

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

**FY 2020 STATEMENT OF NEED**

**Weapons Systems and Platforms (WP) Program Area**

**INNOVATIVE APPROACHES TO  
FLUORINE-FREE FIRE FIGHTING AGENTS**

**1. Objective of Proposed Work**

The objective of this Statement of Need (SON) is to develop an alternative formulation for use in Department of Defense (DoD) Class B (flammable liquid) fire-suppression operations in lieu of Aqueous Film Forming Foam (AFFF) in accordance with Interim Amendment 3 of MIL-F-24385F, available at: [https://quicksearch.dla.mil/qsDocDetails.aspx?ident\\_number=283209](https://quicksearch.dla.mil/qsDocDetails.aspx?ident_number=283209). Specific research areas of interest include:

- Development of fluorine-free drop-in replacements for existing applications of AFFF. Drop in replacements would need to meet the performance requirements of MIL-F-24385F at MILSPEC application rates. Formulations that cannot meet the sections below are not disqualified.:
  - Section 3.3.1: Film Formation and Sealability (applicable to low expansion fluorine-free foams)
  - Section 3.3.3: Compatibility with fluorinated AFFF.
- Development of low expansion fluorine-free foams for applications other than drop-in replacements; alternative delivery methods should be specified.
- Development of novel extinguishing agents and approaches.

Proposed solutions that can act as a drop-in replacement that can be employed with a minimum of modification to currently used agent storage and delivery configurations (ship, facility, and fire apparatus) are especially desirable and will be given preferential consideration. Proposals should include an initial assessment of the human health and environmental impacts of proposed ingredients, formulations, and byproducts. Proposers should show clear understanding of past research efforts in this area to avoid duplication of prior work.

**2. Expected Benefits of Proposed Work**

New fluorine-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**

AFFF is a water-based foam used by the military since the 1970s for fire suppression in ships, shore fixed systems, aircraft hangers, and to extinguish liquid fuel fires. The DoD (primarily the Air Force and Navy) used AFFF mixtures containing significant quantities of perfluorooctane

sulfonate (PFOS) and related perfluoroalkyl sulfonates until 2002, when production stopped; however, the DoD continued to use PFOS-containing AFFF stocks for some time after. The DoD inventory still contains at least an estimated 500,000 gallons of PFOS-based AFFF with 423,000 and 97,000 gallons, respectively associated with the Air Force and Navy. The vast majority of DoD's environmental liability likely results from the use of this PFOS-based AFFF. Multiple DoD installations have detected PFOS and perfluorooctanoic acid (PFOA) at 3 to 4 orders of magnitude greater than the current EPA health advisory.

Since 2006, use of AFFF containing PFOS and PFOA has generally been replaced by foams that have fluorosurfactants of 6 carbons or fewer. These newer foams are thought to be less toxic and bioaccumulative, though concerns remain.

Industry has identified potential fluorine-free alternative foams; however, none of these technologies currently meet the performance required for military applications, a problem that extends beyond military operations. Civil aviation continues to use other AFFF or fluorosurfactant-free fire suppression foams that do not meet the performance of AFFF. Alternatives that meet or exceed current AFFF performance requirements without fluoro-surfactants would dramatically reduce the environmental impact of fire suppression training and operations while maintaining the safety of personnel at crash sites or around liquid pool fires.

#### **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 four years in length and vary considerably in cost consistent with the scope of the effort.

**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 \$200,000 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**

Robin A. Nissan, Ph.D.

Program Manager for Weapons Systems and Platforms

Strategic Environmental Research and Development Program (SERDP)

4800 Mark Center Drive, Suite 16 F 16

Alexandria, VA 22350-360 Phone: 571-372-6399

E-Mail: [Robin.A.Nissan.civ@mail.mil](mailto:Robin.A.Nissan.civ@mail.mil)

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