



DoD's Environmental Research Programs

Headlines is a quarterly newsletter highlighting the latest research and demonstration efforts to address the DoD's energy and environmental challenges.

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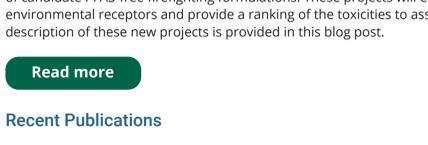
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Research & Demonstration Updates

PFAS Treatment and PFAS-Free Firefighting Formulations

Blog: Ecotoxicity of Novel PFAS-Free Firefighting Formulations



The Strategic Environmental Research and Development Program (SERDP) is funding research to develop per- and polyfluoroalkyl substances (PFAS)-free firefighting formulations for use in Class B fire-suppression operations as well as testing commercially available PFAS-free products under the Environmental Security Technology Certification Program (ESTCP) to determine whether these formulations can meet the current U.S. Department of Defense (DoD) performance requirements. Although these formulations are being developed and tested for their performance, there is still a need to understand the ecotoxicity, specifically the chronic toxicity, of these newer products.

In 2020, SERDP began funding a group of projects investigating the relative environmental toxicity of candidate PFAS-free firefighting formulations. These projects will each study the same six (6) formulations in different environmental receptors and provide a ranking of the toxicities to assist in the selection of a new formulation for use by DoD. A description of these new projects is provided in this blog post.

[Read more](#)

Recent Publications

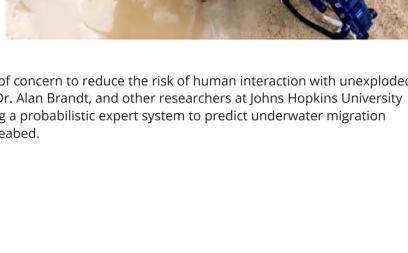
- Field Demonstration of Infrared Thermal Treatment of PFAS-Impacted Soils from Subsurface Investigations - [SERDP Final Report](#)
- Baseline Data Acquisition and Numerical Modeling to Evaluate the Fate and Transport of PFAS within the Vadose Zone - [SERDP Final Report](#)
- Per- and Polyfluoroalkyl Substances (PFAS) Neurotoxicity in Sentinel and Nontraditional Laboratory Model Systems: Potential Utility in Predicting Adverse Outcomes in Human Health - [Journal Article](#), [Toxics Project Webpage](#)

Munitions Response Underwater

Blog: Highlights from Munitions Responses Spring In-Progress Review

The SERDP and ESTCP Munitions Response Program held its Spring In-Progress Review virtually on June 2 – 5. Below is a highlight of two projects that focused on unique underwater munitions response issues.

Big waves and shoreline terrain can be big problems for small robots, especially autonomous ones. Waves can overturn small robots, so typically, the larger the waves the larger the robot needs to be. At the same time, sand can trap robots and rocks can be too large for robots to cross. This limits autonomous robots that could be valuable tools for munitions response. In contrast, biological crabs at a range of sizes thrive in shallow water. In her [SERDP project](#), Dr. Kathryn Daltorio of Case Western Reserve University hypothesizes that an essential part of a crab's strategy is that they use waves and terrain against each other.



At many inland waters and coastal areas, significant efforts have been mandated to manage and clean-up former DoD aquatic sites contaminated with munitions and explosives of concern to reduce the risk of human interaction with unexploded ordnances (UXO). In this [SERDP project](#), Dr. Sarah Rennie, Dr. Alan Brandt, and other researchers at Johns Hopkins University Applied Physics Laboratory (JHU/APL) have been developing a probabilistic expert system to predict underwater migration potential and depth of burial of munitions residing in the seabed.

[Read more](#)

Recent Publications

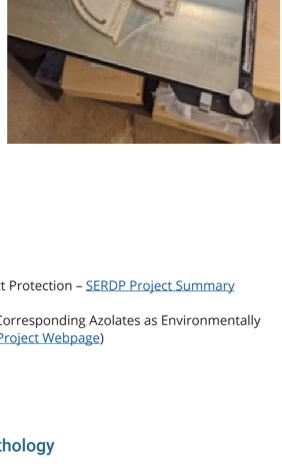
- Cubist-Inspired Deep Learning with Sonar for UXO Detection and Classification - [SERDP Final Report](#)
- Underwater Unexploded Ordnance (UXO) Neutralization by Explosively Generated Plasma - [ESTCP Technical Report](#)
- Simple Parameterized Models for Predicting Mobility, Burial and Re-Exposure of Underwater Munitions - [SERDP Final Report](#)

Additive Manufacturing and Industrial Processes

Blog: SERDP Principal Investigators Manufacture Face Masks for Health Care Workers

Amidst the COVID-19 pandemic, many scientists and researchers have dedicated their time and expertise to advance our understandings of the virus and provide essential resources to health care workers and the general public. SERDP Principal Investigators are among such volunteers who are pivoting to apply their technologies to the production of personal protective equipment (PPE).

At the University of Alabama, Dr. Paul Allison has helped lead an effort to manufacture 3D printed PPE as part of a partnership between the College of Engineering and the STEM Path to the Master's in Business Administration (MBA) Program. Under SERDP, Dr. Allison is developing a transformative hybrid solid-state additive manufacturing process, Additive Friction Stir Deposition (AFS-Deposition), that recycles metal waste to manufacture and repair components at a forward operating base (FOB) ([Project Webpage](#)).



When the University of Alabama set up shop to produce face masks, Dr. Allison reached out to another SERDP Principal Investigator, Dr. Prabhat Krishnaswamy, to collaborate on extra materials to use for the 3D printing machines. Dr. Krishnaswamy is working with SERDP on a similar project to conduct applied research that will improve the development of an innovative agile manufacturing plant for onsite fabrication of recycled thermoplastic products at forward operating bases (FOBs).

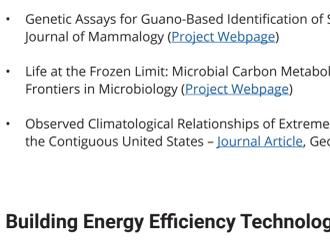
[Read more](#)

Recent Publications

- Electrospun Multifunctional Composite Fibers for Improved Warfighter Insect Protection - [SERDP Project Summary](#)
- Comparison of Functionalized Lithium Dihydrobis(azoly)borates with Their Corresponding Azolates as Environmentally Friendly Red Pyrotechnic Coloring Agents - [Journal Article](#), [ChemPlusChem Project Webpage](#)

Species Ecology and Management

Blog: ESTCP Demonstration Published in Journal of Field Ornithology



Results from a recently completed and award-winning project, "Conspicuous Attraction as a Management Tool for Endangered and At-risk Species on Military Lands" were just published in the Journal of Field Ornithology.

Possessing two objectives, the project (1) demonstrated the use of conspicuous attraction as a cost-effective management tool for encouraging colonization of restored habitats by target at-risk bird and amphibian species; and (2) tested the use of conspicuous attraction to establish populations following cessation of the broadcast calls.

To maintain open access to training lands, DoD spends considerable effort in restoring habitats for species of conservation concern. The approach examined in this project, conspicuous attraction, can be used to attract species both within an installation to established conservation areas or to partner lands away from conflict with military training. The recent [journal article](#) highlights the project team's work detecting the presence of Northern Bobwhites (*Colinus virginianus*).

[Read more](#)

Recent Publications

- Genetic Assays for Guano-Based Identification of Species and Sex in Bats of the United States and Canada - [Journal Article](#), [Journal of Mammalogy Project Webpage](#)
- Life at the Frozen Limit: Microbial Carbon Metabolism Across a Late Pleistocene Permafrost Chronosequence - [Journal Article](#), [Frontiers in Microbiology Project Webpage](#)
- Observed Climatological Relationships of Extreme Daily Precipitation Events with Precipitable Water and Vertical Velocity in the Contiguous United States - [Journal Article](#), [Geophysical Research Letters Project Webpage](#)

Building Energy Efficiency Technologies

Blog: RMF Self-Assessment Tool Available for Facility-Related Control Systems

ESTCP invested in a project to develop a cost-effective solution to streamline and tailor Risk Management Framework (RMF) processes for Facility-Related Control Systems (FRCS).

DoD manages over 500 installations where Public Works personnel are System Owners (SOs) of many FRCSs, such as energy and water control systems, building control systems, microgrid controls, heating ventilation and air conditioning (HVAC), and several other types of control systems. Though these FRCS are usually not connected to the local enterprise network, they often support critical buildings, and/or critical missions have a dependence on them.



SOs must perform RMF self-assessments to identify, mitigate, and monitor cyber-security risks. Unfortunately, it is often the case that FRCS owners/operators have little to no cybersecurity or RMF background and don't have the required organizational security policies and procedures in place.

The Intelligent Power & Energy Research Corporation (IPERC) developed the RMF Self-Assessment Tool (R-SAT) to help bridge this gap. R-SAT was developed to apply across the military services and federal agencies, but specifically for FRCS. It could be easily modified to accommodate service- or agency-specific FRCS nuances, or for non-FRCS systems. Some organizations have already developed their own versions. These can be quickly integrated into R-SAT.

[Read more](#)

Recent Publications

- Energy Efficient Phase Change Materials (PCM) Insulation - [ESTCP Final Report](#)
- Cyber-Security Integrity for Electric Grid Facilities Management - [ESTCP Final Report](#)

SERDP and ESTCP 2020 Symposium Announcement

Blog: Symposium Update from SERDP and ESTCP Director, Dr. Herbert Nelson



Given the restrictions on gatherings and travel resulting from the COVID-19 pandemic, I am sure it will surprise no one to hear that the 2020 SERDP and ESTCP Symposium will be held as a virtual event the week of November 30 to December 4, 2020. I'll still be in Washington, DC for the Symposium (likely in my home office where I have spent the last five months) but you can now be wherever you want. The [Symposium web site](#) is up and mostly complete so I urge you to take a look at it soon. The upside to this move is that we get to have the Symposium this year; the downside is you have to provide your own finger food and beverages during the poster sessions.

As I am sure applies to many of you, we have had some experience this summer hosting meetings and conferences and attending others. We have tried to take the best of our experiences and observations and apply them to Symposium planning but we have not been able to sample every conference this summer. If you have had a particularly positive experience at a conference or seen a particularly clever way to create as much of the feel of an in-person event as possible, please feel free to call or e-mail me with a suggestion.

[Read more](#)

Upcoming Webinars

Reducing Hazardous Materials in Weapons Systems: Advances in Waterjet Applications and Cold Spray Technologies

Thursday, September 10, 2020 at 12:00 PM (ET)

This SERDP and ESTCP webinar focuses on DoD-funded research efforts to reduce or eliminate the use of hazardous metals in weapons applications. Specifically, investigators will discuss the process of waterjet-based cavitation and its application to weapons to remove refractory metals, and innovative designs of powders developed to support cold spray applications for coating deposition.

[Learn more and register](#)

Munitions Mobility and Burial in Underwater Environments

Thursday, September 24, 2020 at 12:00 PM (ET)

This SERDP and ESTCP webinar focuses on DoD-funded research efforts to model munitions mobility and burial. Specifically, the Principal Investigator will present results of field and laboratory experiments performed using surrogate and inert certified munitions in underwater environments, summarize a conceptual understanding of the science behind the modeling, and discuss the design of future demonstrations of modeling technologies for site management.

[Learn more and register](#)

Managing AFFF Impacts to Subsurface Environments and Assessment of Commercially Available PFA-Free Foams (Part 1)

Thursday, October 8, 2020 at 12:00 PM (ET)

This SERDP and ESTCP webinar presents novel technologies to remove per- and polyfluoroalkyl substances (PFAS) from groundwater and to develop high-performing PFAS-free fire-fighting foams. Specifically, investigators will discuss the development and optimization of cyclodextrin-based adsorbents to remove PFAS from groundwater, and the optimization of compressed air foam (CAF) and ultra-high pressure (UHF) foam delivery systems to improve the quality of commercial, off-the-shelf PFAS-free foams that meet stringent military specifications.

[Learn more and register](#)

Managing AFFF Impacts to Subsurface Environments and Assessment of Commercially Available PFA-Free Foams (Part 2)

Thursday, October 22, 2020 at 12:00 PM (ET)

This SERDP and ESTCP webinar presents an evaluation of environmentally friendly alternatives to AFFF, as well as a novel technology to destroy PFAS in contaminated groundwater. Specifically, investigators present results of real-scale and laboratory-scale experiments assessing the effectiveness of AFFF alternatives, including fluorine-free foams as well as wetting agents and other water additives, and summarize research and current understanding of PFAS defluorination and reaction mechanisms for PFAS degradation using hydrated electrons generated under ultraviolet irradiation.

[Learn more and register](#)

[View the full SERDP and ESTCP Webinar Series Schedule](#)

Calendar and Related Events

Related Events

- October 5 – 30: [OCEANS Conference & Exposition](#) (Live Virtual and On-Demand)
- December 1 – 3: [SERDP and ESTCP Symposium](#) (Virtual)
- December 7 – 11: [American Geophysical Union Fall Meeting](#) (Virtual)
- December 7 – 11: [Acoustical Society of America Meeting](#) (Virtual)

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