



# HEADLINES

## 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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## SERDP and ESTCP Project of the Year Winners

*SERDP and ESTCP are pleased to announce the 2020 Projects of the Year. These awards recognize scientific advances and technological solutions to some of the Department of Defense's (DoD) most significant environmental and installation energy challenges. The award winners for each Program Area are highlighted below, as well as recent publications and final reports.*

### Environmental Restoration

#### SERDP Project of the Year - Dr. Christopher Higgins, Colorado School of Mines

*"Key Fate and Transport Processes Impacting the Mass Discharge, Attenuation, and Treatment of Per- and Polyfluoroalkyl Substances and Comingled Chlorinated Solvents or Aromatic Hydrocarbons"*

Dr. Christopher Higgins from Colorado School of Mines and his team led a SERDP-funded project that established a more complete and coherent foundation on the role of source zones and low permeability materials on PFAS release. These data provide insight into the fundamental processes controlling fate and transport of PFAS in groundwater at aqueous film-forming foam (AFFF)-impacted sites.



Dr. Christopher Higgins

[Read more](#)



Dr. Craig Divine

#### ESTCP Project of the Year - Dr. Craig Divine, ARCADIS-US, Inc.

*"Demonstration and Validation of the Horizontal Reactive Media Treatment (HRX) Well for Managing Contaminant Plumes in Complex Geological Environments"*

Dr. Craig Divine from Arcadis and his team led an ESTCP-funded project that validated the horizontal reactive media treatment well (HRX Well®), an in situ remediation approach that demonstrated a per-well hydraulic treatment zone width of 50 feet (ft) and an average mass discharge reduction of about 1.8 grams per day of contaminants. The HRX technology captures and passively treats large volumes of groundwater in situ by using the "flow-focusing" behavior created by the strong well-to-aquifer permeability contrast.

[Read more](#)

### Recent Publications

- Phytoremediation of Explosives from Contaminated Soil by Transgenic Grass - [ESTCP Final Report](#)
- Electrically Assisted Sorption and Desorption of Per- and Polyfluoroalkyl Substances - [SERDP Final Report](#)

### Installation Energy and Water

#### ESTCP Projects of the Year



Mr. Tim Hansen



Mr. Nathan Johnson

- **Mr. Tim Hansen, 350Solutions, Inc. and Mr. Nathan Johnson, Arizona State University**

*"Design, Modeling, and Control of Hybrid Energy Storage System for Defense Installation Microgrids"*

- **Mr. Benjamin Lavoie, Ameresco, Inc.**

*"Demonstrating the Benefits of Long-Duration, Low-Cost Flow Battery Storage in a Renewable Microgrid"*

- **Mr. David Altman, Raytheon**

*"Advanced Phasor-based Control of Energy Storage Microgrids"*

ESTCP issued a solicitation topic in fiscal year (FY) 2019 to demonstrate the cost and performance benefits of battery energy storage systems (BESSs) when integrated with microgrids. The solicitation topic was designed with phases to include a techno-economic modeling study (Phase 1), followed by Hardware-in-the-Loop (HIL) testing of technologies and control approaches (Phase 2), and finally field demonstration in Phase 3. The objective of the Phase 1 study was to analyze the economic performance and quantify the impact of BESSs on the reliability of diesel-based microgrids serving critical loads on military installations.

ESTCP selected six projects under Phase 1. All six project teams were provided data from seven installations to perform the techno-economic modeling study and were required to meet or beat the baseline reliability curve (the probability over time that the critical load will be met by the available resources in the microgrid) for each installation. The three project teams, listed above as the Project of the Year winners, were selected to proceed to Phase 2 to conduct HIL testing of their chosen technologies and control strategies.

[Read more](#)

### Recent Publications

- Underground Thermal Energy Storage (UTES) Technology Transfer - [ESTCP Technical Report](#)
- Statistical Development of Microgrid Resilience During Islanding Operations - [Journal Article](#), Applied Energy ([Project Webpage](#))

### Munitions Response



Dr. Margaret Palmsten (right) & Dr. Allison Penko (left)

#### SERDP Project of the Year - Dr. Margaret Palmsten, U.S. Geological Survey

*"Probabilistic Environmental Modeling System for Munitions Mobility"*

The 2020 SERDP Project of the Year under the Munitions Response Program Area was headed by Dr. Margaret Palmsten from the United States Geological Survey. Dr. Palmsten and her project team are developing recent hindcasts of waves, currents, and sediment transport, including uncertainties using a coupled modeling system. The project is focused on modeling the environment where munitions are found in water depths less than 35 meters. The project will link water motion (hydrodynamic) and seafloor change (morphodynamic) models with a probabilistic model for munitions mobility, which is under development by Sarah Rennie and Alan Brandt at the Johns Hopkins University Applied Physics Laboratory. Dr. Palmsten's approach provides better forcing conditions and a better understanding of the role of time-dependence and uncertainty in munitions mobility simulations.

[Read more](#)

#### ESTCP Project of the Year - Dr. Kevin Williams, Applied Physics Laboratory of the University of Washington

*"Multi-Sensor Towbody (MuST) for Detection, Classification, and Geolocation of Underwater Munitions"*

The 2020 ESTCP Project of the Year for the Munitions Response Program Area was headed by Dr. Kevin Williams from the Applied Physics Laboratory of the University of Washington and his team. Dr. Williams's first goal was to build, test, and demonstrate the system that uses a Multi-Sensor Towbody (MuST) to deploy detection, classification, and geolocation hardware from a surface vessel. The second, complementary goal was to assist in the development of underwater testbeds. Test bed development was identified as a key effort in the overall success of demonstrating the MuST system capability.



ESTCP Project of the Year Team, Munitions Response

[Read more](#)

### Recent Publications

- New Target Detection Algorithms for Volumetric Synthetic Aperture Sonar Data - [Conference Proceedings](#), Proceedings of Meetings on Acoustics ([Project Webpage](#))
- A Preliminary Design Study of a Re-Deployable Underwater Test Bed" - [SERDP Final Report](#)
- Next Generation Buried Object Scanning Sonar (BOSS) for Detecting Buried UXO in Shallow Water" - [SERDP Final Report](#)

### Resource Conservation and Resiliency

#### SERDP Project of the Year - Dr. David Lytle, Oregon State University

*"Risk-Population Models for Tracking Non-Stationary Changes in Riparian and Aquatic Ecosystems"*

Dr. David Lytle from Oregon State University led his SERDP-funded team in examining the question of how climate change alters stream flow and how these changes influence sensitive aquatic and riparian organisms. The effort examined the critical link between landscape-level climate predictions and population response. Examining this link enables researchers and managers to anticipate climate-driven changes to the distribution of aquatic and riparian organisms. In addition, the project developed web-based tools for managers that enable them to explore the consequences of proposed management actions.



SERDP Project of the Year Team, Resource Conservation and Resiliency

[Read more](#)



Ms. Samantha Phillips

#### ESTCP Project of the Year - Ms. Samantha Phillips, Select Engineering Services

*"Use of sUAS/UAS to Cost Effectively Monitor Eagle Nesting"*

Ms. Samantha Phillips from Select Engineering Services and her team led an ESTCP-funded project that developed Small Unmanned Aerial System (sUAS)/Unmanned Aerial System (UAS) technology fit for purpose and demonstrated the use of it as a cost-effective, low impact way to monitor golden eagles on military installations. The primary objective of this project was to reduce the total hours required to monitor the nests and validate the cost effectiveness of using sUAS/UAS over the traditional monitoring on foot or from a vehicle. A DJI Matrice platform equipped with a Z30 Enterprise camera demonstrated a flight time of 26-32 minutes and a range of up to 4.3 miles. The demonstration was performed at Dugway Proving Ground, which is home to the Rapid Integration and Acceptance Center (RIAC), allowing the team to conduct end-to-end testing and integration of the sUAS/UAS.

[Read more](#)

### Recent Publications

- Linking Habitat Suitability with a Longleaf Pine-Hardwood Model: Building a Species-Predictive Fire-Land Management Framework - [Journal Article](#), Ecological Modelling ([Project Webpage](#))
- Evaluating the Use of Spatially Explicit Population Models to Predict Conservation Reliant Species in Non-Analogue Future Environments on DoD Lands - [SERDP Final Report](#)
- Control and Mitigation of Aquatic Invasive Species in Pacific Island Streams" - [SERDP Guidance Document](#)

### Weapons Systems and Platforms

#### SERDP Project of the Year - Mr. Aaron Nardi and Dr. Victor Champagne, U.S. Army Research Laboratory, Weapons and Materials Research Directorate

*"Cold Spray Coatings for Chromium (Cr) and Nickel (Ni) Plating Replacement"*

Mr. Aaron Nardi and Dr. Vic Champagne from the U.S. Army Research Laboratory worked to advance the state-of-the-art for cold spray (CS) by developing a holistic approach to coating development and process optimization using advanced computational and analytical tools. This approach led to a better understanding of CS particle to substrate interaction and bonding mechanism and the compaction and consolidation of powders. It also resulted in the development of novel CS coating materials that can be used by the DoD and industry to replace chrome and nickel electroplating along with optimized process parameters and hardware.



Mr. Aaron Nardi



Dr. Vic Champagne

[Read more](#)

#### ESTCP Project of the Year - Dr. Erick Iezzi, Naval Research Laboratory

*"Demonstration and Validation of Siloxane-Based Aircraft Topcoats that are Isocyanate-Free and Provide a Reduced Environmental Impact"*

Dr. Erick Iezzi and a team of materials engineers and chemists from the Naval Air Systems Command, Air Force Research Laboratory, and NCP Coatings, Inc. evaluated various 1K and 2K polysiloxane topcoats to MIL-PRF-85285, Type II and IV performance requirements in the laboratory, in addition to testing their corrosion resistance over chromate and non-chromate primers at outdoor exposure sites. After meeting these requirements, the topcoats were demonstrated and validated on the exterior of active DoD assets at various locations across the country.



Dr. Erick Iezzi

[Read more](#)

### Recent Publications

- Evaluation of Bilgewater Emulsion Stability Using Nondestructive Analytical Methods" - [Journal Article](#), Industrial & Engineering Chemistry Research ([Project Webpage](#))
- Phase-Dependent Surfactant Transport on the Microscale: Interfacial Tension and Droplet Coalescence" - [Journal Article](#), Langmuir ([Project Webpage](#))
- Advanced Nanocrystalline Cobalt Alloys and Composites as Alternatives for Chromium and Nickel Plating in Repair Operations" - [SERDP Final Report](#)

## Upcoming Webinars

### Advancing Coating Systems for Army Tactical Assets: A Fred Lafferman Tribute Webinar

Thursday, March 25, 2021 at 12:00 PM (ET)

Dr. Robin Nissan, SERDP and ESTCP  
Mr. John Escarsega, U.S. Army Research Laboratory (Contractor)  
Mr. Jack Kelley, U.S. Army Research Laboratory  
Mr. Daniel Pope, U.S. Army Research Laboratory

This SERDP and ESTCP webinar is a tribute to Mr. Fred Lafferman who was a coatings chemist with the U.S. Army Research Laboratory. Mr. Lafferman dedicated his career to researching, developing and transitioning coatings for use on Department of Defense assets. He contributed significantly to the Weapons Systems and Platforms SERDP and ESTCP program area. Mr. Lafferman's co-principal investigators will provide an overview of his achievements and contributions to this area of research.

[Learn more and register](#)

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

## Calendar and Related Events

### Related Events

April 19–23: [29th Annual Joint Safety and Environmental Professional Development Symposium](#)

May 17–21: [2021 Virtual Joint Engineer Training Conference & Expo](#)

May 24–26: [2021 ARPA-E Energy Innovation Summit](#)

May 24–26: [American Industrial Hygiene Conference & Expo](#)

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