weapons (Code 35)” and the “Sea Warfare & Weapons (Code 33)” sub-section of BAA 11-001, Section I, item 6, Research Opportunity.

The research opportunity described in this announcement can be found at:

<http://www.onr.navy.mil/Science-Technology/Departments/Code-35/All-Programs/air-warfare-352/Air-Platforms-Affordability.aspx> and <http://www.onr.navy.mil/Science-Technology/Departments/Code-33/All-Programs/332-naval-materials/Composite-Materials-and-Prognostics.aspx>

White papers and proposals may be received under the new ONRBAA12-001, which is expected to be released in September 2011, since the requested submission date for white papers and proposals will be after the expiration of the ONRBAA11-001. Once the new ONRBAA12-001 is released, this special notice will be amended to require the white papers and proposals to be submitted under that BAA number, instead of ONRBAA11-001. Potential Offerors may review the current ONRBAA11-0001 to get a general understanding of what the submission requirements may be in the ONRBAA12-001.

The purpose of this announcement is to focus attention of the scientific community on (1) the area to be developed, and (2) the planned timetable for submission of white papers and full proposals.

II. TOPIC DESCRIPTION: Integrated Hybrid Structure Management System

The Office of Naval Research is interested in receiving white papers from system integrators in Structural Health Management--specifically for the Integrated Hybrid Structural Management System (IHSMS) Enabling Capability (EC) Future Naval Capability (FNC). The objective of the IHSMS program is to develop and demonstrate structural health management (SHM) and prognostic capabilities for rotorcraft for the purpose of moving beyond deterministic flight-hour based maintenance philosophy towards a reliability-based maintenance framework. The IHSMS program seeks to integrate a number of individual sensor technologies and analytical methodologies into a modular SHM system with an open architecture. It is required that the system is demonstrated as being suitable for transition to the CH-53K heavy lift helicopter. Adaptability to current Navy and Marine Corps rotorcraft applications with minimal

modification is encouraged but not required.

Background:

Current airframe structural life prediction methods for Navy rotorcraft are based on accumulated flight hours referenced to an assumed severe design usage spectrum, with worst-case loading and environmental conditions also imposed. This approach results in a high degree of uncertainty in how rotorcraft are actually utilized in service, leading to restrictive structural maintenance requirements and component life limits. The impact to the fleet from such uncertainties is increased maintenance costs, reduced platform availability, significant unplanned maintenance requirements and a larger logistics footprint. Global and local structural health monitoring technologies that can be transitioned to fleet rotorcraft have the potential to significantly reduce the uncertainty associated with rotorcraft usage and structural damage progression. For the purpose of this topic description, Global Health Monitoring is the continuous or periodic assessment of the initiation and/or progression of structural damage and in-service loading & environment by in-situ sensor measurements, which provide data to enable the overall health of the air vehicle structure and its constituent components to be quantified. Local Health Monitoring is considered the assessment of applied loading and fatigue damage progression at previously known fatigue critical locations (hotspots). A robust fleet management decision tool, when combined with these capabilities, can enable a shift away from the current deterministic fixed flight-hour based maintenance strategy to one based on the management of risk and reliability over an entire rotorcraft fleet. This capability is a key enabling technology for the implementation of the Condition-Based Maintenance Plus (CBM+) approach to rotorcraft structures. The Department of Defense and the U.S. Navy have both issued guidance for the implementation and integration of CBM and CBM+ technologies to military platforms, DoD Instruction 4151.22 (2007) and OPNAVINST 4790.16A (2007). The Integrated Hybrid Structural Management System program falls under the enabling technologies described in those documents.

Objective:

The IHSMS program objective is to develop an integrated system that will be for installation on the CH-53K heavy lift helicopter. As such, the system will be subject to the same operational, environmental, safety and logistics constraints as the rotorcraft Type-Model-Series (T/M/S) platform that the system will be installed on. The IHSMS system developed in this program must be adaptable to existing Integrated Vehicle Health Management System (IVHMS). Every effort should be made by the contractor to leverage any existing IVHMS equipment and infrastructure to the maximum extent practical for the proposed IHSMS system.

The target fleet-level performance and logistics goals of IHSMS for the CH-53K heavy lift helicopter airframe and drivetrain structures are as follows:

- 15% reduction in projected Material Maintenance Cost.

- 20% reduction in touch labor.

- Increase of 50% in Mean Time between Operational Mission Failures.

- Provide reliable weight and Center of Gravity (CG) data to crew in real time.

These capability improvements are to be measured against the baseline CH-53K Program of Record. The fleet-level metrics are the criteria to be used by the contractor to perform design trade studies to optimize the IHSMS system products and applications. Ultimate program success will be determined by how close the IHSMS comes to achieving the capability goals defined by these metrics.

The IHSMS program will develop and demonstrate a single integrated structural health fleet management system for the CH-53K platform with two levels of performance capability developed in a concurrent spiral process and described as follows:

1. Rotor/Hot Spot Sensors & Integration is a localized structural health management capability that focuses on the assessment of applied loading and fatigue damage progression at previously known fatigue critical locations (hot spots).
2. Distributed Structural Microsensors is a global structural health management capability that provides continuous or periodic assessment of the initiation and/or progression of structural damage and in-service loading and environment by in-situ sensor measurements.

III. INDUSTRY DAY

An industry day is not planned in conjunction with this Special Program Announcement. In lieu of Industry Day, industry/academia that have relevant technologies but do not wish to propose a complete IHSMS are encouraged to provide a one page public releasable description of their technology that will be forwarded to all white paper submitters from which a full proposal is requested.

IV. WHITE PAPER SUBMISSION

White papers should be submitted per format requirements found in Section IV, item 2a of the ONR Long Range Broad Agency Announcement (BAA) for Navy and Marine Corps Science & Technology BAA 11-001 or ONR Long Range BAA 12-001 when issued.

White papers need to address a complete IHSMS, including the specific technology approaches that will be considered for each level of performance capability identified in Section II. The white paper should list the current TRL level of the technologies being considered for development and transition in this program. White papers need to discuss the development, demonstration and validation of a complete integrated IHSMS system to a TRL 6 within a five (5)-year effort. White papers should indicate how the IHSMS would be integrated and transitioned to the CH-53K. White papers should also identify a plan to subcontract with multiple vendors (if necessary) that have expertise with the various technologies needed to demonstrate this system, as well as with the platform Original Equipment Manufacturer (OEM) for transition support efforts. Teaming arrangements are highly encouraged. Offerors and their subcontractors must be willing to cooperate and exchange software, data and other information

in this integrated program with the government, the platform OEM and its subcontractors. Cost sharing by the contractor to expand the activities of this program is encouraged.

White papers shall be submitted electronically to the primary technical point of contact, Ms. Malinda Pagett, at malinda.pagett@navy.mil. These shall be in Microsoft Word or Adobe PDF format. White papers should not exceed ten (10) single-sided page limitation, excluding of the cover page and resume of principal investigator.

Although not required, white papers are strongly encouraged for all Offerors seeking funding. Therefore to ensure full, timely consideration for funding; white papers should be submitted no later than 45 days after the posting date of this Special Notice (11-SN-0026). White papers received after the due date will be considered as time and availability of funds permit.

White papers will be evaluated by the Government to determine whether the technology advancement proposed appears to be of particular value to the Department of the Navy. The initial white paper appraisal is intended to give entities a sense of whether their concepts are likely to be funded. Initial Government evaluations and feedback will be issued via email notification. Full Proposal will be subsequently encouraged from those Offerors whose proposed technologies have been identified as being of "particular value" to the Government. However, any such encouragement does not assure a subsequent award.

V. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION

Full proposals (including one technical volume and one cost volume) should be submitted in accordance with the instructions at Section IV, Application and Submission Information, item 2b, Full Proposals, of the ONR Long Range BAA.

Full Proposals may be submitted by any Offeror whose white paper was not identified as being of particular value to the Government, or by any Offeror who did not submit a white paper. Full proposals received after the recommended submission date (see below) will be considered as time and availability of funding permit.

Full Proposal are encouraged from those Offerors who have received a white paper evaluation notification via email identifying their white papers proposed technologies as being of "particular value" to the Government. Full proposals shall address all of the technical and programmatic considerations necessary for execution and delivery of the integrated system capabilities. As part of the email notification, ONR will provide both a Statement of Objectives (SOO) to provide additional program description for the full proposal and a recommended date for ONR receipt of the full proposal.

The Office of Naval Research plans to issue at least one (1), but no more than two (2) contracts (particularly cost plus fixed fee (CPFF) type contracts) that represent best value to the Government in accordance with evaluation criteria in Section V. of BAA 11-001 entitled Evaluation Information. The total period of performance of the award(s) will be five (5) years commencing in FY-12, with a one-year base effort, two one-year option and one two-year option

periods; however only one contractor will be selected to go forward beyond the base year contracted effort. Funds to support this development are from ONR’s Future Naval Capabilities, budget category 6.2/6.3. For planning purposes, the maximum available government funding is approximately \$15.11 million, distributed by Government fiscal year as follows:

FY12*	FY13	FY14	FY15	FY16
\$752K	\$2.07M	\$3.6M	\$4.32M	\$4.368M

* If more than one award is given, the first year effort budget will be divided between the two awardees.

Significant Dates –

All dates listed are for the span of days subsequent to the posting date of Special Notice 11-SN-0026.

Event	Date	Time
White Paper Submission Date	45 days	
Notification of White Paper Evaluation	52 days*	
Full Proposal Submission Date	82 days*	
Notification of Selection: Full Proposals	96 days*	
Awards	2QFY2012	

Note: * These are approximate dates.

VI. POINTS OF CONTACT

In addition to the points of contact listed in BAA 11-001, the specific points of contact for this announcement are listed below:

Technical Points of Contact:

Primary:

Ms. Malinda Pagett,
 Program Officer, Code 352,
 Office of Naval Research
 875 North Randolph Street
 Arlington VA 22203-1995
 Email: malinda.pagett@navy.mil

Secondary:

Dr. Ignacio Perez de Leon
 Program Officer, Code 332
 Naval Materials Division
 Office of Naval Research
 875 North Randolph Street
 Arlington VA 22203-1995
 Email: ignacio.perez1@navy.mil

Business Point of Contact:

Mrs. Mily H. Le
Contract Specialist, Code 255
Office of Naval Research
875 North Randolph Street
Arlington, VA 22003-1995
Email: mily.le@navy.mil

VII. Submission of Questions

Any questions regarding this announcement must be provided to the Technical Points of Contact and/or the Business Point of Contact listed above. All questions shall be submitted in writing by electronic mail.

Answers to questions submitted in response to this Special Notice will be addressed in the form of an Amendment and will be posted to the following web page:

- ONR Broad Agency Announcement (BAA) Webpage -
<http://www.onr.navy.mil/en/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>

Questions regarding **White Papers or Full Proposals** should be submitted NLT two weeks before the date and time for receipt of White Papers or Full Proposals. Questions after this date may not be answered, and the date for submission of the white papers/full proposals may not be extended.