

**Strategic Environmental Research and Development Program
(SERDP)**

FY 2022 STATEMENT OF NEED

Weapons Systems and Platforms (WP) Program Area

**FUNCTIONAL ADDITIVES AND FOAM FORMATION TO ENHANCE
PFAS-FREE FIRE SUPPRESSANTS FOR MILITARY USE**

1. Objective of Proposed Work

The objective of this Statement of Need (SON) is to identify, develop, and deploy functional additives and/or modifications of existing fire-fighting equipment to enhance the fire-suppression performance of mature and emerging per- and polyfluoroalkyl substance (PFAS)-free fire suppressants for military use. Functional additives should provide increased performance for currently available firefighting foams through foam enhancement or alternative suppression mechanisms. In addition, alternative foam production methodologies that are compatible with current fire trucks and infrastructure are needed to improve foam output, stability, and quality to provide a cost-effective improvement in firefighting foam performance with existing foam formulations. The outcome of this SON will enable fire fighters to evaluate additive use and equipment modifications to develop effective firefighting operations. Proposals should address one or more of the following objectives:

- **Performance:** Provide data on the firefighting performance of the proposed functional additives and/or modifications to existing firefighting equipment.
- **Storability:** Evaluate factors such as flammability, reactivity, viscosity, and shelf-life affecting the long-term safe storage of the proposed functional additives.
- **Compatibility:** Determine the compatibility of the proposed functional additives with the foam, foam delivery equipment, and infrastructure.

Proposals focused on compressed air foams or ultra-high-pressure nozzles will not be considered under this SON.

Proposals should include a task to conduct a Sustainability Analysis of appropriate proportion for the proposed research and development. Proposals should establish a lifecycle framework that can mature as the technology or process advances through the acquisition process. This tiered approach aims to develop and document a minimum data set at each stage of research and development that can be used to make informed decisions and streamline transition to an acquisition program. The Sustainability Analysis may include varying depths of data and information that can inform the goal and scope of an analysis; the identity and quantity of relevant inputs and outputs to the system; and the estimation of life cycle impacts and costs.

2. Expected Benefits of Proposed Work

Program Managers, installations, and warfighters across all services would benefit from enhancement of fire suppression performance. No currently available PFAS-free formulation meets the fire extinguishment requirements in MIL-PRF-24385. Functional additives and improved foam formation, discharge and delivery methods are anticipated to provide increased performance for currently available foams. New PFAS-free formulations will enable sustained manufacture and use of AFFF or alternative fire suppression technologies by meeting environmental requirements while maintaining equivalent performance to ensure safety of DoD personnel at airfields and onboard ships.

3. Background

The 2020 National Defense Authorization Act (NDAA) prohibits the utilization of currently approved, PFAS-containing AFFF beginning October 1, 2024; however, none of the currently available, fluorine-free (thus PFAS-free) fire suppressants meet the stringent requirements of MIL-PRF-24385. It is undesirable to relax the fire extinguishment time requirements given the safety asset-protection requirements unique to the U.S. Military. It is also undesirable to increase the PFAS-free foam application rates due to environmental and equipment capacity concerns.

For efficient fire extinguishment, several physical and chemical property requirements are specified, such as foam spreadability, foam quality, ability to cool fire, and ability to disrupt the fire. Current foam formulations rely on cooling, film formation, and limiting oxygen to the fire with a stable foam blanket. However, there are alternative mechanisms to extinguish fires that have not been evaluated in conjunction with foam use. Furthermore, in order to allow deployment of additives, it may be necessary to develop delivery subsystems that can be retrofitted to currently available fire trucks, fixed systems or shipboard nozzles. The ability of available PFAS-free foams to extinguish liquid pool fires has been shown to rely primarily on bubble quality. Alternative foam generation, discharge or delivery systems have been shown to increase foam performance by modifying bubble production.

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. Two options are available:

Standard Proposals: These proposals describe a complete research effort. The proposer should incorporate the appropriate time, schedule, and cost requirements to accomplish the scope of work proposed. SERDP projects normally run from two to five years in length and vary considerably in cost consistent with the scope of the effort. It is expected that most proposals will fall into this category.

Limited Scope Proposals: Proposers with innovative approaches to the SON that entail high technical risk or have minimal supporting data may submit a Limited Scope Proposal for funding up to \$250,000 and approximately one year in duration. Such proposals may be eligible for follow-on funding if they result in a successful initial project. The objective of these proposals should be to acquire the data necessary to demonstrate proof-of-concept or reduction of risk that will lead to development of a future Standard Proposal. Proposers should submit Limited Scope Proposals in accordance with the SERDP Core Solicitation instructions and deadlines.

5. Point of Contact

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For Core proposal submission due dates, instructions, and additional solicitation information, visit the [SERDP website](#).