SON Number: RCSON-21-C2 **24 October 2019**

Strategic Environmental Research and Development Program (SERDP)

FY 2021 STATEMENT OF NEED

Resource Conservation and Resiliency (RC) Program Area

RESEARCH TO IMPROVE INSTALLATION INFRASTRUCTURE RESILIENCY PROCESSES, SYSTEMS, AND TOOLS

1. Objective of Proposed Work

The objective of this Statement of Need (SON) is to improve methods used to evaluate the benefits of resilience measures for new and existing built infrastructure. Specifically, this SON invites applied research and advanced technology development proposals to improve tools that address infrastructure resilience to climate and weather extremes over the lifetime of building and infrastructure system function. Tool improvement may include the integration and optimization of existing methods and means or the development of new methods and means. For the purpose of this SON, resilience is defined to include methods and means to return to a pre-perturbation state, transformation to a new base state after perturbation, or methods and means that allow for arrival to a new base state ahead of an impending perturbation.

Proposals based foundationally on proprietary products are of less interest since the logic used in their development often is opaque and unavailable for peer review. The ultimate intent is that the resulting research and advanced technology development, if successful, would translate into improvements for installation and municipal planning practitioner decision making and ultimately improve the resilience of the Department of Defense's (DoD's) infrastructure.

2. Expected Benefit of the Proposed Work

The proposed research work will address the DoD's critical need to optimize resilience enhancements that impact the DoD's ability to implement strategies for resilience in the face of major catastrophes, broadly enhance DoD's ability to protect assets, increase adaptability, and support power projection and global operations. The knowledge derived from this research will be transferred and integrated into the Environmental Security Technology Certification Program (ESTCP) and other ongoing efforts within the DoD and other Federal, State, and Public institutions to develop methods to improve resilience measures for new and existing built infrastructure.

3. Background

The DoD relies on a large number of installations with extensive supporting infrastructure to prepare for and execute missions to defend U.S. national security interests. Many installations and their supporting infrastructure systems (e.g., energy, transportation, water resources, medical services) are located in areas prone to natural hazards such as floods, coastal storm surge, droughts, extreme temperatures, and other events. Engineers, architects, and planners are responsible for

designing facilities that are suited to expected conditions and that provide low failure risks and acceptable performance as conditions change over the facilities' service lives.

Complying with standard code requires design professionals to rely on assumptions that include a wide range of climatic attributes regarding the frequency, magnitude, intensity, and seasonality of climate. For infrastructure projects, relevant design life often exceeds 30 years and may exceed 100 years. Both time periods are of sufficient duration that climatological shifts are likely to have relevance. Future designs need to be able to adapt to changing conditions since today future conditions may be both known generally but unknowable in their specifics. Designs built upon uninformed assumptions or assumptions which do not account for shifts in climate pose hidden risks to DoD mission capabilities, readiness, safety, and budget.

4. Cost and Duration of Proposed Work

The cost and time to meet the requirements of this SON are at the discretion of the proposer. The proposals must describe a complete research effort. It is anticipated that the scope of this SON is such that a multi-disciplinary team will be required to execute a successful effort. Single investigator efforts will not be of sufficient scope to compete successfully. The proposer should incorporate the appropriate time, schedule, and cost requirements to accomplish the scope of work proposed. SERDP projects normally run up to four years in length and are currently limited to less than $900,000 per year. Limited scope proposals encouraged in previous statements of need for funding up to $250,000 and approximately one year in duration, will not be accepted under this SON.

5. Point of Contact

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For Core proposal submission due dates, instructions, and additional solicitation information, visit the SERDP website.