

FALL 2019 EDITION

DoD's Environmental Research Programs

INSIDE THIS ISSUE

- New SERDP Initiatives on Treatment Technologies for Munitions Constituents
- Isolating the Resilience Contribution of Electricity Storage: An Update
- SERDP Representation at the 5th Underwater Acoustics Conference & Exhibition
- The Ecological Society of America Conference 2019
- Are Corrosion Inhibitors Needed in Adhesive Bond Primers for Bondline Durability?
- Calendar, Announcements and Related Events

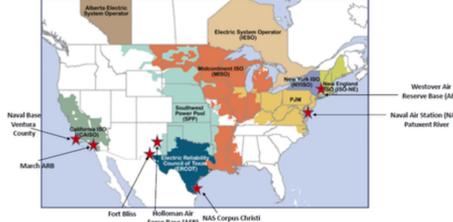
NEW SERDP INITIATIVE ON TREATMENT TECHNOLOGIES FOR MUNITIONS CONSTITUENTS

The Department of Defense's (DoD's) testing and training ranges are a critical asset for the military; however, they present unique challenges for characterization, control, and treatment technologies. In FY2019, SERDP began funding two groups of projects to address (1) mitigation of the transport of munitions constituents from testing and training range sites and (2) treatment of wastes from munitions constituent manufacturing.



The first group of projects was funded to improve the DoD's ability to mitigate transport of legacy and new munitions constituents from testing and training ranges to off-site surface and ground waters. The second cohort of projects was funded to develop cost effective options for treatment of wastes generated from munitions constituents manufacturing and load/assemble/pack (LAP) operations. The full blog post on the SERDP and ESTCP website provides a brief summary for each project. All reports originating from these efforts will be available from the project webpages. [MORE](#)

ISOLATING THE RESILIENCE CONTRIBUTION OF ELECTRICITY STORAGE: AN UPDATE



The exceptional versatility of electricity storage is a double-edged sword for military microgrids. Storage, in its various battery chemistries and non-battery forms, can perform more functions and respond more quickly than any other power asset in a microgrid. Storage is increasingly deployed on military installations in a variety of scales and for a range of resilience, renewable energy integration, and cost-saving uses. However, the same versatility brings challenges in answering fundamental questions—Is electricity storage a more cost-effective and robust way to provide back-up power than other assets? If so, what types of storage, in what configurations, in what locations, and with what operational rules perform best?

Those are the questions addressed by ESTCP's "Large Scale Energy Storage and Microgrids" research and development (R&D) topic. Six project teams began work on these questions in late 2018 and are nearing finalization of their Phase I results in what is intended to be a three-phase effort for the most promising teams. Phase I involved detailed hourly simulation of storage-enabled microgrid performance over a 20-year period compared to an ESTCP-provided baseline microgrid model without storage.

Initial results point to several types of electricity storage and operational patterns that can be included in microgrids to both lower lifecycle microgrid costs and enhance reliability performance during utility outages ranging from 1 hour to 1 week, compared to microgrids relying exclusively on diesel generators and uninterruptible power supply (UPS). Just as importantly, the results highlight where storage assets make less-valuable and more-costly contributions to resilience. [MORE](#)

SERDP REPRESENTATION AT THE 5TH UNDERWATER ACOUSTICS CONFERENCE & EXHIBITION



Dr. David Bradley, the Munitions Response (MR) Program Manager, recently participated on the organizing committee for the 5th Underwater Acoustics Conference & Exhibition (UACE2019) held June 30-July 5, 2019. At UACE2019, researchers from all over the world gathered to exchange recent results and discuss future challenges in implementing and applying underwater acoustic technologies. Many topics were covered including unexploded ordnance (UXO) detection, classification, and remediation; automatic target recognition, detection, classification, and modeling; and marine acoustics.

A number of SERDP Principal Investigators attended and presented at the conference. Dr. Steven Kargl discussed the Multi-Sensor Towbody (MuST) being developed at the University of Washington Applied Physics Laboratory and the research that has led to the design of the prototype platform ([Project Web Page](#)). Dr. David Williams from NATO Science & Technology Organization (STO) Centre for Maritime Research and Experimentation presented his research developing a novel detection and classification framework for UXO that exploits synthetic aperture sonar (SAS) data ([Project Web Page](#)). Dr. Michael Richardson, a technical advisor to the MR Technical Committee, organized a special session entitled "Underwater Unexploded Ordnance (UXO): Detections and Remediation" related to the interests of the MR program. [MORE](#)

THE ECOLOGICAL SOCIETY OF AMERICA CONFERENCE 2019

The Resource Conservation and Resiliency (RCR) team provided attendees of this year's Ecological Society of America (ESA) conference the opportunity to learn more about DoD environmental research needs and opportunities. In addition to presenting at the ESA Workshop titled Accessing Research Funding from Federal Agencies, team members stood ready to answer questions and discuss program specifics at the SERDP and ESTCP booth in the Louisville, Kentucky convention center.



In addition to the RCR Team, SERDP researchers highlighted their work at the ESA Conference.

- Dr. Elizabeth Crone presented her research in a talk entitled, "Transient responses of bumble bee populations to spatial and temporal variation in food resources." This research found that for the focal species work, in all cases, restoration had both positive and negative effects on individual vital rates and that it was necessary to integrate these effects across the life cycle to understand the net effects of restoration.
- Dr. Anna Carter discussed her ongoing SERDP project entitled "Using unoccupied aerial systems to model spatially-mediated heterogeneity in 3D microclimate landscapes."

Established in 1915 and possessing over 9,000 members, ESA works to promote ecology in the United States and around the world. The theme of this year's meeting was "Bridging Communities and Ecosystems: Inclusion as an Ecological Imperative." In the spirit of the meeting's theme, ESA held this year's meeting in partnership with the U.S. Society for Ecological Economics (USSEE), so this year, in addition to ESA's scientific sessions and business meetings, USSEE held sessions focused on economics, human impact, sustainable development and more. [MORE](#)

ARE CORROSION INHIBITORS NEEDED IN ADHESIVE BOND PRIMERS FOR BONDLINE DURABILITY?

Historically, chromated inhibitors in structural adhesive bond primers for aircraft, ground structures, support equipment, and armor applications are assumed to not only affect adhesion properties as related to varying environmental stresses (i.e., moisture, atmospheric contaminants, salt air, and elevated temperatures) but also reduce the possibility of corrosion leading to premature structural failures along the bond primer/adhesive interface.



Based on tests conducted in SERDP project [WP-2144](#), hexavalent chromium (Cr(VI)) corrosion inhibitors in adhesive bond primers were found to have no statistical significance for adhesive bondline environmental durability compared to non-chromated and non-inhibited primer variants. Using chromated bond primers as controls, the project evaluated both non-chromated and non-inhibited primers using electrochemical and mechanical test methods. Aluminum alloys, phosphoric acid anodize (PAA), grit blast/sol-gel (GBSG) surface preparations, and two 250°F-cure toughened epoxy film adhesive systems were used during the project. Environmental conditioning included four laboratory environments and two beach environments (Canaveral Air Force Station, FL and Whidbey Island Naval Air Station, WA).

There is now a greater understanding of the correlation of bond primer properties to environmental response and, subsequently, a high level of confidence that Cr(VI) plays a smaller role in bondline durability than previously believed. Metal surface preparations, and even key individual steps in these processes, appear to be more critical to bondline environmental durability than bond primer corrosion inhibition.

Use of a non-inhibited bond primer (BR-6747-1NC) for the T-45 rudder is proposed by this effort based on structural requirements, damage tolerance, and economic risk potential for repair and maintenance. Navy depot-level installation of an aluminum F/A-18D doubler, potential Army use of non-Cr(VI) primer for improved out-life/shelf life of ground support equipment and armor prior to bonding, and Air Force installation of co-located Cr(VI) and non-inhibited primer bonded repairs under consideration on C-5 aircraft will generate data on in-service performance differences between the primer variants. [MORE](#)

CALENDAR

[January 7](#): SERDP FY 2021 Solicitation Pre-Proposals Due

ANNOUNCEMENTS

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

RELATED EVENTS

- [December 9-13](#)
American Geophysical Union (AGU) Fall Meeting 2019, San Francisco, CA
- [February 5-6](#)
2020 Military Additive Manufacturing Summit and Technology Showcase, Tampa, FL
- [March 8-13](#)
North American Wildlife and Natural Resources Conference, Omaha, NE
- [April 28-30](#)
Navy Remedial Project Manager Training Workshop, Norfolk, Virginia