

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

FY 2010 STATEMENT OF NEED

Sustainable Infrastructure (SI) Focus Area

**FUGITIVE DUST EMISSIONS DUE TO DEPARTMENT OF DEFENSE
ACTIVITIES**

1. Objective of Proposed Work

The objectives of this Statement of Need (SON) encompass fundamental and applied research that can improve the understanding of fugitive dust emissions from military activities. Proposals should focus on one or more of the following research objectives to fill gaps in the current knowledge base.

1. Improve our understanding of fugitive dust emission potential from military activities. To meet this objective, the following have been identified as specific critical research needs:
 - a. Improve our understanding of how to characterize relevant soil properties and surfaces for the purpose of developing more accurate and useful predictors of airborne dust emission potential;
 - b. Improve our understanding of the impact of the quantity, duration, and characteristics of military activities as a function of surface and landscape characteristics on the generation of fugitive dust;
 - c. Improve emission models to address wheeled and tracked vehicle fugitive dust emissions.
2. Improve our ability to predict fugitive dust transport and emission fluxes. To meet this objective, the following have been identified as specific critical research needs:
 - a. Improve our understanding of how soil, vegetation, meteorology, and terrain characteristics interact with physical processes in the atmosphere to affect dust transport in the near-field scale, which is defined here as encompassing a few hundred meters;
 - b. Develop models that can estimate the emission fluxes resulting from military activities at the scale of a few hundred meters.
3. Improve our ability to achieve source compliance and ambient fence-line monitoring for fugitive dust emissions at Department of Defense (DoD) installations. To meet this objective, the following have been identified as specific critical research needs:
 - a. Identify and develop new detection strategies for monitoring fugitive dust mass, composition, and optical properties (for visibility monitoring) for installation sources and along installation fence lines;
 - b. Improve our ability to provide cost-effective in-situ detection of particulate matter (PM) mass concentrations in near real time that also can distinguish relevant size fraction contributions to PM;

- c. Improve our understanding of how to rapidly integrate fugitive dust mass and/or visibility monitoring measurements with simultaneous meteorological observations and local field conditions to quantify the potential transport of fugitive dust plumes.

Proposals submitted in response to this SON may address one or more of the above objectives and research needs. For any methodology that is proposed to be developed, proposers should plan to coordinate their work with appropriate regulatory bodies to facilitate future regulatory acceptance.

The Strategic Environmental Research and Development Program (SERDP) co-sponsored a Workshop in February 2008 on Research Needs for Assessment and Management of Non-Point Air Emissions from Department of Defense Activities that identified high priority research topics in this area. A more detailed description of these issues is available in the proceedings from the workshop at <http://www.serdp.org/Research/upload/Air%20Quality%20Workshop%20report.pdf>. We strongly encourage proposers to review the workshop proceedings for additional details and to be cognizant of past and ongoing work in this area that has been funded by SERDP (www.serdp.org).

2. Expected Benefits of Proposed Work

The desired outcome of this work is improved knowledge that provides the DoD an ability to cost effectively predict, assess, and manage the potential impacts of military activities on fugitive dust emission.

3. Background

The Department of Defense conducts military training and testing activities on approximately 30 million acres of land. These lands may be far removed from other human inhabitants or may be located in close proximity to populated areas. As it carries out its mission activities, the DoD generates a variety of air emissions, many of which are subject to regulatory control. In addition, development pressure continues adjacent to and in close proximity to many DoD installations, potentially exposing more and more people to the effects of DoD activities. The preceding factors in combination place tremendous pressure on DoD's ability to continue training and testing without interruption and to effectively manage its natural resources because of potential air quality-related compliance issues or community complaints.

Military training and testing ranges tend to have a considerable potential for fine particle dust emissions generated by mechanical disturbance and by wind erosion of surface materials, especially in areas where the ground surface is regularly disturbed. This potential includes unpaved roads, trails and staging areas, and munitions impact areas at weapons ranges. The dust emission potential of these areas is also affected by weather cycles and is intensified by drought conditions that may be associated with climate change.

Fugitive dust is created by vehicle and aircraft maneuvers, artillery/missile backblast, range maintenance and construction activities, and wind erosion on disturbed surfaces. The amount of dust suspended depends on the properties of the soil, the method and intensity of suspension, and

prevailing meteorological conditions. Significant amounts of dust may be deposited within the near-field environment, but the amount deposited is highly dependent on local environmental conditions and physical processes that lead to dust deposition. The air quality impacts of fine particle dust emissions generated by military training activities may have a detrimental effect that could impair the full use of military installations. This has become more critical in areas that are in nonattainment with the National Ambient Air Quality Standards (NAAQS) for PM (PM₁₀ and PM_{2.5}). It is expected that fine particle dust emissions from military installations may be subject to additional attention and restrictions to bring nonattainment areas into compliance with the PM₁₀ and PM_{2.5} NAAQS, as air quality regulators and land managers are under increased pressure to assess the environmental and regulatory impacts of non-point source emissions from DoD installations on air quality and public health. DoD installations also may be subject to restrictions associated with meeting the requirements of the Regional Haze Rule as it applies to visibility degradation.

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 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.

Limited Scope Proposals: Proposers with innovative approaches to the SON, that entail high technical risk and/or have minimal supporting data, may submit a Limited Scope Proposal for a nominal amount of funding (up to \$150,000) and approximately one year in duration to develop the data necessary to provide for risk reduction and/or a proof of concept. Proposers should submit Limited Scope Proposals in accordance with the SERDP Core Solicitation Instructions and deadlines. Such proposals may be eligible for follow-on funding if they result in a successful initial project.

5. Point of Contact

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For Core proposal submission due dates, instructions, and additional solicitation information, visit the Funding & Opportunities page on the SERDP web site: <http://www.serdp.org/funding>.