NDCEE

National Defense Center for Energy and Environment

Technology Experts • Sustainability Trailblazers • Collaborative Problem Solvers

Multi-Year Review

Acronyms

BA: Business Area

COTS: Commercially Available Off-the-Shelf

DoD: Department of Defense

Dem/Val: Demonstration and Validation

DENIX: DoD Environment, Safety and Occupational Health Network and Information Exchange

DEVCOM: U.S. Army Combat Capabilities Development Command

DoDD: Department of Defense Directive

EABO: Expeditionary Advanced Base Operations

ENG: Energy

ENV: Environmental

EO: Executive Order

ESOH: Environment, Safety and Occupational Health

ESOHE: Environment, Safety, Occupational Health and Energy

FY: Fiscal Year

LI-ION: Lithium-ion

MDO: Multi-Domain Operations

NDCEE: National Defense Center for Energy and Environment

OSD: The Office of the Secretary of Defense

RDT&E: Research, Development, Testing and Evaluation

ROI: Return on Investment

SOH: Safety and Occupational Health

TES: Threatened and Endangered Species

TRL: Technology Readiness Level

TTA: Technology Transition Agreement

USMC: United States Marine Corps

Executive Summary

The National Defense Center for Environmental Excellence (NDCEE) was established by Congress in 1991 with a directive to “serve as a national leadership organization to address high priority environmental problems for the Department of Defense (DoD), other government organizations, and the industrial community.” In May 2008, the Program was re-designated from the National Defense Center for Environmental Excellence to the National Defense Center for Energy and Environment to ensure that the Center’s mission recognizes and addresses the strategic interdependence of energy and environmental technology requirements within an overall sustainability framework in support of our installations, weapons systems, and war fighters.

The NDCEE Program has evolved into a national resource for demonstrating, validating, and transitioning innovative Environmental, Safety & Occupational Health and Energy (ESOHE) technologies. This Program is managed by the Army on behalf of the Assistant Secretary of Defense for Sustainment.

The United States (U.S.) Army’s broadly encompassing and growing mobile, personal, and stationary technological requirements include infrastructure, alternative and synthetic energy, training lands, emerging contaminates, transportation, systems integration, personnel well-being, and others. Further, to train as we fight, validated ESOHE technologies need to be available and implemented at Army installations. The NDCEE will continue to demonstrate, validate, and transfer these technologies supporting our integrated environment, safety, occupational health, and energy objectives to enable mission, readiness, innovation, lethality, and modernization to ensure our soldiers maintain a technological advantage over our adversaries.

This multi-year report highlights the accomplishments of the technologies the NDCEE program has supported since fiscal year 2015. Through their invaluable demonstration/validation efforts performed, the DoD can improve operations, reduce risks and costs, and enhance energy, environmental, and safety stewardship.

Celebrating over...

Years of

Technology Transition

for the DoD

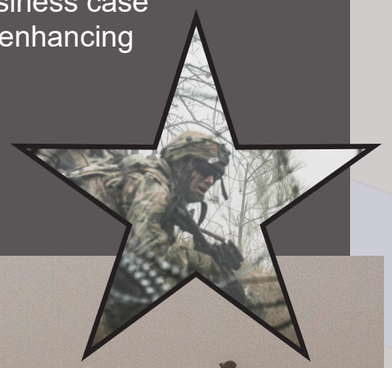
Our Mission ~

As a critical component of the DoD's environmental quality investment strategy, the NDCEE investigates, demonstrates, and helps field viable, mission-driven solutions that reduce total ownership costs and fulfill DoD environmental, energy, health, safety, and sustainability requirements.

Through DoD-wide participation in the NDCEE program development and application of the process, the following benefits are achieved:

1. Addressing DoD Priorities/Challenges - Proactively identify and focus on current and emerging issues; develop service-wide programs for joint initiatives
2. Leveraging Resources - Share information and successes, synergize Research, Development, Testing, and Evaluation (RDT&E) execution, and enhance coordination among the services while minimizing duplication of effort
3. Transfer of Tools and Technologies - Apply and propagate solutions in support of warfighter / mission requirements
4. Providing Value-Added / Measurable Benefits - Assess the business case to optimize return on investment; reduce life-cycle costs while enhancing readiness and sustainability

Since its inception by Congress in 1991, the NDCEE has successfully executed hundreds of tasks to improve operations, reduce risks and costs, and enhance energy, environmental, and safety stewardship.

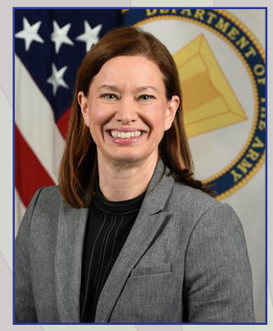


A message from

The Office of the Executive Agent

"Over the past three decades, the NDCEE has become increasingly more effective in providing an agile program construct that does a better job of increasing multi-service benefits and leveraging opportunities to ensure alignment to current (and future) priorities. With a focus on mission, readiness, and modernization, NDCEE remains a critical part of this organization dedicated to identifying and solving ESOHE challenges. The NDCEE provides a productive platform for research, demonstration, validation, and transition of sustainable technologies, all which contribute toward a more resilient and strong future. In this review, you will see the range of ESOHE collaborations and the engagement of all services, as well as the impact that the successful technology transitions have provided. Through this, the NDCEE and the services have and will continue to safeguard the warfighter, saving lives and protecting our environment."

Hon. Rachel Jacobson
Assistant Secretary of the Army
Installations, Energy and the Environment



"As the NDCEE surpasses a milestone of providing 30 years of technology transition to the DoD, the program continues to prove its value today. Within the past two to three years, NDCEE has increased technology partnerships, enhanced multi-service participation, and increased program transparency with a new digital platform for real-time data. All these efforts have resulted in maximized effectiveness and enhanced provision of service to the DoD. The program's ability to comprehensively tackle our military's most pressing issues related to energy, environment, and occupational health and safety within a collaborative structure supports the warfighter, protects our resources, and generates resilience. Continued investment in NDCEE will ensure we remain strategically and technologically positioned for the next 30 years."

Ms. Amy L. Borman
Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health
Lead Agent for NDCEE

National Defense Center for Energy and Environment

NDCEE is a DoD Technical Resource

The NDCEE was established to help DoD and the warfighter achieve performance advantages, enhance efficiency and cost-effectiveness, and comply with regulations for its installations, ranges, and weapon systems. Our mission is to transition technology solutions in support of the DoD as it strives to maintain readiness, meet sustainability goals, and support warfighters at home and abroad.

NDCEE projects demonstrate and validate high-priority ESOHE technology requirements and transitions them to the technology transition partners who will integrate them into end-user programs and processes.

Trusted

NDCEE's unique collaborative structure allows us to be the voice of the warfighter to the ESOHE community, ensuring that the DoD is informed, responsive, and capable of solving real-world problems with enhanced, technology-informed, and mission-ready solutions.

Situationally Aware

Through ESOHE focus group discussions, quarterly Technical Working Group meetings, and annual Executive Advisory Board forums, as well as maintaining connections with project collaborators and DoD leaders, the NDCEE program remains aligned to ESOHE challenges and needs.

Engaged

The NDCEE has created a joint project selection process that is conducted annually and coordinated with other DoD and ESOHE agencies. By funding technology demonstrations and ensuring technology transitions back into the ESOHE community, the program elevates the DoD's ability to sustainably provide the warfighter with the right tools and resilient technologies for mission success.

NDCEE investments have resulted in new technologies that can now be applied at the installation and tactical level. Results from demonstration / validation of battery storage and charging technologies for tactical efforts have resulted in longer storage life, less waste, and increased flexibility. Treatment technologies for wastewater, drinking water, and contaminated soils demonstrated and validated by NDCEE are modifying installation approaches.

Technological Advancements

NDCEE has invested resources to demonstrate and evaluate new technologies that have been developed through DoD investments or taking off-the-shelf technologies to determine suitability and effectiveness at bridging technological gaps for the warfighter, operational safety, and mission requirements. In working with leading DoD researchers, industry subject matter experts, universities, and installation personnel, new and emerging technologies were validated and have resulted in reduction of regulatory restrictions. For each year of projects funded by NDCEE, there is an average overall ROI for DoD of 400% with $100M in savings over five years.

From environmental to safety stewardship, these efforts have increased fidelity and decreased costs associated with detection, sample analysis, remediation, and mitigation. The demonstration and evaluation of new technologies within this report have improved occupational health and safety for DoD servicemembers and civilians. In addition, they have resulted in improved capability to reduce mitigation efforts.

Adoption of new technologies and methodologies for conservation and regulatory monitoring for compliance have resulted from NDCEE investments. These investments have improved operations, reduced risks and costs, and enhanced energy, environmental, and safety stewardship.

Technology Experts

Sustainability Trailblazers

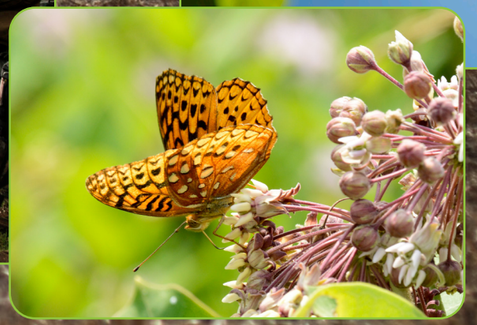
Investment in sustainable approaches and solutions provides the DoD with the ability to make sound ecological decisions to support the warfighter and environmental stewardship.

NDCEE has invested in low-cost and simple approaches to evaluate acquisition changes that will reduce contamination, energy, and improve waste management and water quality. Validation of sustainable solutions to commonly purchased goods provide green, low-impact acquisition solutions.

Sustainable Progress

NDCEE is a trailblazer in sustainability and has continued to lead and forge new paths towards a sustainable future. Funding and leveraging the small scale to regional partnership efforts have resulted in low-cost resilient systems for mission readiness. Demonstration and validation of approaches and technologies have determined transition potential, improved adoption, and resulted in DoD modernization. Projects have focused on simple to complex solutions that will continue to place the DoD at the forefront of sustainability. The DoD is invested in the protection of our natural resources, facilities, soldiers, and civilians. NDCEE prides itself on investment into projects that will help achieve sustainability goals.

Support of new low-impact and low-cost monitoring and analysis approaches for the detection of Threatened and Endangered Species (TES) has resulted in significant improvements to best management practices in the field.



Collaborative Problem Solvers

NDCEE has a broad and deep military perspective and an alliance of industry and academia, as well as government and non-government entities to deploy available and practical solutions.

NDCEE brings together common interests and joint funding to solve cross-cutting challenges in a cost-effective manner.

The interdependency of national security with energy supply and costs, water supply and costs, environmental resiliency, and human health and safety are clear. NDCEE is integral in the development of solutions respectful of these interdependencies.

Collaborative Solutions

The structure of the NDCEE program and project alignment with transition partners across the DoD services is aimed at ensuring projects are developed and executed collaboratively. The structure of program oversight, project selection, funding, and in-progress/close-out reviews are geared to function at the strategic level. The lead agent, executive advisory board, program director, and selection committee all ensure that the technology and transition process is operational. The program management office, focus groups, and the technical advisory group provide feedback throughout the project. The transition goal is to provide a technology that is immediately usable by the transition partners and the end user. From start to finish, the process is collaborative. This ensures that the end result can be used across the DoD in any applicable target environment, assuring cost savings, environmental sustainability, mission readiness, and safety.

Program Focus Areas

The NDCEE serves as a national resource for advancing technologies and processes that address high-priority environmental, safety, occupational health, and energy (ESOHE) challenges. Created by Congressional mandate in 1991, the NDCEE works to integrate ESOHE decisions into the life-cycle planning of DoD activities.

Proven technologies that are beyond the research stage are considered strong project candidates. **Projects must meet the basic eligibility requirements and clearly address four scoring criteria:**

1. **Mission/readiness**
2. **Technical quality**
3. **Transition potential**
4. **Modernization/innovation**

NDCEE provides a direct funding process for DoD agencies seeking to demonstrate, validate and transition commercially available off-the-shelf as well as recent laboratory innovations for military application. Funded projects typically range from one to two years with an average annual cost below $100k, up to $500k. A Support Agreement is signed by the DoD Installation willing to demonstrate the technology, and a DoD Transition Partner is required to ensure the successful project is implemented DoD-wide.

Desirable NDCEE project attributes align with the goals of the program:

- Project transition time-frame within two years
- Multi-service and/or multiple DoD partners is preferred
- Commercially available off-the-shelf (COTS) technologies are preferred to avoid production challenges for DoD-wide uptake
- If the proposed project has a signed technical transition agreement prior to final selection, that assists in reducing funding risk by assuring that technology transfer is set up and has a high likelihood of being successful

Each NDCEE focus area has a dedicated facilitator to help project teams throughout their time in the program. The facilitators are subject matter experts who are responsible for coordination, oversight, and execution of NDCEE projects in support of Army and other service-specific program areas and initiatives.

Environment (ENV)

Projects within the Environmental focus area work to lessen the impacts that DoD has on natural resources, and increase sustainability and resiliency. Subjects include, but are not limited to: water use and intensity reduction, contamination cleanup, reduction and/or replacement of hazardous materials and waste, monitoring TES.

Safety & Occupational Health (SOH)

The Safety and Occupational Health focus area funds projects that enhance safety, minimize warfighter exposure to hazardous substances, and decrease risk of injury and death. Subjects include but are not limited to: modernizing and modifying equipment technology to decrease safety and health risks, tool modifications, workplace protection technologies, and self-provisioning in austere environments.

Energy (ENG)

Projects funded within the Energy focus area maximize efficiencies, improve service flexibility, increase safety, and better manage and conserve energy for the DoD across all activities and locations. Project topics include but are not limited to: battery container technologies, energy conversion and power capability technologies, fuel cells, fuel management, and renewable energy.

Challenges

NDCEE is always looking to improve program management and project funding workflow with the interest of providing the best possible service to the DoD and the warfighter. The biggest challenges have historically been in ensuring transition and tracking the projects post-transition to better understand the beneficial impacts and ROI coming after technology transitions. There are ways that the program can improve before, during, and after project funding that can improve both of these issues, and the NDCEE continues to adjust its processes and project requirements to tackle these challenges.

Project Transition & Tracking:

One of the bigger elements of project transition is the technology transition agreement (TTA). The best project transitions occur when there is a signed TTA prior to or at the point of project funding. This ensures that the transition partner is able and ready to adopt the new technology once the Dem/Val is completed.

Typically projects that are able to utilize COTS technology without further applied or developmental research also fare better. Dem/Val of COTS is also more successful if the full lifecycle of the project and transition path is understood at the outset. The ability to anticipate any technology/software maintenance, housing, components issues is also very helpful, as well as being able to avoid manufacturing unforseen bottlenecks that might occur when pushing out the technology or components nationwide/DoD-wide. Equally, any security issues that might arise should be flagged and addressed during project funding review.

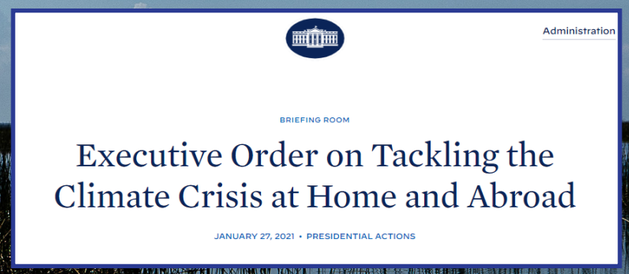
For real property project assets, there should also be a plan toward the transfer of the technology to installation real property. Funding for future maintenance and day-to-day upkeep is a typical requirement of some project technologies, but the installation must be able to fund future upkeep needs for the technology transition to be truly successful long-term.

Other Useful Points:

Financial management of projects can sometimes be challenging as well, since DoD services use different financial accounting systems. This can cause issues with obligation/disbursement rates. Meeting OSD funding disbursement targets can also be a challenge, especially with yearly funding disbursal occurring late in the FY.

Path Forward

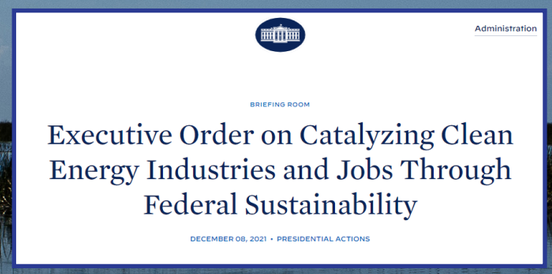
The NDCEE looks forward to future years of providing leadership and technological solutions to the DoD to maintain readiness, meet sustainability goals, and support warfighters. Broad program-level goals include increasing visibility and funding levels, as well as continuing to promote the program's successes and cost savings across all DoD services. Multi-service participation continues to be a high priority, for both engagement of services receiving project funding as well as the diversity of services engaged as transition partners for technology dem/val. A successful transition partner is one that has funding to purchase these technologies within the DoD. The inclusion of more acadamia and private industry entities is also welcome to further develop the reach of the NDCEE program and maximize cost savings for the DoD in the long term. The challenges of ensuring project transition and post-transition tracking will also be addressed at every level.


Administration

BRIEFING ROOM

Executive Order on Tackling the Climate Crisis at Home and Abroad

JANUARY 27, 2021 • PRESIDENTIAL ACTIONS


Administration

BRIEFING ROOM

Executive Order on Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability

DECEMBER 08, 2021 • PRESIDENTIAL ACTIONS

NDCEE is also adapting to and responding to Federal climate change and sustainability priorities. This year, in addition to the traditional ESOHE topics, submissions focused on climate resilience and sustainability were invited in response to recent Executive Orders (EOs). These include EO 14008 (Tackling the Climate Crisis at Home and Abroad) and EO 14057 (Catalyzing Clean Energy Industries and Jobs through Federal Sustainability). Submission topics included increased energy and water efficiencies, reduced waste and pollution, reduced greenhouse emissions, and obtained net-zero emissions from buildings, campuses, installations, and fleet. This sets precedent for NDCEE to continue to focus on Federal priorities in future out-years in order to maximize the impact of NDCEE funding within the Department of Defense as well as in response to Federal compliance targets, maximizing the impacts of increasing readiness and sustainability for warfighter support.

Achievements Supporting...

NDCEE has evolved into a recognized source of service-ready technologies that immediately benefits the DoD. These technologies range from knowledge-based products like best management practices and strategies, to supportive widgets and tangible innovative products. Completed projects inform a program of record, assist installations to be more efficient, transform workflows, solve safety challenges, create force multipliers, and provide the warfighter adaptive solutions that enhance mission readiness across the DoD.

NDCEE is integral in the development of solutions towards the interdependency of national security, energy & water supply, cost savings, environmental resiliency, and human health and safety.

Effective Technology Transfer

NDCEE has over 30 years of established technology transfer. It was established in 1991 to “address high priority environmental problems” for DoD, other government organizations, and industry. In 2008 the focus areas of Energy and Safety and Occupational Health Challenges were included. Due to the nature of this program targeting high-priority problems, the proposed solutions were, by nature, funded to demonstrate and validate innovative technologies. The short two-year project timeframe also supports fast dem/val which will immediately benefit the targeted recipient (initially the transition partner but post-validation the technologies are meant to transfer DoD/service-wide, wherever applicable). This technology transfer approach is meant to maximize ROI, emphasize multi-service benefits, and leverage opportunities wherever they exist.

Screening criteria ensure: projects support mission and readiness; are of high technical quality; have strong transition potential; and support modernization and innovation. NDCEE is working to increase multi-service transition, and technology transfer status of all projects is tracked through project close-out and beyond.

...Our Future

Service Support

Redesigned DENIX website includes project fact sheets for DoD accessibility and public visibility.

Historically, all services have been well represented in funded project selections. All DoD services continue to be encouraged to submit proposals.

The U.S. Army's broadly encompassing and growing mobile, personal, and stationary technological requirements include: infrastructure, alternative and synthetic energy, training lands, emerging chemicals, transportation, systems integration, personnel well-being, and others. Further, to train as we fight, validated ESOHE technologies need to be available and implemented at DoD installations. The NDCEE will continue to demonstrate, validate, and transfer these technologies supporting our integrated environment, energy, safety, occupational health, and energy objectives to enable mission, readiness, innovation, lethality, and modernization to ensure our soldiers maintain a technological advantage over our adversaries.

NDCEE supports the demonstration and validation of mature Budget Activity 4 (BA4) environment, safety, occupational health, and energy technologies that support mission requirements. The objective is to invest in innovative technologies that support military mission/readiness, employ a high degree of technical fidelity, have a high potential for transition success, and align with modernization goals.

The Return on Investment (ROI):
ROI is captured to understand how this project may have technological benefits and result in cost avoidance or cost savings over time, with target levels of at least 15% savings if applicable. As NDCEE funds 6.4 Advanced Component Development and Prototypes work, it is typically not practical to determine an accurate ROI at the start or even at the end of the 6.4 effort. Therefore, the NDCEE closeout process includes a 6-month and 12-month follow up. Depending on the timeline associated with achieving a particular technology's fielding, a follow up ROI check may be necessary at a later date.

Program & Funding Information

For More Information:

Projects submittal details are included in the "How to do Business with NDCEE" guide on our website.

https://denix.osd.mil/ndcee/home

Direct questions to the "Contact Us" link on the website and the NDCEE Program Manager will respond to you.

Funding:

NDCEE is a DoD Program; the Army is designated as the lead agency responsible for planning, programming, budgeting and execution. NDCEE thus provides a direct funding process to DoD agencies for researchers and shelf-ready technologies seeking demonstration, validation, and transition at DoD installations. Typical projects range from one to two years with a range of annual costs from $20K - $500K.

Eligibility requirements ensure that there is a multi-service need and an official transition partner. Selection process ensures that projects support mission/readiness, are of high technical quality, have strong transition potential, and support modernization / innovation.

Project categories are: Energy, Environment, and Safety & Occupational Health

The Office of the Assistant Secretary of the Army for Installations, Energy, and Environment (Environment, Safety and Occupational Health) is the Lead Agent, and the U.S. Army Environmental Command executes Program Management.

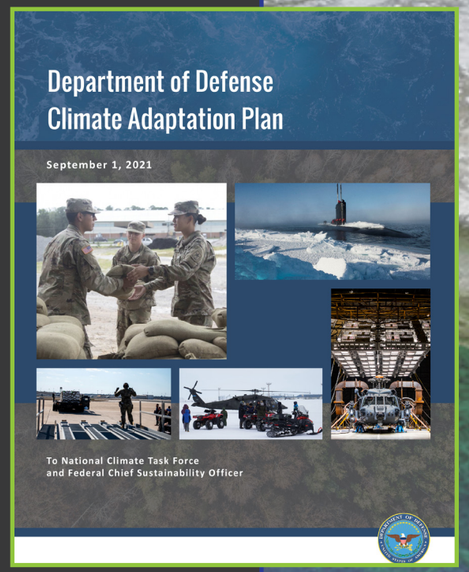
Climate Resilience

"Today, no nation can find lasting security without addressing the climate crisis. We face all kinds of threats in our line of work, but few of them truly deserve to be called existential. The climate crisis does... Climate change is making the world more unsafe and we need to act."

- Secretary of Defense Lloyd Austin, President Biden's Leaders Summit on Climate, Earth Day, April 22, 2021

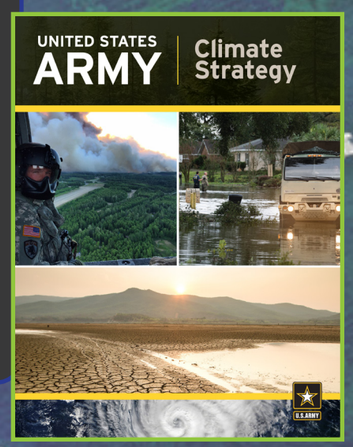
The Army is currently responding to the following climate change policies to build climate resilience:

- Executive Order (EO) 14008
- 2019 National Defense Authorization Act
- DoD Climate Adaptation Plan
- 2020 Directive 4715.21
- Army Directive 2020-08
- Army Climate Strategy
- Army Climate Action Plan



The Army Climate Strategy's "End State" goals are to reduce emissions and increase its sustainability activity to align with the Nation's commitments to:

- Reduce greenhouse gas pollution by 50-52% by 2030
- Reach net zero emissions by 2050
- Comply with the federal clean electricity and vehicle procurement strategy
- Ensure climate change adaptation and resilience are integrated across all Army programs, management of real property, and financial services

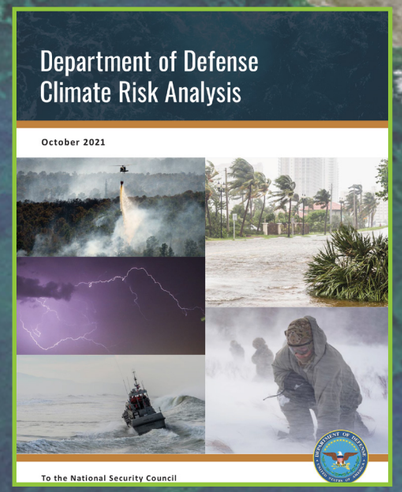


NDCEE supports projects that contribute toward Army Climate Resilience across all funding categories thus increasing warfighter readiness.

Energy: Projects target power extension and battery power, increased power transmission capabilities and reduced reliance on generators, efficient power flow management, enabled transport of charged batteries, and soldier relief from having to spend downtime recharging or carrying extra batteries on extended missions. Energy projects enhance energy efficiency, improve service flexibility, and increase safety.

Environmental: Projects focus on water use, by decreasing remote area water requirements, reducing water demand, and increasing water management functions. This in turn decreases water use intensity, reducing potential natural resource limitations.

SOH: Projects increase safety, with a particular focus on reducing warfighter exposure and risk of loss of life in remote areas and extreme environments. One particular element of this is increasing water and energy self-provisioning. Regulatory compliance is also increased, which also reduces environmental risks to soldiers.



Climate Change is defined as: Variations in average weather conditions that persist over multiple decades or longer that encompass increases and decreases in temperature, shifts in precipitation, and changing risk of certain types of severe weather events.

Resilience is defined as: Ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.

- DoDD 4715.21: Climate Change Adaptation and Resilience

Current Climate Resilience NDCEE Project Contributions

1. **Autonomous and Robotic Remote Refueling Point (AR3P) Objective Field Prototype (OFP)**

Delivers ground based autonomous unmanned refueling capability and reduces soldier exposure, increases combat radius of existing rotary wing aircraft. The integration of this technology will allow for operation in ruggedized environments with hostile climates and for Sling Loading Operations in support of aerial delivery/ emplacement methods. By placing fuel forward, operational reach is extended and demand and volume are reduced. [Energy - FY21]

2. **Agile Power Extender for Remote Operations: Power Extender-Grid Source (PEGS)**

This project will enable the capability to convert 120VAC 20amp circuit common on military power distribution equipment to 600VDC to transmit over a power line. The higher voltage will eliminate the issues with line loss at the higher distances and enable the removal of spot generators from the battlefield, saving fuel and reducing the logistic burden on the warfighters. [Energy - FY20]

3. **Intelligent Battery Tray for Small-and Medium-sized EOD Robots**

Project will design a battery tray which will manage BB-2590 power flows and ensure resilient, predictable, and flexible power to achieve optimal Common Robotic System - Heavy (CRS-H) mission time and performance. Technology developed also applies to Man Transportable Robotic System Increment II (MTRS Inc II), CRS-Individual, TALON, and Packbot. Potential cost savings are also significant as each new set of CRS-H batteries costs up to $5,400 each saving $5M/year for a 1000 robot fleet. [Energy - FY22]

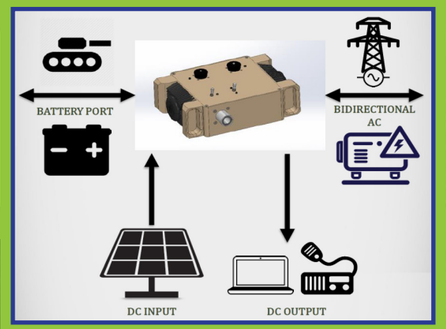
4. **Multi-Service Lithium Battery Charging, Transport, and Storage**

Enables fully charged battery transport increasing readiness and reducing downtime during recharge with ROI of >$1M per unit based on approximately 24hrs saved per deployment of air-carried systems using Li-ion batteries with additional savings in prevention of battery fires. [Energy - FY17]

Current Climate Resilience NDCEE Project Contributions

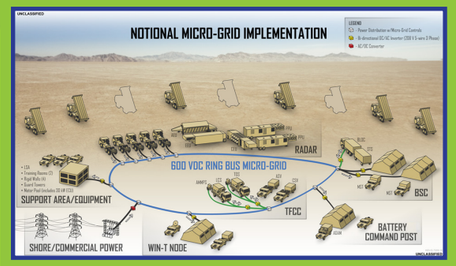
5. 6T HYbrid Power Energy Router (6T-HYPER) - 6T Based Bidirectional Inverter Cap

The 6T-HYPER will be a one-man carry device that can both harvest energy from any AC or DC source and supply clean AC/DC power from a 6T Li-Ion battery, from the 24VDC bus of a vehicle and from any AC power source up to 10kW. [Energy - FY22]



6. Marine Corps Secure Tactical Advanced Mobile Power (MCSTAMP) Hybrid Dashboard

Integrated power generation, distribution, energy storage, metering, control systems and on-board power from mobile tactical platforms capable of forming into an AC/DC micro-grid will enhance resiliency, mobility and flexibility of advanced units to execute distributed cross-domain maneuvers in multi-domain operations. [Energy - FY22]



7. Distributed Low-Energy Wastewater Treatment (D-LEWT) 2.0 to Enhance Energy and Water Security and Resiliency

A 10,000 gallon/day modular/scalable containerized wastewater treatment system which generates hydrogen and methane for energy production with the potential for an 80% energy reduction compared to traditional aerobic treatment systems. [Energy - FY20]

8. Charging-capable Li-ion Autonomous Safe Storage Container

Design and produce a standard footprint container capable of transporting, charging and storing various non-portable Li-ion batteries safely on aircraft and other DoD platforms allowing for electrification of the force safely. [Energy - FY20]

9. DCDP Direct Current Power Distribution (DCPD)

This project will enable Army Multi-Domain Operations (MDO) and USMC Expeditionary Advanced Base Operations (EABO) warfighting concepts, as the services need improved flexibility, speed and efficiency of distributing Small Unit Power. DCPD will change the paradigm of power at the tactical edge by reducing reliance on large AC generators, therefore reducing fuel requirements and minimizing transported equipment needs for the fight. [Energy - FY21]

10. Honey Badger 50 - Reformed Methanol Wearable Fuel Cell Power System

Soldiers on extended missions will not need to carry extra batteries or recharge batteries; they simply refill the fuel cell saving on energy costs and improving safety. The HB50 is a 50 Watt Reformed Methanol Fuel Cell (RMFC) system which generates power by converting the chemical energy in a methanol/water mix (fuel) to electrical energy. [Energy - FY21]

Current Climate Resilience NDCEE Project Contributions

11. Greywater Treatment and Reuse System (GWTRS)
Decreases remote area water requirements by 60% and increases energy efficiency. Transitioned to Product Manager (Petroleum and Water Systems) and will commence usage at Fort Leonard Wood with projected ROI of $2.2M. [Environment - FY16]

12. Deployable Water Metering and Monitoring System for Multi- Domain Operations (KETOS)
This project will increase military capabilities for integrated metering and monitoring of water supplies in Multi-Domain Operations (MDO) and resilient installations to better manage water and energy resources. [Environment - FY19]

13. Greywater Reuse Pretreatment Module for the Lightweight Water Purifier
A system to reduce water demand by treating greywater for non-potable reuse at the point of use with existing equipment. [Environment - FY21]

14. Remote Emergency Generator Monitoring
Project demonstrates a custom system for remotely monitoring air permitted emergency generators reducing air emissions and labor costs at the Installations. [Environment - FY20]

Achievements

The NDCEE continues the critical mission it began over 30 years ago: Identifying, demonstrating, evaluating, and fielding technologies in support of DoD readiness, sustainability, and the warfighter.

FY20 Highlights

Managed & tracked **49** projects

10 FY19 projects transitioned

8 projects closed-out

16 FY20 continuing projects

6 FY21 new starts

9 continuing prior-year projects

Enhanced multi-service participation

Doubled the number of project proposals, with **53** submitted in FY21

Successfully obligated **$3M** Congressional Add

Engaged in various **marketing** efforts

Redesigned DENIX website to include **project fact sheets**

Increased program funding transparency with **real-time data** platform

FY21 Highlights

Managed & tracked **45** projects

3 FY20 projects transitioned

6 FY21 continuing projects

9 FY22 new starts

33 continuing prior-year projects

Increased technology partnerships and leveraged funding

Continued multi-service participation

Increased the number of project proposals, with **65** submitted in FY22

NEW Digital Platform used for project submissions for FY22 funding cycle

Conducted **4 site visits** to view demonstrations and promote transition to technology partners

Presented NDCEE 101 at the SERDP Symposium and other DoD Conferences

FY20-FY21 highlights are provided as an example of the program's yearly achievements.

Doing Business with the NDCEE

The NDCEE is available to DoD and all federal agencies. Our customers benefit from leveraging the Army's investment in the NDCEE Program infrastructure and its streamlined contract management and project execution. There is no administrative fee for using the NDCEE contract vehicle, allowing stakeholders to receive the maximum return on their RDT&E investments.

User Requirements
Valid User Requirements; Sources Drive the Process

Project Solicitation
Joint participation with DoD, industry, and academic partners

Project Selection
Structured selection process to ensure Joint benefits and transition success

Funded Project Management
Focus reporting to ensure Dem/Val completion in accordance with plans

Project Transition
Ultimate goal is to transition viable technologies to end-users

Proposals Due
1 APRIL

Project Selection
JULY

Project Start
When funds are available; Typically Nov-Mar.

In-Progress Reviews
QUARTERLY

Project Transition
OCTOBER + 2 years

Transition Tracking
OCTOBER + 2.5 - 3 years

Projects must be eligible for Budget Activity 4, must be at a Technology Readiness Level (TRL) of 5-6 at entry and progress to 8-9 upon exit. There must be a valid multi-service need, and a technology transition partner must sign a transition agreement. Projects must also be completed within two years. Projects should utilize DoD / service installations if a locational presence is required to demonstrate the technology and/or prove successful tech transfer.

Energy Efficient Expeditionary Small Unit Water Purifier (SUWP)

Project Purpose

Dem/val a commercial SUWP system that provides safe drinking water from multiple water sources through energy efficient, reverse osmosis. This will enable warfighter readiness. Water is required by every warfighter to maintain both proper health and readiness. The logistics of transporting water for 30 persons varies between 945-1950 lbs. of water per day. Producing water at the point of need would represent a novel way to eliminate the need to haul water, reduce supply logistics, extend mission length, and create a more agile and effective force. The E3-SUWP is a fully functional reverse osmosis water purification system, can purify any water source, HMMWV transportable, and utilizes a high efficiency energy recovery pump to reduce power consumption.

Project Impact

Stakeholder/Beneficiaries include U.S. Army Africa (USARAF), Sustainment Capabilities Development and Integration Directorate (CDID), and the U.S. Marine Corps. All ground troops will benefit from a secure and readily available water supply. The successful outcome of this NDCEE project will result with the E3-SUWP which can produce 20-26 gal/hr. from any water source while using only an average of 275-485 W of energy. This will reduce the amount of water transported for a three-day operation by 90-95%.

Special Notes / DOD ROI

Stakeholder/Beneficiaries include USARAF, Sustainment CDID, and the US Marine Corps. All ground troops will benefit from a secure and readily available water supply. The successful outcome of this NDCEE project will result with the E3-SUWP which can produce 20-26 gal/hr. from any water source while using only an average of 275-485 W of energy. This will reduce the amount of water transported for a three-day operation by 90-95%.

Agile Power Extender for Remote Operations: Power Extender-Grid Source (PEGS)

Project Purpose

Convert 120VAC circuit common on power distribution equipment to 600VDC to transmit over a ruggedized power line to extreme distances. This effort developed a product that provides the capability to run power from its current maximum of 300' to a longer distance 4000'. This will enable remote sensors, weapon systems, and power loads to be run from the more efficient central power generation source and eliminate the need to run an extra generator set for one load in a remote area. This product will take the normal 120VAC 20amp circuit into the transmitter box and convert the 120VAC to 600VDC to transmit over a ruggedized power line to the receiver box which will convert it back to 120VAC for the local load to plug into. Converting to the higher voltage will eliminate the issues with line loss at the higher distances and enable the removal of spot generators from the battlefield, saving fuel and reducing the logistic burden on the warfighters.

Project Impact

PEGS reduces the number of required generator sets while providing increased power reliability and availability by running from the main grid or central power generation source. It increases the readiness of the warfighter across all the services, increases the operational flexibility of the battle commander, reduces the logistic burden on the warfighter, and reduces the fuel needed on the battlefield. The operation and maintenance of the system requires minimal specialized or additional training for an Army 91D or other services maintenance personnel. PEGS is DoD-owned, with all firmware, source code, and drawing packages belonging to the Army.

Special Notes / DOD ROI

Completion of this project will result in a transition of Hardware, a Tech Data Package, and/or Purchase Description to Project Manager–Expeditionary Energy & Sustainment Systems. PM-E2S2 holds the DoD charter for power generation and distribution. Upcoming major activities include demonstrations, field evaluations, soldier touch-points, and mil-spec testing.

Autonomous Robotic Remote Refueling Point for Rotary Wing Aircraft (AR3P)

Project Purpose

The AR3P is a robotic refueling system for both manned and unmanned rotary-wing and VTOL aviation systems. Program goals are to re-introduce the Forward Airing and Refueling Point (AR3P) concept using autonomous capabilities in order to a) reduce warfighter exposure and b) improve combat radius / increase the range of key existing rotary wing manned and unmanned aircraft. System deployment will reduce or eliminate warfighter exposure at forward air refueling points (FARP). By placing fuel forward, operational reach is extended and demand and volume are reduced. During the current phase of the effort, technology maturation includes modification of the robotic arm and end effector fuel delivery system. Additionally, warfighter-recommended updates will be made to the large-diameter fuel hose, COTS standard high flow rate fuel nozzle, and small mount manifold. The integration of high flow rate safety features to minimize fuel spillage such as emergency cutoff valves will also be conducted. Testing of the existing end effector static abatement circuit will be performed to increase the overall TRL level of the end effector design.

Project Impact

The transition products will be: An Objective Fielding Prototype (OFP) system and design, technical drawing package, and performance specifications. Future demonstrations will include one or more of the following aircraft the SH-60, MH-6, MV-22, CH-53. Successful rotors turning demonstrations involving a USMC K-MAX and an S-70 (UH-60A) (helicopters) were conducted in September and October 2020. The AR3P system is service-agnostic, and may also be leveraged by coalition/partner forces.

Special Notes / DOD ROI

The AR3P program will reduce soldier exposure to zero, increase survivability of flight crews during long range missions by providing “pit stop” capability, support demand reduction of associated log support on the battlefield, and provide improved time on station for reconnaissance. It will also provide a robotic system with remote fuel certification techniques. The system satisfies the need of the Army for autonomous refueling and rearming in austere locations; also the needs of the Navy in an improved range for littoral operations.

Smart Universal Static Line Snap Hook

Project Purpose

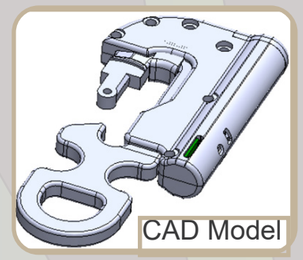
During static line airborne operations, a towed jumper can occur when an airborne soldier does not separate from aircraft, which may lead to serious injury or death of the airborne soldier. – A towed jumper may not be identified immediately, which may cause injury and/or death by striking the aircraft or other jumpers exiting the aircraft. – The SUSH detection device will be an adapter-type visual and/or audio notification device which will attach to currently used equipment to notify on-board safety personnel of the towed jumper.

Project Impact

The primary stakeholder for this technology is the static line airborne soldier and his or her Unit. The airborne soldier will benefit from this technology by reducing the risk of injury when executing a static line airborne operation and the soldier’s unit will benefit from this technology by increasing mission readiness through a reduction of risk and potential injury during static line airborne operations. Other DoD stakeholders include the US Navy, Marine Corp and Air Force and US Forest Service, who also conduct static line jump operations and experience towed jumper malfunctions.

Old SBIR SUSH

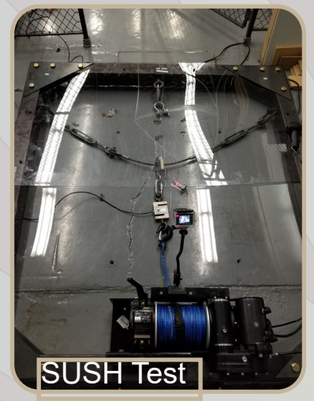
New SUSH



CAD Model

Special Notes / DOD ROI

There is historically an average of approximately one towed jumper event per year. Resulting in risk/injuries that can range from permanent partial disability (Class B) or fatality/permanent total disability (Class A). This capability significantly reduces the severity of injuries resulting from towed paratroopers by reducing the time to detect a towed paratrooper event, which will allow the jumpmaster and/or safeties to stop following jumpers from exiting more rapidly and reduce the time a towed paratrooper is exposed outside the aircraft.



SUSH Test

Human Vibration Exposure Directory (HVED)

Project Purpose

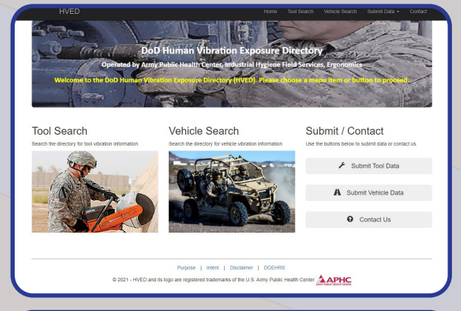
This project combines existing technology and data to develop an online platform that is accessible by Occupational Health and Safety (OHS) personnel. The platform will house a directory of whole-body vibration and hand-arm vibration exposure measurements made on DoD equipment used by DoD personnel. This effort will develop, populate and deploy a web-based, searchable directory of human vibration exposure measurements of DoD power tools and vehicles for use in the estimation of soldiers' and civilians' exposures.

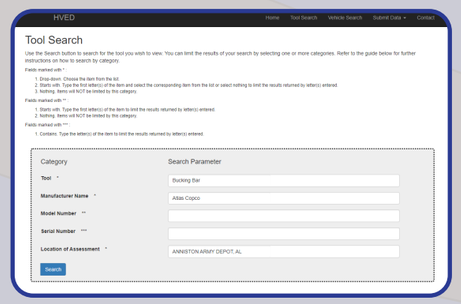
Project Impact

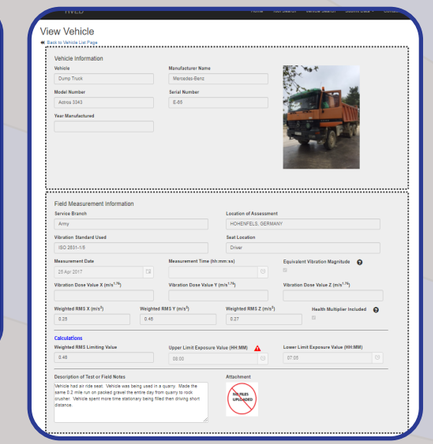
Once this project is complete, OHS personnel will be able to estimate exposure measurements and enter data into the Defense Occupational and Environmental Health Readiness System (DOEHRS) and document an individual's longitudinal exposure record.

Special Notes / DOD ROI

The directory becomes a force multiplier by allowing OHS personnel the ability to search other installations' efforts to determine if equipment was previously measured under similar conditions. Worker exposure can then be estimated and quickly compared to recognized standards to determine if further investigation is warranted.







Improved Bucking Bar to Maximize Worker Performance and Health

Project Purpose

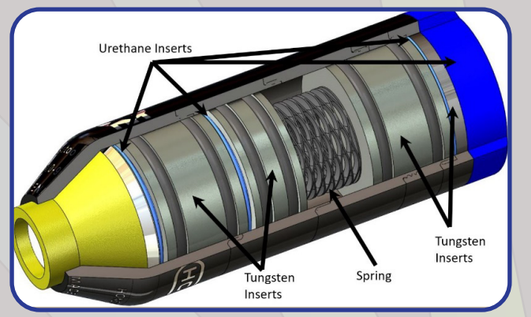
The purpose of this project is to determine if a new bucking bar designed with vibration dampening materials will reduce the level of hand-transmitted vibration (HTV) riveters are exposed to as part of their normal job responsibilities. Workers using manually operated riveting tools (riveting hammers and rivet bucking bars) are exposed to significant levels of hand-transmitted vibration. Riveters are at risk of developing components of hand-arm vibration syndrome as they can install thousands of rivets in a work week when performing maintenance on aircraft. This effort will field test a new bucking bar design that incorporates use of a spring, urethane and tungsten inserts as vibration dampeners to minimize the vibration exposures.

Project Impact

All DoD services perform pneumatic percussive riveting and use bucking bars in the maintenance of aircraft. Literature indicates that gloves do a poor job of protecting the hands at less than 250 Hz. The literature also notes that it is very difficult to find or make a glove that could reduce the vibrations transmitted to the fingers in this frequency range. This study therefore, focuses on reducing the finger-transmitted vibration by developing a better bucking bar tool, and will provide impacts reaching across the DoD if successful.

Special Notes / DOD ROI

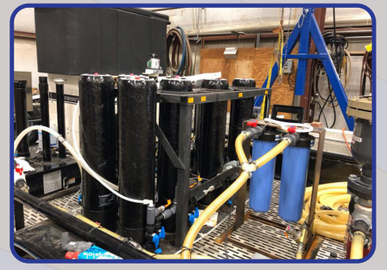
This project will help the DoD determine if there is a benefit to using bucking bars that possess vibration dampening properties. This study looks at human health impacts relative to potential decrease in hand-arm vibration levels, decrease in muscle activity, decrease in perceived exertion, and decrease of error rates. If this project is able to prove health benefits to workers, vibration dampening bucking bars could replace current bucking bars. ROI would be seen in human health/safety, likely also in cost decreases due to decrease in error rates and increase in work rates due to decrease in perceived exertion.



PFAS Effluent Treatment System (PETS)

Project Purpose

ERDC's Environmental Laboratory has developed a mobile treatment system to remove Per- and polyfluoroalkyl substances (PFAS) from water. The PETS can be effectively applied to relatively small quantities (250,000 gallons or less) of collected PFAS contaminated water. The water sources can be areas collecting runoff water from AFFF equipment, wash off and Aqueous Firefighting Foam (AFFF) equipment decommissioning areas, PFAS contaminated groundwater from Investigative Derived Wastes (IDW), small groundwater pumping sites where PFAS contaminated groundwater is collected in a storage system, and in construction dewatering operations involving sites with PFAS contamination. This dem/val project was successful in providing a mobile system to effectively treat collected contaminated water at multiple sites.



Project Impact

AFFF are an established source of PFAS environmental contamination. The U.S. Air Force, Navy, Marine Corps, and Army have numerous facilities where AFFF was used for training and stored for future use. Many of these facilities have recovery systems that collect the contaminated water. Although some of these can have large water volumes, (>1 million gallons), many of these systems are relatively small, ranging from 500 to 250,000 gallons. A mobile system to periodically treat the contaminated water from these systems will be useful.

Special Notes / DOD ROI

As part of the NDCEE project, the system was completed and successfully demonstrated at Hurlburt Field (Air Force) in Florida, and Millington, TN. Following the NDCEE project, advanced versions of the PETS were successfully demonstrated for two projects at Air Force and Marine Corps bases in Japan. The system (including every component) is approximately $200,000. The maintenance cost will be merely on the replacement of the ion exchange resin media. The Return on Investment on using a PETS to treat water from an 150,000 gallon pond was calculated to be over 14:1 compared to pumping it out and incinerating the collected water, and is recognized due to the mobility, versatility, and compatibility of treating the smaller contaminated water systems periodically and as necessary.

Picogrid: Satellite-Connected Remote Monitoring for Field Sensor Suite Deployment

Project Purpose

The primary objective of this project is to clearly demonstrate the effectiveness and efficiency of the Picogrid satellite-based technology at transmitting data collected from remote ground sensors to a secure internet site, from which data can be readily accessed by the end-user. This project will prove the technology's capability to operate with a wide range of existing sensors and equipment to enable rapid, cost-effective integration into array of applications. The goal of the project is to develop a process using the Picogrid technology that provides the DoD a cost effective and efficient enterprise-scale method for accessing and transferring ground-based sensor data in remote areas without the need for physical data retrieval.

Project Impact

The current state of the art technology for accessing data in remote areas without cellular service often requires complex, ground-radio networks or frequent manual access. Deploying field-equipment with Picogrid terminals enables faster installation and greater reliability than ground radio networks since each terminal is independently solar powered and maintains a dedicated satellite internet connection. The frequency of manual access is reduced through network connectivity. This technology enables federal land managers, including DoD range management offices, environmental divisions, and a live, real-time connection to the field. The dem/val site location for this project is Luke AFB/56 RMO in Arizona where it will augment existing environmental field operations. Other DoD (Naval Base Ventura County) and non-DoD organizations (Alert Wildlife, Seychelles Dept. of Foreign Affairs, Pacific Gas & Electric, and various fire departments have also expressed interest in this technology.

Special Notes / DOD ROI

The Picogrid Lander is a fully self- contained, grid-independent remote monitoring terminal designed to supply persistent power and to secure, high- bandwidth connectivity to sensors and remote field equipment for years without maintenance. This capability will alleviate the reliance on physical data retrieval in remote areas, which provides warfighter safety. It also reduces the amount of ground equipment that is required, thus also reducing costs. Finally, it is possible to utilize this technology in sensitive environmental sites, away from power sources or other connectivity infrastructure, which assists in environmental compliance and stewardship.

Citric Acid Passivation (CAP)

Project Purpose

The Army must mitigate the impacts of hexavalent chromium (Cr6+) on our workforce and our processes to ensure sustainment of readiness capability. Cr6+ is a known human carcinogen. Corpus Christi Army Depot (CCAD) uses nitric acid passivation (NAP) for corrosion protection on retainers, spacers, mounts, and other SS components. NAP requires the use of nitric acid (NOx) in wastewater and Cr6+ from the passivation process. This project is one of several projects designed by AMCOM G-4 to eliminate the use of Cr6+; it is a demonstration / validation project an Citric Acid Passivation for corrosion resistant steel (CRES) weapons system components.

Project Impact

The use of CAP will eliminates risk for workplace exposure to NOx and Cr6+. CAP will be incorporated as a critical process for jet engine overhaul, impacting all aviation platforms processed at CCAD including UH 60, AH 64 and CH 47, as well as aviation platforms at other DoD activities as applicable.

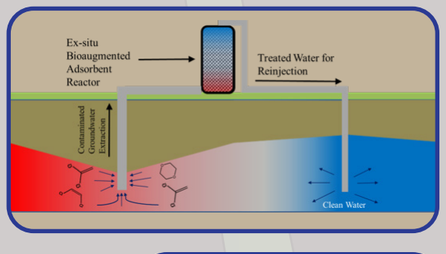
Special Notes / DOD ROI

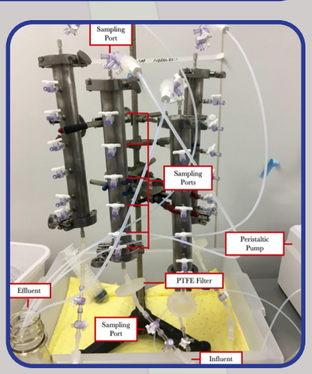
This chemical cleaning process improves weapons systems corrosion resistance, and reduces both hazardous waste generation and greenhouse gas emissions. CCAD will realize $200,000 in annual cost avoidance using the CAP process as it reduces: process time and labor, chemical material, disposal, and treatment costs, the number of scrapped parts from etching, and labor for bath maintenance for test and disposal. CAP is safer, faster, cheaper, more environmentally friendly, and imparts superior corrosion resistance over NAP for the seven stainless steel alloys which are immersion passivated at CCAD. All this combined contributes to increased mission readiness through improved employee safety and health.

Novel Bioaugmented Sorption Treatment Technology for CVOCs and 1,4-Dioxane

Project Purpose

Chlorinated volatile organic compounds (CVOCs) and 1,4-dioxane are persistent chemicals that often co-occur in groundwater at DoD sites. Conventional treatment methods such as advanced oxidation are very expensive, while sorption or air stripping are typically ineffective for the complete removal of both CVOCs and 1,4-dioxane due to the hydrophilicity of 1,4-dioxane. The project objective was to demonstrate an ex-situ adsorption/ biodegradation treatment train to irreversibly remove CVOCs and 1,4-dioxane from waters at a DoD site using bioaugmented adsorbents. The goal was to limit the cost associated with existing pump and treat technologies (e.g. advanced oxidation) by minimizing costs from energy inputs and/or chemical inputs (e.g. costs from UV sources and chemical oxidants), as well as to use this process for other remediation efforts.





Project Impact

The hybrid biological/physiocochemical process provides sustainable realtime sorbent bioregeneration, with low costs, longer operational lifetime, and minimized RCRA waste to ensure minimal toxic byproducts. There is also minimized leaching concerns associated with potential secondary release (landfilling) due to biodegradation of 1,4-dioxane and some CVOCs.

Special Notes / DOD ROI

A tool provided by the Navy Environmental Sustainabilty Development to Integration Program was used to understand lifecycle savings for this process versus existing pump and treat systems (including RCRA waste disposal cost). Project costs were scaled over 30 years of treatment life cycle across 50 potential sites. The study found a RDTE cost effectiveness ratio of 16.11, an extended present value of savings of $9,990,300 and a savings-to-investment ratio of 10.08.

Environmental DNA Surveillance of Threatened /Endangered Species on Military Ranges

Project Purpose

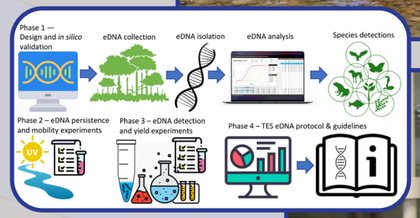
The project goal is to develop standardized environmental DNA (eDNA) sampling protocols and guidance materials to facilitate widespread adoption of eDNA surveillance techniques for monitoring threatened/endangered species (TES) on military ranges. Environmental DNA analysis has emerged as a rapid, cost-effective option for detecting and monitoring rare, cryptic, and/or elusive species. This technology can detect and identify species from the DNA that they have shed into the environment, without requiring animals to be physically present at the time of sampling. Specific project objectives include 1) demonstration of the use of eDNA on military ranges, 2) construction of a database of currently available eDNA assays for DoD species and 3) provide detailed guidance on use of eDNA.

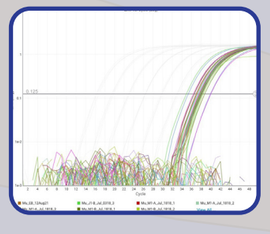
Project Impact

Endangered Species Act mandates often require extensive survey and monitoring efforts for threatened/endangered species on DoD installations which can be time intensive and expensive. The use of eDNA can drastically improve survey efficiency, resulting in cost and time savings for installation managers and minimizing impacts of TES encroachment on military training.

Special Notes / DOD ROI

This project is demonstrating the use of eDNA conducted within standardized protocols across a variety of military relevant challenges and contexts including single species assays, community level assays and variable habitats (standing water, flowing water and terrestrial). This demonstration, in combination with detailed guidance developed and informed via these efforts, as well as an eDNA database, will facilitate adoption of this technology for more cost effective monitoring of TES on DoD lands.





Cost-Effective Autonomous Monitoring of Military Ranges for Threatened/Endangered Species

Project Purpose

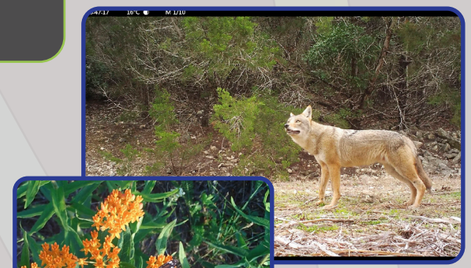
Autonomous cameras have been used for decades to monitor wildlife species, however, the development of accompanying software that would allow automated animal identification from cameras images has lagged. Recently developed deep learning software has shown great promise with >90% accuracy for animal identification. This project used autonomous cameras to photograph wildlife in remote field locations, then used deep learning software to identify the species present. This project demonstrated the successful capability of integrating monitoring hardware and deep learning software for monitoring of threatened and endangered species (TES) on military lands.

Project Impact

The presence of TES on military lands can be costly, in terms of species management costs but, also and more importantly, through the potential for training restrictions. Effective management, and thus avoidance of restrictions, is dependent on detailed information on where species occur on the Installation. This project demonstrated the combination of remote, autonomous cameras and machine learning for image identification, allowing highly cost-effective monitoring of endangered species across military Installations and enabling regulatory compliance.

Special Notes / DOD ROI

By providing detailed, step-by-step guidance on how to transition DoD datasets to available animal ID programs and identifying limitations to their use, we have enabled adoption of this technology by Installation Natural Resource Managers interested in a wide variety of at-risk species and with varying technical skills. Further, we have initiated an equipment loan program in FY21 whereby interested DoD Installation land managers can borrow game camera equipment to pilot the technology.



Technology Index

Net Zero Energy for Security Lighting at Contingency Locations

Security lighting is critical for protection of warfighters at forward locations, with the self-contained portable light cart ubiquitous at contingency locations. This project investigated cart modifications and developed a Dem/Val Plan for further validation of proposed modifications to existing carts, as well as incorporating lessons learned from other alternative lighting technology efforts in the DoD.

2015 Energy

Department of Defense Sustainable Product Demonstration and Implementation Program

The DoD is the largest buyer of goods and services in the Federal Government. Improving sustainable procurement throughout DoD is a high priority. This project conducted three regional sustainable product validation demonstrations, from which lessons learned were shared in outreach events across the DoD.

2015 Environment

Live Round Interrupter (LRI)

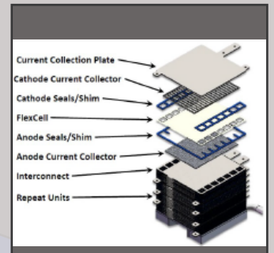
This is a device attached to the barrel of a gun that locks the barrel and prevents live round from firing due to the depth of the firing pin strike. It is for use in blank fire training operations to reduce injuries and accidental deaths. The device also adds realism, increases performance, and reduces weapon malfunctions. More testing and work is required on integrating the device with the Military Infrared Laser Engagement System (MILES) gear which is also used on the rifle.

2016 SOH

Parachutist Suite of Sensors

Automates comprehensive quantitative data to reduce jump fatalities and inform trainers on mishaps. Proof of concept visualizations & user interface mock-ups designed and generated using data from live personnel static line parachute operations. Final transition product is a Web-based S&T after action tool. ~$400k annual savings projected.

2016 SOH



Sulfer Tolerant Solid Oxide Fuel Cell (SOFC)

5-kW scale, power dense and sulfur tolerant solid oxide fuel cell stack for military ground vehicle auxiliary power units that enables the development of an SOFC system capable of operating with JP-8 logistic fuel which enables longer mission durations and can support larger payloads. System is still in development.

2016 Energy

Joint Operational Energy Command & Control (JOEC2)

The Joint Operational Energy Command and Control (JOEC2) project directly supports DoD, Army, and USMC energy and fuel consumption strategies and objectives by allowing expeditionary Army and USMC combat teams to operate with real time and accurate energy information. The JOEC2 project significantly reduces operational risk, enhanced energy security, changed behavior, and curtailed waste.

2016 Energy

Multi-Service Lithium Battery Charging,Transport, & Storage Container

Enables fully charged battery transport increasing readiness and reducing downtime during recharge. This project advanced the state of the art related to safe lithium battery storage and transport. The knowledge gained in this project will be utilized in the NDCEE FY20 new start project, Charging-Capable Li-ion Autonomous Safe Storage Interservice Container.

2017 Energy

Realtime Fuel Contamination Analyzer

Eliminates malfunctions due to dirty fuel improving safety and prolonging equipment life. The Real-Time Fuel Contamination Analyzer will monitor fuel contaminant size distributions, concentrations, and state of matter. the analyzer failed to perform as predicted in a relevant environment. The product will require additional R&D outside of NDCEE to ensure technology performs in a manner conducive to DoD requirements.

2017 Energy

Environmental Toolkit for Expeditionary Operations (ETEO)

Detects contaminants real-time in the field to reduce exposure risks to soldiers and personnel. Now available to the warfighter when environmental conditions need to be monitored or analyzed, and up to 10 kits can be checked out through ERDC at no cost with an annual cost savings of $338k.

2016 Environment

Grey Water Treatment & Reuse System (G-WTRS)

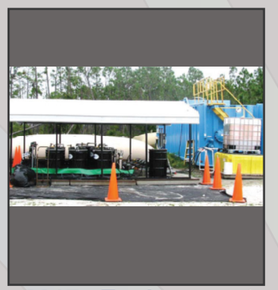
G-WTRS (‘gee-waters’) provides gray water reuse to reduce logistics requirements and costs, and shower water heat recovery technology to reduce fuel requirements in field shower systems. End-users could see water requirements reduced by 60% with payback in <1yr. The shower technology reduces energy requirements for water heating by up to 50%. G-WTRS transitioned to FLW in Spring 2021; projected ROI is $2.2M.

2016 Environment

Mobile Electric Hybrid Power Sources (MEHPS)

Hybridizes existing DoD generators with high efficiency Li-ion batteries and a lightweight photovoltaic technology. Benefits include additional load is placed in energy storage and utilizes renewables to reduce liquid diesel requirements. The MEHPS system extends the time needed between fuel supply by about a week.

2017 Energy



PFAS Foam Filtration Using Renewable Natural Fibers

This project of water management, treatment, and disposal of Aqueous Film Forming Foam (AFFF) proved successful PFAS removal by adsorption to renewable natural fibers (e.g. hair, wool): pH conditioned fibers removed >6500 ppt of total PFAS (>90+% of original concentration). Current field-tested system uses matted human hair. Lab results with other media show higher removal efficiencies; optimization will continue.

2017 Environment

Citric Acid Passivation (CAP)

CAP protects weapons and aircraft parts from corrosion eliminating Hexavalent Chromium. Cost benefit is calculated at $192K per year, accounting for reduction of: process time/labor, chemical material/disposal/ treatment costs, and number of scrapped parts from etching and labor for bath maintenance for test and disposal. It is safer, faster, cheaper, environmentally friendly and imparts superior corrosion resistance over nitric acid in current use-cases.

2016 Environment

Operational Vibration Assessment & Database

Informs flight community on human health and rotary wing design impacts decreasing exposure and health risks. Transferred to the Collaborative Biomechanics Data Network database used by researchers and developers to mitigate vibration issues within the aviation community. Savings of $16k per prevented injury (10% reduction annually = $4.8M).

2016 SOH

Toxicology Toolbox Assessment of Emerging Contaminants

Provides rapid, cost effective analysis of human health risks accelerating fielding of new materials. This project has resulted in gaining the ability to do toxicity prediction/screening now on > 75% of chemicals vs. current < 10%. Future work is necessary to make the “Tox Toolbox” usable by those who are not computational toxicologists, etc. Field portability is also a desirable design target.

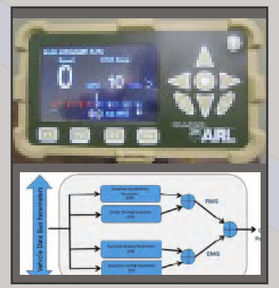
2017 SOH

Smart Universal Static Line Snap Hook

Dem/val of a detection device to alert if a towed jumper malfunction is occurring. This will reduce injuries and deaths during jump events. The Towed Jumper Detection concept is being future matured and evaluated for alternative designs in FY23 with first unit equipped (FUE) in FY25.

2018 SOH

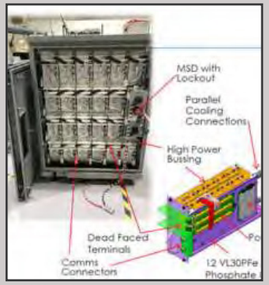
Technology Index (continued)



Automated Driver OE Training and Tracking Tool

Dem/val of a digital telematics device, also development of requirements documents and algorithms to track driver performance via sensors attached to a Ground Tactical Vehicle. The purpose is to improve driver operational energy accountability through driver awareness and track an operator's experience, remediation needs, and training. Findings indicated that improved driver performance yielded 13-18% fuel savings.

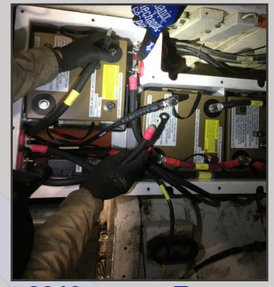
2018 Energy



Non-propagating Lithium Battery Module for Navy Shipboard Multifunction Energy Storage

Dem/val of a Li-ion battery module that prevents thermal failure propagation to adjacent battery cells and limits total catastrophic failure on military platforms. While successful within NDCEE, additional research is required in the future to enable overall electrical bus stability with shipboard power generation systems.

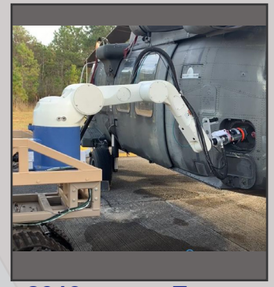
2018 Energy



Navy Safety Certification of Li-ion 6T batteries for Grounds Vehicle Use and Surface Ship Transport

Dem/val Li6T batteries for Navy. Technology advanced the use of lithium-ion 6Ts in many vehicle platforms by establishing a clear and cost-effective path forward for Navy safety certification of Li6T batteries, which can replace outdated technology (lead-acid) to provide unprecedented mission capabilities to the warfighter.

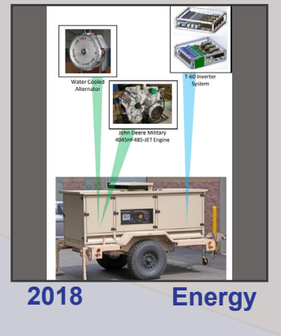
2019 Energy



Autonomous Robotic Remote Refueling Point for Rotary Wing Aircraft (AR3P)

This project addresses the range and on-station time limitations and mission risks faced by current military Rotary Wing (RW) aircraft through the AR3P system. A 2nd phase in FY21 is the AR3P Objective Field Prototype (OFP) project. ROI includes reduced manpower, combat vulnerability, and refueling operating costs. Total savings during tactical missions are projected to exceed $1M per fielded AR3P.

2019 Energy



Towable Load Following 60 kW (T-60) Generator Set with Integrated Microgrid

This is a HMMWV / JLTV towable 60kW power system with a self-contained microgrid that provides variable output, follows loading, and operates in grid tie and standalone power modes in tactical environments, using open source control signals and a universal microgrid interface. Variable speed technology could reduce fuel transportation casualties in theater by reducing the fuel consumption by 25%.

2018 Energy

DBx-1 Green Primary Explosive Demonstration in Detonators to Replace Lead

Optimize the current coating method and demonstrate coated DBX-1 as a lead azide and a lead styphnate replacement in detonators such as the C70 used in the M213 Fuze (in the M67 Hand Grenade). Within this technology, primers will be loaded via automation for homogeneous loading and reduced operator exposure. Technology validation is still ongoing.

2018 Environment

Energy Efficient Expeditionary Small Unit Water Purifier

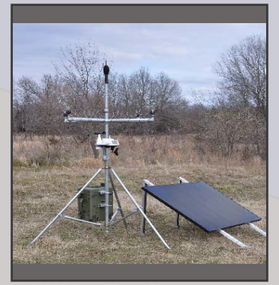
Commercial SUWP system dem/val to provide safe drinking water from multiple water sources through energy efficient, reverse osmosis to enhance and enable warfighter readiness. The project resulted in a patent-pending invention for reducing the need of physical filters by 66%. Licensing evaluation and production plans to supply the E3-SUWP to the military and for humanitarian assistance are underway with the manufacturer.

2019 Energy

PFAS Effluent Treatment System (PETS)

Dem/val of a mobile system to effectively treat collected PFAS contaminated water from multiple sites. PETS successfully advanced the technology PFAS-contaminated water treatment. The system treated large quantities of contaminated waters with concentrations over 200 ug/L to levels below 0.070 ug/L. Per gallon, the PETS treatment was 14x cheaper that the traditional pump out and incineration treatment method.

2019 Environment



Low Cost Acoustic Monitor (LCAM)

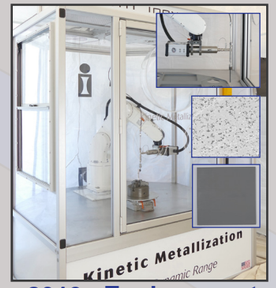
Device monitors military noise environments with enhanced technological capabilities at a lower maintenance cost, improved source localization accuracy, and with customizable environmental noise classifiers for noise source identification to better support training and readiness. The $10K cost of the LCAM provides a 75% cost reduction in purchase price vs. the previously used $40K COTS device.

2018 Environment

Elimination of Perchlorate and Volatile Organic Chemicals (VOCs) from the M662 Red Star Parachute Signal

The M662 Red Star Grenade Cartridge is a low-velocity rifle-launched 40mm cartridge that descends by parachute and provides a 35-second illumination display. The developed perchlorate-free, epoxy alternate cartridges will need additional formulation adjustment testing, followed by static and ballistic tests of 40mm candles.

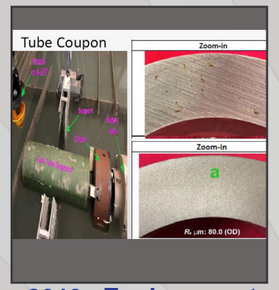
2018 Environment



Environmentally-Compliant Inorganic Materials for Corrosion and Wear Protection

Optimization, dem/val, and transition to environmentally benign amorphous-iron Heavy Metal Free (HMF) coatings for high-strength steel applications for U.S. military aircraft and weapon systems to replace legacy contaminant coatings. Qualification of a fully developed coating product to the coating system performance specification is estimated at $120k per coating system.

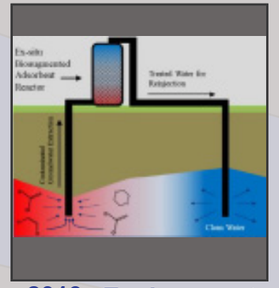
2019 Environment



Green Machining of Multi-Service Weapons By 3D Waterjet

Modernize and demonstrate the usage of 3D Abrasive Waterjet (AWJ) technology by expanding the machining technology to weapon systems and components. This technology avoids the use of environmentally toxic chlorinated lubricants, and the life cycle disposal costs.

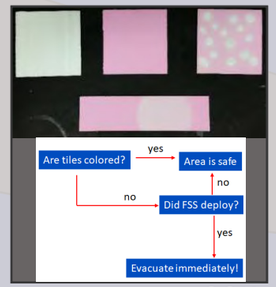
2019 Environment



Novel Bioaugmented Sorption Treatment Technology for CVOCs and 1,4-Dioxane

This project demonstrated the use of a hybrid biological/physicochemical treatment process that simultaneously and irreversibly removed CVOCs and 1,4-dioxane from groundwater at a DoD site, where roughly 90-100% of 1,4-dioxane was consistently removed. A Savings to Investment Ratio (SIR) of 10.08 was reached when comparing operating savings to capital costs.

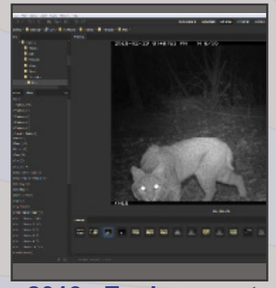
2019 Environment



Visual Indicator for Hydrogen Fluoride (HF) Produced from Extinguishing Fires with Hydrofluorocarbon Fire Supression Technologies

Visual Indicators dem/val to detect HF from extinguishing fires to minimize worker exposure. Results confirmed techniques needed to detect HF within seconds of HFC discharge, but further development of colorimetric indicators is required to resolve the sensitivity and response time.

2019 SOH



Cost-Effective Autonomous Monitoring of Military Ranges for Threatened/Endangered Species (TES)

Integration of autonomous cameras and deep learning software for improved autonomous surveying of TES on military lands will greatly improve TES monitoring to >95% accuracy with artificial intelligence recognizing the presence of animals. Result will allow greater access and flexibility for military training.

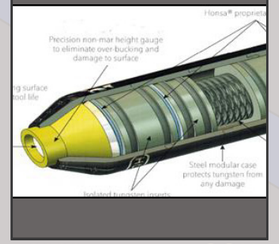
2019 Environment

Deployable Water Metering and Monitoring System for Multi-Domain Operations (KETOS)

Enables public health officials and sustainment operations by remotely monitoring water quality, proactively addressing potential safety issues, and ensuring that water meets compliance and sustainability standards. The annual cost savings is $445K based on reduced cost for grab samples and lab analyses.

2019 Environment

Technology Index (continued)



Improved bucking bar to maximize worker performance and health

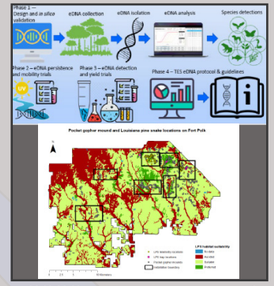
Demonstration of a bucking bar designed with vibration dampening materials to reduce the level of hand-transmitted vibration (HTV) that riveters experience from job duties. While the goal of reducing vibration levels was achieved, design consideration should be considered as the newer bucking bar is more than twice the size of a traditional bucking bar and may not fit into the riveting spaces.

2020 SOH

Human Vibration Exposure Directory

Project developed, populated, and deployed a web-based, searchable directory of human vibration exposure measurements that were made on DoD power tools and vehicles for use in the estimation of soldier and civilian exposures. Eliminates need to conduct vibration surveys and rental of vibration meters for data inside of system ($1,720 savings per vibration survey).

2020 SOH



Environmental DNA (eDNA) Surveillance of Threatened/ Endangered Species (TES) on Military Ranges

Development of standardized eDNA sampling, analytical protocols, and guidance materials to facilitate wide-spread eDNA surveillance adoption. This technology surveyed amphibians, reptiles, bats, and freshwater mussels with a two to 70 times cost reduction over traditional methods resulting in substantial time and cost savings.

2020 Environment

Remote Emergency Generator Monitoring

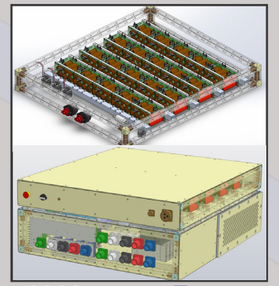
Project is demonstrating a custom system for remotely accessing operational and conditional aspects of emergency generators. All equipment has been delivered and software customization has been finalized. Reduced compliance and engine maintenance cost results in an ROI of 2.5 years. This system will also avoid compliance enforcement fines through immediate notification of non-permitted use.

2020 Environment

Charging-capable Li-ion Autonomous Safe Storage Interservice Container

Design and production of a container capable of transporting, charging and storing man-portable Li-ion batteries safely on aircraft and other DoD platforms. Projected benefits are thousands of hours saved in deployment times due to no longer needing to discharge batteries prior to flight, and millions of dollars of damage saved due to the protection from battery fires offered by the container.

2020 Energy



AMATS: Ruggedized Automatic Critical Power Transfer Switch

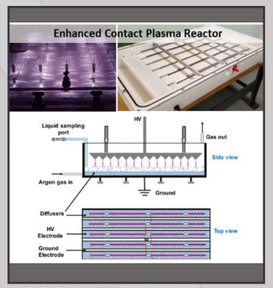
Delivers a capability to provide secure and reliable power to critical mission loads on the tactical battlefield. The AMATS system monitors an existing power generation source (military generator, microgrid, host nation power grid, or commercial generator) for power loss, when it will automatically command a military standard Advanced Mobile Medium Power Source (AMMPS) generator set to power critical loads within 10 seconds.

2020 Energy

Wastewater Evaporators as AFFF Mitigation Strategy at Firefighting Training Facilities

Establish and optimize wastewater evaporation technology to minimize wastewater volume and simplify aqueous film forming foam (AFFF) waste disposal. Transitioning system design and operation protocols with commercial 100-gal evaporators. Results achieved up to 99% waste volume reduction. Fuel and consumables for industrial scale operation cost ~ $0.35/gal for one year.

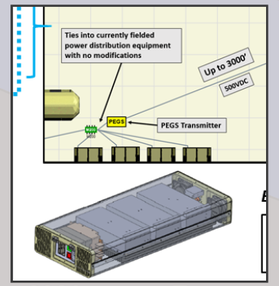
2020 Energy



An Innovative Plasma Technology for Treatment of PFAS-Impacted Waters

Field demonstration and validation of a mobile plasma treatment system for the treatment of PFAS-impacted waters at DoD fire training areas. System provides rapid destruction of PFAS and other contaminants without chemical additions or production of residual waste. Final PFAS/contaminant destruction to be documented in final report; cost estimates are significantly less than existing alternatives.

2020 Environment



Agile Power Extender for Remote Operations: Power Extender-Grid Source (PEGS)

Project will enable the capability to convert 120VAC 20amp circuit common on military power distribution equipment to 600VDC transmiting over a ruggedized power line. A single system will replace the 5kW AMMPS being used for spot generation at an immediate savings of $14K per unit. More savings will be realized via cost savings involving transport, fuel, and maintainance of the legacy generators.

2020 Energy

Compact High Density Tactical Energy Storage (CHDTES)

Development of a composite enclosure for two Li-ion 6T batteries and related equipment to support transport and operation in expeditionary missions. System reduces the need for fuel resupply through reduced generator fuel consumption, lower total ownership cost (TOC) via reduction of generator maintenance and battery life improvement, and makes important progress toward USMC 2025 objective of using fuel for mobility only.

2020 Energy

Mobile PFAS Removal System to Support Warfighter Aircraft and Carriers

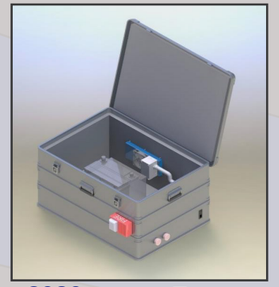
Demonstrate/validate a system that may effectively remove PFAS chemicals from AFFF impacted waters to less than 70 ppt. (i.e., PFOS + PFOA) regardless of concentration as recommended by the 2016 Environmental Protection Agency lifetime health advisory, with a capability to continuously process up to 20 gallons per minute. Final results will be published in a technical report.

2020 Environment

The Destruction of PFAS using Supercritical Water Oxidation

PFAS/AFFF contaminated groundwater was processed through an industrial Super Critical Water Oxidation (iSCWO) demo facility to measure destruction efficiency (DE). The iSWCO achieved >99.992 DE for PFAS. ROI varies, but with an initial start-up cost coupled with a treatment operation expense of $1.15/gallon, capital costs may be recovered 40 - 53 months after installation, dependent on the amount of PFAS-laden water present.

2020 Environment



Assessment of ZARGES BatterySafe™ products and prototyping cost-effective large lithium battery charging containers

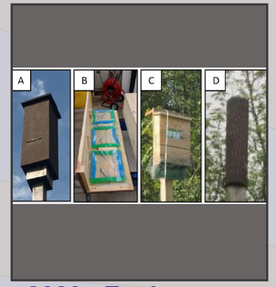
Investigate and develop man-portable lithium battery containers for use as hazard mitigation while on board surface/subsurface/air platforms. The COTS system was successful with the 2.5 kW batteries but not with the 5 kW batteries. Additional 5 kW prototype development with 5 kW is required.

2020 Energy

Distributed Low-Energy Wastewater Treatment (D-LEWT) 2.0 to Enhance Energy, Water Security, and Resiliency

Assembling and demonstrating a 10,000 gallon/day (gpd), modular/ scalable, containerized wastewater treatment system which generates hydrogen and methane for energy production. Potential for an 80% energy reduction compared to traditional aerobic wastewater treatment systems.

2020 Energy



Improved Efficiency of Artificial Roosts as a Management and Mitigation Tool for Threatened and Endangered Bats

Demonstrate bat preference for the rocket box roost design and validate the utility of acoustic lures to recruit bats to accelerate roost colonization. Guidance will be transferred, providing DoD natural resource managers an effective management tool to improve roost success and enhance population monitoring capabilities.

2020 Environment

Picogrid: Satellite-Connected Remote Monitoring for Field Sensor Suite Deployment

Innovative satellite-connected technology demonstration for remote environmental data collection that is transmitted to the cloud for real-time access by natural and cultural resources, and range management/ security office DoD personnel. An ROI of 3-5 years, which varies based on size of land area and monitoring frequency.

2020 Environment

Technology Index (continued)

Direct Current Power Distribution (DCPD)

Standardized power distribution architecture for mobile forces using DC power connectors reduces reliance on large alternating current generators, creates cost savings, enhances reliability, and streamlines effectiveness while enabling operational strategies and capabilities. The DCPD improves the current typical distribution of nearly 79% to exceed 95% while reducing training and labor requirements.

2021 Energy

Improved riveting hammer to maximize worker performance and health

The project is performing field validation of a new riveting hammer design that incorporates use of a zero rebound polymer handle and a tungsten piston to minimize vibration exposures to riveters. Preliminary results indicate no significant vibration difference between the non-vibration dampening hammer and the vibration-dampening tool.

2021 SOH

Marine Corps Secure Tactical Advanced Mobile Power (MCSTAMP) Hybrid Dashboard

Develop / demonstrate an improved energy command and control (EC2) capability to manage and control energy generated by a STAMP vehicle-formed micro-grid. By modifying existing tactical vehicles and using technology that converts direct current systems to alternating current systems, a microgrid system can be created, reducing fuel needs and removing the need for towing generator systems.

2022 Energy

DoD Sustainable Materials Alternatives Recommendations Tool (SMART)

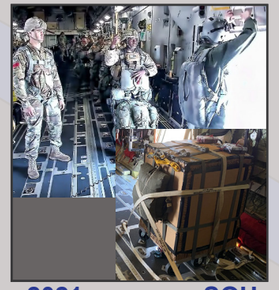
This project will further develop and validate a prototype enterprise-wide chromium-free technology tool, by incorporating additional available data and expanding functionality to accommodate other toxic metals to transition to safer materials, reduce exposure, and respond to regulations. The end product will be an operational tool on a DoD website.

2022 Environment

Autonomous and Robotic Remote Refueling Point (AR3P) Objective Field Prototype

The 2nd phase prototype improves operational capabilities for on-range and time-on-station constraints of rotary wing aircraft; reduces soldier exposure and aircraft risk during Combat Operations; and supports logistical initiatives. Further design and technology integration required for ruggedized environment with hostile climates and sling loading ops in aerial delivery/emplacement.

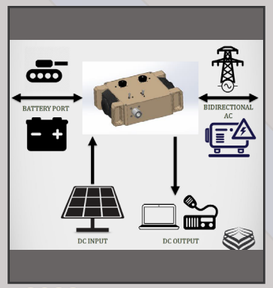
2021 Energy



Immediate Response Force (IRF) Soldier Offload

This project will integrate out of service T-11 personnel parachutes with the Caster Assisted Aerial Delivery System (CAADS) to offload weight from airborne soldiers, increasing safety and reducing injuries. This equates to a weight savings of up to 46 lbs. per jumper per C-130 aircraft, resulting in fewer group impact injuries and reducing waste by converting expired personnel parachutes for cargo use.

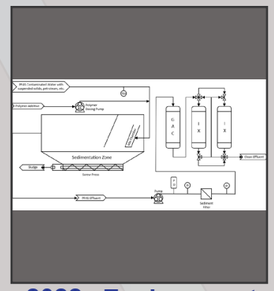
2021 SOH



6T HYbrid Power Energy Router (6T-HYPER)

The 6T-HYPER will be a one-man carry device to harvest AC or DC source energy and supply clean AC & DC power from a 6T Li-ion battery; from the 24VDC bus of a vehicle and from any AC power source up to 10kW. This will reduce the need for the warfighter to procure/transport added generators and fuel needed for operations, enabling the use of multiple power sources; converting and providing man-portable power on the battlefield.

2022 Energy



ENVIROPETS for PFAS Contaminated Water

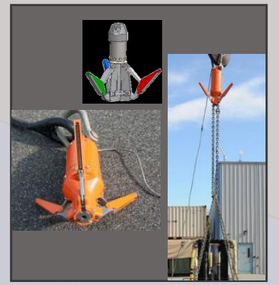
Combines the PETS system, proven effective in treating various PFAS-contaminated water sources, with WTG ENVIRO technology which is proven effective for removing contaminants such as COD, BOD, heavy metals, petroleum, dissolved solids and suspended solids from water and sludges. The combination will provide a robust mobile treatment system that can handle water from a large variety of sources, including sludges.

2022 Environment

Honey Badger 50 (HB50): 50 W Reformed Methanol Wearable Fuel Cell Power System

The HB50 is a 50-Watt Reformed Methanol Fuel Cell (RMFC) system that generates power by converting the chemical energy in a methanol/water mix (fuel) to electrical energy. It reduces the weight burden of the dismounted soldier in extended missions (up to six times) by replacing the number of batteries required to carry and allows soldiers to recharge their fuel cells faster, with less fuel use.

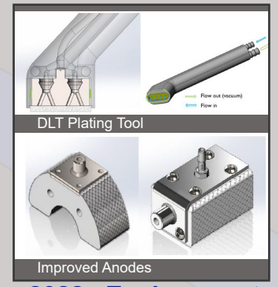
2021 Energy



Unmanned Helicopter Hook-Up for Sling Load Operations

Develop / mature an unmanned helicopter sling load (HSL) hookup capability to enable connection of an HSL payload without requiring soldiers to be under the helicopter during hookup. This will increase the operator safety while maintaining operational effectiveness; it will also increase operational safety by freeing up personnel for perimeter control. Will obtain airworthiness approval for at least one aircraft and prototype system.

2022 SOH



Dem/Val of Dripless Brush Zinc-Nickel Electroplating as a Cadmium Alternative

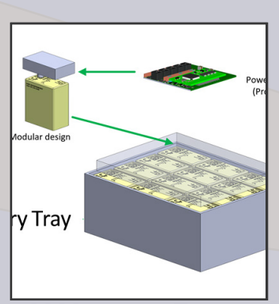
Develop / deploy dripless brush low hydrogen embrittlement alkaline Zinc-Nickel electroplating mobile cart systems for non-Cadmium corrosion protection on low and high strength steel alloys in weapon system components in DoD aircraft maintenance, eliminating toxic brush cadmium in depot/field maintenance activities and producing hazardous waste disposal / compliance savings.

2022 Environment

Greywater Reuse Pretreatment Module for the Lightweight Water Purifier

Reduces water demand by treating greywater for non-potable reuse at the point of use with existing equipment. Greywater reuse for shower and laundry water for the Army and Marines (over 70% recovery rate), reducing potable water resupply, water demand and wastewater hauling. Can recycle 2,500 gallons a day, yielding cost savings between $13,500 and $42,000 in water procurements alone.

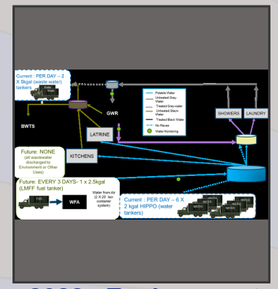
2021 Environment



Intelligent Battery Tray for Small- and Medium-Sized EOD Robots

This effort will design a battery tray for BB-2590 Lithium-ion batteries that will function in the Common Robotic System-Heavy (CRS-H) to manage power flows and ensure resilient, predictable, and flexible power to achieve optimal performance and mission time, as well as extending the life of BB-2590 batteries.

2022 Energy



Zero Water Footprint Strategy for Agile Bases

This effort will develop a new capability to eliminate or significantly reduce the water logistics requirement through the integration of water purification, generation, recycling, and waste water treatment technologies for on-site use at small agile bases in logistically challenged environments. A key focus will be reducing supplied potable water requirements and use through a system-level modular component management approach.

2022 Environment

Collaborative Relationships

Collaborative relationships are an integral component of the NDCEE's success at identifying, demonstrating, validating, and implementing solutions for the DoD. From the onset of each project, the NDCEE works closely with stakeholders to understand their unique concerns, challenges, and needs. Wherever appropriate, the NDCEE collaborates with other entities to achieve a cost-effective, technically viable solution that is most appropriate for each project. The NDCEE partners with a wide variety of organizations and programs; over the past 30+ years the organizations and programs that the NDCEE has worked with includes but is not limited to the following:

Air Force Safety Center

Air Mobility Command Fuel Efficiency Division

Air National Guard

Alliant Techsystems Inc.

Anniston Army Depot, AL

Arlington County, VA

Arlington National Cemetery, VA

Army & Air Force Exchange Service

Aviation and Missile Research Development and Engineering Center

BAE Systems, Inc.

Base Camp Integration Lab, Fort Devin, MA

Blue Grass Army Depot , KY

The Boeing Company

C-130 System Program Office

Camp Buehring, Kuwait

Camp Lemonnier, Djibouti, Horn of Africa

Cape Canaveral Air Force Station, FL

Center for Environmental Management of Military Lands

Cherry Point In-Service Support Center, NC

Combatant Command - Cultural Heritage Action Group

Corpus Christi Army Depot, TX

Defense Commissary Agency

Defense Logistics Agency Distribution Hill, UT

Defense Logistics Agency Distribution Norfolk, VA

Defense Logistics Agency Distribution Oklahoma City, OK

Defense Logistics Agency Distribution Red River, TX

Defense Logistics Agency Distribution San Joaquin, CA

Defense Logistics Agency Distribution Susquehanna, PA

Defense Logistics Agency Distribution Warner Robins, AL

Defense Safety Oversight Council

Department of Homeland Security

DoD/Department of the Navy Chesapeake Bay Program Office

DoD Sustainable Procurement Program Work Group

Enviance

F-16 System Program Office

Fisher House Foundation

Fleet Readiness Center Southeast, Jacksonville, FL

FRC Southwest, North Island, CA

Forest Glen Annex, MD

Fort A.P. Hill, VA

Fort Bliss, TX

Fort Bragg, NC

Fort Campbell, KY

Fort Carson, CO

Fort Detrick, MD

Fort Hood, TX

Fort Huachuca, AZ

Fort Hunter Liggett, CA

Fort Indiantown Gap, PA

Fort Irwin, CA

Fort Knox, KY

Fort Lee, VA

Fort Leonard Wood, MO

Fort Polk, LA

Fort Stewart, GA

General Services Administration

Hill Air Force Base, UT

Holston Army Ammunition Plant, TN

Joint Base Andrews, MD

Joint Base Charleston, SC

Joint Base Langley-Eustis, VA

Joint Base Lewis-McChord, WA

Joint Base Pearl Harbor Hickam, HI

Joint Base San Antonio, TX

Joint Ordnance Commanders Group

Lake City Army Ammunition Plant, MO

Letterkenny Army Depot, PA

Marine Corps Air Ground Combat Center – Twentynine Palms, CA

Marine Corps Base Hawaii, HI

Marine Corps Base Quantico, VA

Marine Corps Mountain Warfare Training Center, CA

Maryland Department of the Environment

Natick Soldier Systems Center, MA

National Aeronautics and Space Administration

National Geospatial Intelligence Agency

National Guard Bureau

National Oceanic and Atmospheric Administration

Naval Air Station Jacksonville, FL

NAS Whidbey Island, WA

Naval Air Systems Command

Naval Air Warfare Center

Naval Base Coronado, CA

Naval Base San Diego, CA

Naval Facilities Engineering Command Engineering and Expeditionary Warfare Center

Naval Facilities Engineering Command Mid-Atlantic

Naval Facilities Engineering Command Naval District Washington

Naval Station Mayport, FL

Naval Support Activity Mechanicsburg, PA

Naval Support Facility Carderock, MD

Naval Support Facility Potomac Annex, DC

Nebraska Avenue Complex, DC

Office of the Army Deputy Chief of Staff, CIO/G-6

Office of the Army Deputy Chief of Staff, G-3/5/7

Office of the Army Deputy Chief of Staff, G-4 Logistics

Office of the Army Deputy Chief of Staff, G-8

Office of the Assistant Chief of Staff for Installation Management

Office of the Assistant Secretary of the Army for Financial Management and Comptroller

Office of the Assistant Secretary of the Army for Installations, Energy and Environment

Office of the Deputy Assistant Secretary of the Air Force, Energy

Office of the Deputy Assistant Secretary of the Army for Energy & Sustainability (DASA[E&S])

Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health

Office of the Deputy Under Secretary of Defense Installations and Environment

Office of Naval Research

Ogden Air Logistics Complex, UT

Oklahoma City ALC, OK

Pacific Disaster Center

Pennsylvania Department of Environmental Protection

Pentagon Reservation, VA

Product Manager for Demilitarization

Product Manager Force Sustainment Systems

Product Manager Soldier Clothing and Individual Equipment

Program Executive Office Ammunition

Project Director for Joint Services

Project Manager Maneuver Ammunition Systems

Radford Army Ammunition Plant, VA

Redstone Arsenal, AL

Robins Air Force Base, GA

Scranton Army Ammunition Plant, PA

Sikorsky Aircraft Corporation

Strategic Environmental Research and Development Program

Tinker Air Force Base, OK

Tobyhanna Army Depot, PA

Tooele Army Depot, UT

Tripler Army Medical Center, HI

U.S. Air Force 18th Air Support Operations Group

U.S. Air Force Civil Engineer

U.S. Air Force Life Cycle Management Center, Wright-Patterson Air Force Base, OH

U.S. Air Force Materiel Command

U.S. Air Force Office of Logistics Readiness

U.S. Air Force Operations, Plans, and Requirements

U.S. Air Force Research Laboratory

U.S. Army XVIII Airborne Corps

U.S. Army 82nd Airborne Division

U.S. Army Africa

U.S. Army Armament Research, Development and Engineering Center

U.S. Army Aviation and Missile Life Cycle Management Command

U.S. Army Central Command

U.S. Army Corps of Engineers

USACE – Construction Engineering Research Laboratory

USACE – CERL-Engineer Research and Development Center

U.S. Army Cyber Command

U.S. Army Environmental Command

U.S. Army Garrison-Hawaii, HI

U.S. Army Geospatial Center

U.S. Army Installation Management Command

U.S. Army Institute of Public Health

U.S. Army Joint Munitions Command

U.S. Army Logistics Innovation Agency

U.S. Army Materiel Command

U.S. Army National Guard

Defense Centers for Public Health – Aberdeen

U.S. Army Research, Development & Engineering Command

U.S. Army Research Laboratory

U.S. Army Reserve Command

U.S. Army Special Warfare Training Group

U.S. Army Tank-Automotive and Armaments Command

U.S. Army Tank Automotive Research, Development and Engineering Center

U.S. Army Western Regional Medical Command

U.S. Central Command

U.S. Department of Agriculture

U.S. Department of State

U.S. Department of Veterans Affairs

U.S. Environmental Protection Agency

U.S. Military Academy at West Point, NY

U.S. Southern Command

Virginia Department of Conservation and Recreation

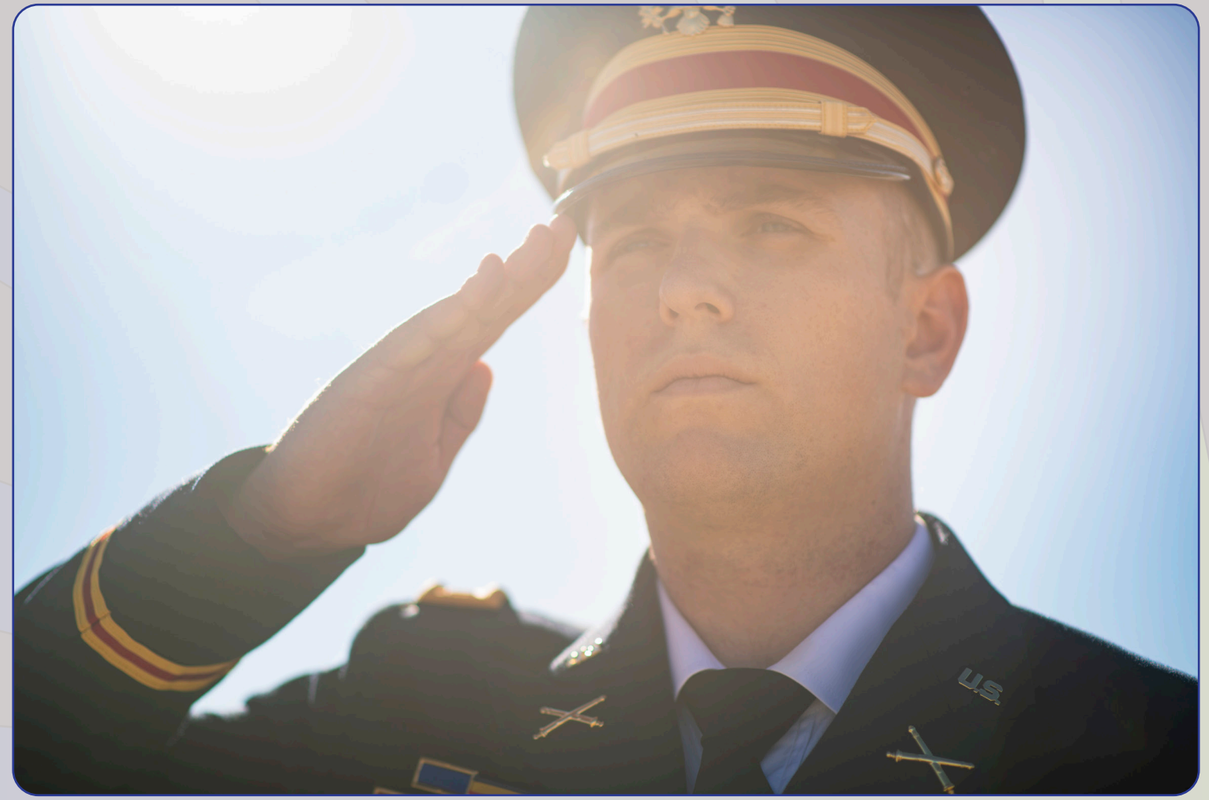
Virginia Department of Environmental Quality

Walter Reed Army Institute of Research

Warner Robins ALC, GA

White House Council on Environmental Quality

Yuma Proving Ground, AZ



DoD Executive Agent

Office of the Assistant
Secretary of the Army for
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Program Management Office

US Army
Environmental Command

NDCEE
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Energy and Environment

For additional information, please visit: denix.osd.mil/ndcee/home/