

**REQUEST FOR STATEMENTS OF INTEREST
NUMBER W912HZ-15-SOI-0022
PROJECT TO BE INITIATED IN 2015**

Project Title: Structural Health Monitoring Capabilities for Real-Time Condition and End-of-Life Assessment of U.S. Large Civil Infrastructure

Responses to this Request for Statements of Interest will be used to identify potential investigators for a project to be funded by the Army Engineer Research and Development Center (ERDC) to provide information regarding the state-of-the-art for R&D of structural health monitoring. Approximately \$150,000.00 is available to support this project for one (1) year.

Background:

U.S. federal and state government agencies manage and operate a range of infrastructure assets that protect property, the economy, and lives from floods, droughts, and other catastrophic events. Much of this infrastructure was built many decades ago and is in need of costly repairs. Unfortunately, the total cost of needed repairs exceeds the funds which are available from state and federal budgets. Much of the U.S. large civil infrastructure was built 50 or more years ago, and must be operated and maintained under tightening budgets. The development of asset management strategies to improve sustainability and resiliency of aging infrastructure is a crucial area of research and development that ultimately saves tax dollars through the prevention of infrastructure failures and loss of valuable assets including crops, homes, transportation routes, natural and cultural resources, and lives of those served by the structures.

Structural health monitoring principles and technology can provide continuous measurements and simulations of our aging infrastructure to support real-time alerts of imminent failures and provide longer-term monitoring to accurately quantify asset and component condition, including remaining service life, risk assessment, and maintenance requirements. The tools and techniques investigated and developed through this research will be communicated broadly for potential application to civil infrastructure across the U.S. including bridges, locks, dams, harbors, levees, piers, railways, and more.

Brief Description of Anticipated Work:

The purpose of this research is to ensure structural health monitoring (SHM) research is advancing with the state-of-the-art as it seeks to integrate SHM within the operational and asset management processes for U.S. infrastructure. Specifically, the objectives include:

Objective 1: Report on the state-of-practice globally, nationally, and the potential capabilities of SHM within the context of application to management of assets (lifecycle analysis, repair/replacement decisions, risk analysis, etc.) and facility operations

(proactive maintenance, emergency response, early warning of catastrophic failures, remote operations, etc.), particularly for large civil infrastructure.

Objective 2: Develop a recommended long-range roadmap for R&D milestones from the current state-of-practice to successful implementation of SHM capabilities in the operational and asset management processes. The purpose of this task is to provide recommended next steps for prioritization of future R&D funds.

Objective 3: Develop a conceptual demonstration of SHM concepts and capabilities through an assessment of the existing SHM system on the I-20 bridge spanning the Mississippi River in Vicksburg, MS using any necessary modeling or simulations.

Methods:

Successful applicants should have expert knowledge in the field of structural health monitoring and a record that demonstrates research experience with researching and applying SHM principles to assets in an operational environment. The candidates should have prior experience with use of statistical pattern recognition for detecting and assessing damage of structural systems. The candidates should have experience with designing SHM systems to maximize the reduction of risk per dollar cost. The candidates will be required to prepare a Statement of Work and Work Plan regarding the research to be conducted. The candidates will also be required to submit four (4) quarterly status reports and one (1) annual report to provide updates on the status of the work.

Government Participation:

ERDC will participate and facilitate meetings to discuss current state-of-practice, needs, future vision and goals, and required engineering expertise concerning the demonstration system and other infrastructure as needed. ERDC will participate in field data collection efforts as appropriate and will review quarterly status reports and will provide input to data interpretation for final reports. ERDC will assist in the dissemination of study results through local scientific presentations and website postings.

Materials Requested for Statement of Interest/Qualifications:

Please provide the following via e-mail attachment to:

Deberay.R.Carmichael@usace.army.mil

(Maximum length: 2 pages, single-spaced 12 pt. font).

1. Name, Organization and Contact Information
2. Brief Statement of Qualifications (including):
 - a. Biographical Sketch,
 - b. Relevant past projects and clients with brief descriptions of these projects,
 - c. Staff, faculty or students available to work on this project and their areas of expertise,

- d. Any brief description of capabilities to successfully complete the project you may wish to add (e.g. equipment, laboratory facilities, greenhouse facilities, field facilities, etc.).

Note: A proposed budget is NOT requested at this time.

Review of Statements Received: Based on a review of the Statements of Interest received, an investigator or investigators will be invited to prepare a full study proposal. Statements will be evaluated based on the investigator's specific experience and capabilities in areas related to the study requirements.

Please send responses or direct questions to:

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Timeline for Review of Statements of Interest: Review of Statements of Interest will begin after the SOI has been posted on the CESU website for 10 working days.