

Army Technology Transfer Program 2022 Annual Report

Science and technology collaborations in support of Army modernization

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Science and Technology Collaborations in Support of Army Modernization

Technology transfer (T2) uses a variety of agreement mechanisms for partnering with commercial, academic, or other private entities. These agreements form research and development (R&D) partnerships between Army laboratories and technical centers and non-federal entities, and include cooperative research and development agreements (CRADAs), patent license agreements, testing agreements, educational partnership agreements, and other agreements. T2 collaborations enhance Army's research, development, test, and engineering capabilities by leveraging the private capital of the partner, including but not limited to, personnel, services, facilities, equipment, intellectual property, or resources. T2 is vital to the Army's mission of developing new technologies and promoting technology commercialization as the Army seeks to modernize and maintain its technological advantage. Public-Private collaborations offer an innovative approach to modernization.

The Army science and technology (S&T) program is guided by and aligned to higher level Army, Department of Defense (DoD) and National strategies and policies. The Army executes an investment strategy that delivers technology enabling force modernization. To support this effort, the Army is aligning its research centers and laboratories to priority modernization efforts and emphasizing public-private collaborations. The Army's six modernization priorities (i.e., Long Range Precision Fires; Next Generation Combat Vehicle; Future Vertical Lift; Network; Air and Missile Defense; and Soldier Lethality) will drive materiel development for the Multi-Domain Operations capable force. Nine Army priority research areas advance Army modernization through discovering, developing, and proving state of the art technologies. These priority research areas include: disruptive energetics; Radio Frequency (RF) Electronic Materials; Quantum; Hypersonic Flight; Artificial Intelligence (AI); Autonomy; Synthetic Biology; Material by Design; and Science of Additive Manufacturing. S&T collaborations allow Army laboratories to leverage private research capital in these game changing technologies.

Army modernization is enhanced by engaging private partners in research, development, testing, and engineering partnerships and collaborative activities, which adds expertise, augments capabilities, enhances facilities, and provides resources for the exploration of emerging technologies. Additionally, T2 collaborations can leverage commercial interest in technologies developed in Army laboratories through patent license agreements, which include business plans to mature the patented invention into a manufactured commercial product that can be used or adapted for military purposes.



Science and Technology Collaborations in Support of Army Modernization



Army Leadership Welcome

"By leveraging the national investment in research and development (R&D) through collaboration, technology transfer enhances the Army's R&D capabilities, and speeds up the process toward the development of a product, a capability or an operational upgrade."

- Honorable Douglas Bush,

Assistant Secretary of the Army (Acquisition, Logistics, and Technology)

"Our collaborative agreements with industry and academia foster a vibrant ecosystem that enrich Army research and development. The partnerships and relationships we forge through our technology transfer program play a critical role in the Army's ability to deliver effective capabilities to our Warfighters at an affordable cost."

> – **Dr. Michelle Zbylut**, Acting Deputy Assistant Secretary of the Army (Research and Technology)

"The Army Technology Transfer Program (ATTP) supports the Army in achieving its mission by combining the Army's research, development, test, and evaluation resources, capabilities, and knowledge with those of our academic and industry partners in order to deliver technologies through various partnership mechanisms like CRADAs. These partnerships are essential to ensuring that the Army is positioned for discovery and maturation of critical technologies. The ATTP also enables the manufacture and commercialization of technologies developed by Army laboratories and centers by forming licensing agreements with commercial partners to develop dual-use (i.e., civilian and soldier) technologies."

> – **Dr. Ellen Holthoff,** Army Director for Technology Transfer











The Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (ASA(ALT)) is the Office of Primary Responsibility (OPR) for the ATTP and is responsible for Department of the Army policy and guidance regarding all technology transfer activities. These responsibilities have been delegated to the Army Director for Technology Transfer (ADTT).

The ADTT resides in the office of the Deputy Assistant Secretary of the Army (Research and Technology) (DASA(R&T)) and serves as the Army agency representative in all matters concerning T2. The ADTT monitors the ATTP to ensure compliance with DoD T2 policy and law, provides policy guidance on T2, and presides over the Army Laboratory Quality Enhancement Program (A-LQEP) T2 subpanel. The A-LQEP T2 subpanel is chartered to improve the productivity, effectiveness, and impact of the ATTP. This subpanel enhances Army T2 through policy input and feedback, providing legal clarifications, resolving business questions, and sharing best practices to optimize the impacts of S&T collaborations on Army modernization.

The laboratory commanders or directors have the responsibility and the authority to enter into CRADAs and to license, assign, or waive rights to intellectual property developed by the organization. Each Army T2-designated laboratory has an Office of Research and Technology Applications (ORTA). ORTAs participate in the A-LQEP T2 subpanel. ORTAs are the essential focal point for collaborations between federal laboratories and external partners.



POLICY, BUDGET AND OVERSIGHT



OPERATIONAL AND PROGRAM EXECUTION



7

T2-Designated Laboratories and Centers Available for Partnership

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U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND (MRDC)

Headquarters	Maryland
U.S. Army Aeromedical Research Laboratory (USAARL)	Alabama
U.S. Army Institute of Surgical Research (USAISR)	Texas
U.S. Army Medical Materiel Development Activity (USAMMDA)	Maryland
U.S. Army Medical Research Institute of Chemical Defense (USAMRICD)	Maryland
U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID)	Maryland
U.S. Army Research Institute of Environmental Medicine (USARIEM)	Massachusetts
Telemedicine and Advanced Technology Research Center (TATRC)	Maryland
Walter Reed Army Institute of Research (WRAIR)	Maryland
U.S. Army Medical Research Directorate (USAMRD)	Washington

U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER (ERDC)





U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND (DEVCOM)

Headquarters Marvland Armaments Center (AC) New Jersev AC Watervliet Arsenal New York AC Benét Laboratories New York AC Firing Tables and Ballistics Division Maryland AC Rock Island Arsenal Illinois Army Research Laboratory (ARL) Maryland ARL Army Research Office North Carolina ARL White Sands Missile Range New Mexico ARL Central Illinois ARL Northeast Massachusetts ARL South Texas ARL West California Alabama Aviation and Missile Center (AvMC) AvMC Aeroflightdynamics Directorate California AvMC Aviation Applied Technology Directorate Virginia AvMC Joint Research Program Office Virginia AvMC Maintenance Engineering Division Texas AvMC Aviation Engineering Directorate Texas AvMC Systems Simulation, Software & Colorado Integration Directorate Chemical Biological Center (CBC) Maryland **CBC** Pine Bluff Arsenal Arkansas **CBC Rock Island Arsenal** Illinois **CBC Dugway Proving Ground** Utah Command, Control, Computers, Communications, Maryland Cyber, Intelligence, Surveillance, and Reconnaissance Center (C5ISR) **DEVCOM Analysis Center (DAC)** Maryland Ground Vehicle Systems Center (GVSC) Michigan GVSC Occupant Protection Laboratory Michigan GVSC Bridging Simulation Laboratory Michigan GVSC Freshwater Treatment and Test Facility Michigan GVSC Army Petroleum Laboratory Pennsylvania GVSC Fuels and Lubricants Research Facility at Texas Southwest Research Institute GVSC Rapid Evaluation Capability Michigan Soldier Center (SC) Massachusetts SC Simulation and Training Technology Center Florida

U.S. ARMY TEST AND EVALUATION COMMAND (ATEC)

Headquarters	Maryland
Army Evaluation Center	Maryland
Aberdeen Test Center Cold Regions Test Center	Maryland Alaska
Dugway Proving Ground	Utah
Electronic Proving Ground	Arizona
Operational Test Command	Texas
Redstone Test Center	Alabama
White Sands Missile Range	New Mexico
Yuma Proving Ground	Arizona

U.S. ARMY Army T2 Enterprise

2022 Army Technology Transfer Metrics

Technology transfer facilitates the practical application of Army research directly through the transfer of laboratory results and by providing non-federal entities opportunities to establish partnerships with Army laboratories for sharing information, resources, and personnel. Industry and academic partners can engage with the Army in many ways, including CRADAs, Educational Partnership Agreements (EPAs), Partnership Intermediary Agreements (PIAs), Intellectual Property/Patent License Agreements (IP/PLAs), and Commercial Test Agreements (CTAs). The Army engages in the following Army T2 mechanisms with a variety of partners.



U.S. ARMY 2022 Army Technology Transfer Metrics

Cooperative Research and Development Agreements (CRADAs)

A CRADA allows the laboratory and the partner to provide personnel, services, facilities, equipment, IP, or other resources with or without reimbursement (funds are not paid to the non-federal party) toward the conduct of specified R&D efforts consistent with the mission of the laboratory. CRADAs may not include a procurement contract or cooperative agreement. CRADAs provide an easy way for Army laboratories to engage in S&T collaborations with private partners. Both the Army and the partner may benefit from a CRADA in a variety of ways. In FY22, Army laboratories reported 1,811 active CRADAs, including 395 newly executed CRADAs. Army laboratories reported over \$75M in CRADA revenue over the past three years.

BENEFITS TO THE ARMY AND PARTNERS:

- Accelerate technology maturation;
- Solve specific technical challenges;
- Access Army laboratory facilities and equipment;
- Mutually beneficial discovery and innovation;
- Create new teams and professional connections;
- Reduce technical risk of new technology development;
- Leverage external expertise, ideas, investment and resources;
- Protect IP for patenting;
- Expand the defense industrial base to include non-traditional defense contractors;
- Leverage commercialization potential of inventions developed under the CRADA;
- Access partner's means of advanced development, manufacturing, and commercialization; and
- Share resources and capabilities to accelerate technology development and defray R&D costs.

_ 🗛	CRADAs		
	FY20	FY21	FY22
ИЦ	1,924	1,934	1,811
U	\$23.3M Revenue	\$22.7M Revenue	\$33.5M Revenue



EPAs allow Army laboratories to partner with educational institutions and academic researchers. In FY22, Army laboratories reported over 280 active EPAs.

BENEFITS TO THE ARMY:

- Cultivate educational and research opportunities in Science, Technology, Engineering, and Mathematics (STEM) programs relevant to Army S&T programs;
- Involve faculty and students as an extension of resources to Army laboratories to solve essential Army challenges; and
- Provide academic teaching opportunities for Army S&Es to recruit talent and to leverage academic research methods to solve Army challenges.

USE CASES FOR ACADEMIC PARTNERS:

- Loan or allow students and faculty to use laboratory equipment and facilities;
- Provide technical assistance to academic institutions which can enhance teaching and research;
- Involve students and faculty in research projects side by side with Army scientists and engineers;
- Receive loaned or transferred surplus Army scientific equipment for student and faculty for academic research; and
- Aid in the educational experience of students of all levels by providing a mechanism by which those can benefit from the staff expertise and unique facilities and equipment at Army laboratories.





A PIA is an agreement between an Army laboratory and an agency or entity funded or chartered by state or local government. A partnership intermediary engages in activities to increase the likelihood of successful marketing and formation of commercial partnerships between Army laboratories and non-government organizations. In FY22, Army laboratories reported ten active PIAs.

BENEFITS TO THE ARMY:

- Market Army technologies and capabilities;
- Conduct outreach events;
- Perform market research for Army-developed technologies;
- Find licensees and assist them with business plans;
- Increase technology transfer to commercial partners and technology transition to Army customers; and
- Advocate, connect, inform, and facilitate linkage to manufacturers, small businesses, apprentice programs, etc.

USE CASES FOR NON-FEDERAL ENTITIES:

- Facilitate an understanding of Army needs and interests;
- Find partners to leverage Army technologies and promote technology licensing and CRADA opportunities;
- Research and evaluate markets, help create opportunities for designs and prototypes of Army technology and promote manufacturing capabilities; and
- Facilitate the brokering of license agreements between the Army laboratories and industry, academia, and non-profits.





PIA Locations



Army PIA Highlights



DEVCOM Army Research Laboratory PIA – Energetics Technology Center

Energetics Technology Center (ETC) was established through a partnership with the Center for Energetics Concepts Development at the University of Maryland. ETC's primary focus on energetics and engineering quickly expanded to fields including robotics, autonomous systems, and literature-based discovery. These efforts provided a foundation for focus areas in AI and machine-discovery of next-generation energetic materials. Initiatives also include forecasting foreign military capabilities of advanced weapon systems development and ETC's global awareness project.



ETC is helping DEVCOM ARL create collaborative laboratory environments which include developing and updating the ARL Laboratory Master Plan, exploring partnerships for DEVCOM ARL's Robotics Research Collaboration Campus at Graces Quarters, Maryland, and supporting the National Security Scholars Summer Internship Program pilot to introduce students to national security research activities while advancing DEVCOM ARL research goals. The internship program has built relationships between promising undergraduate, graduate students, and DEVCOM ARL researchers, providing a strong prospective pool of future employees to DEVCOM ARL or to other organizations supporting national security.

Medical Research and Development Command PIA – Energetics Technology Center

A PIA between USAMRDC and ETC was established in late FY22 to further commercialization of USAMRDC inventions through traditional and novel licensing activities. In addition to interfacing with potential Maryland small businesses with interest in collaborating or licensing, ETC has collaboratively developed an expanded version of the Intellectual Property International Consortium. Coordination of future pitch competitions and venture forums are planned.



DEVCOM Army Research Laboratory PIA – Virginia Tech Applied Research Corporation

Virginia Tech Applied Research Corporation (VT-ARC) specializes in business analytics, research, and engineering to facilitate innovative partnerships with the government, academia, and industry. Its vision includes driving technology innovation through the use of technical and operational strategy, providing expansive research that contributes to greater protection of our country's critical infrastructure and resources, and promoting the application of science in the development of commerce, trade, industry, while enhancing global welfare.

VT-ARC assists DEVCOM ARL in conducting many Future Direction Workshops, including those in Predictive Toxicology, Wireless Networking – 6G and beyond, and microelectronics, and hosted a series of expert panel workshops to identify promising research directions, potential technology capabilities, as well as the technology barriers and enablers to realizing those capabilities for the mid-term (5-10 year) horizon in areas including Synthetic Biology, AI, MUM-T, Hypersonic Flight, Disruptive Energetics, and Human Performance Enhancements, Quantum Sciences.

Additionally, VT-ARC provides analytic and outreach support for the Army Small Business Technology Transfer (STTR) program, which encourages small, high-tech U.S. businesses (fewer than 500 employees) in partnership with research institutions to provide innovative R&D solutions in response to critical Army needs. To continue a more sustained engagement with the community, VT-ARC initiated the spring 2022 Phase I STTR solicitation.





DEVCOM Armaments Center PIA – New Jersey Innovation Institute, Inc.

New Jersey Innovation Institute (NJII) is a not-for-profit corporation associated with the New Jersey Institute of Technology (NJIT), a public research university located in Newark, New Jersey. NJII combines the resources of NJIT with strong industry and government relationships in order to transform ideas into innovative and practical solutions.

Through a PIA signed in 2021, NJII promotes defense, homeland defense/security, and public safety objectives by identifying small business firms, private/public sector agencies, and other educational institutions that may need or can make demonstrably productive use of technology-related assistance from DEVCOM Armaments Center.



DEVCOM Armaments Center PIA – New Jersey Manufacturing Extension Program, Inc.

NJMEP is a private, not-for-profit organization (associated with the National Institute of Standards and Technology), that aims to improve the profitability and competitiveness of New Jersey manufacturers by increasing productivity and efficiencies, reducing costs, and enhancing employee performance.

NJMEP currently assists DEVCOM AC with identifying nontraditional defense manufacturing firms (including small and medium-sized businesses) capable of filling key U.S. Army advanced manufacturing technology needs. Once identified, DEVCOM AC may partner with such manufacturing firms under CRADAs, CTAs, and other T2 activities.



DEVCOM Aviation and Missile Center PIA – FirePoint Innovations Center

Wichita State University and DEVCOM AvMC have partnered to create FirePoint Innovations Center, which aims to expedite the development, transfer, and commercialization of joint technologies among DEVCOM AvMC, industry, academia, and other government agencies. FirePoint seeks to assist in the workforce, educational, and commercial development required to promote technology innovation and teamwork across the major Army modernization priorities.



Current efforts between DEVCOM AvMC and FirePoint Innovations are focused on developing a broad set of marketing, messaging, and outreach approaches in support of the ORTA's T2 mission. These efforts include an upcoming Invention Disclosure Training session being hosted on Redstone Arsenal. The purpose of the session is to raise internal T2 awareness, and to inform and educate DEVCOM AvMC S&Es on intellectual property and the internal T2 process. FirePoint Innovations is also leveraging undergraduate students at Wichita State University through a program called Gateway to IP. The program introduces students to the basics of intellectual property and has built relationships between DEVCOM AvMC ORTAs and promising undergraduate students.



DEVCOM Soldier Center PIA – National Security Innovation Council

The National Security Innovation Council (NSIC) was created to align the Texas defense innovation environment with emerging defense priorities identified by national security partners. NSIC's approach includes building an operational model that illustrates national security challenges, identifying Texas-based organizations that can solve the issues, and effectively fostering and guiding the collaboration between the resulting public-private partnership.

The DEVCOM Soldier Center executed a PIA with the NSIC, in support of Army Futures Command. The PIA supports the Army Software Factory, a program that leverages a train-with-industry pipeline to empower Soldiers and Army civilians to scope and solve problems with modern software practices. Activities under the PIA may include, among others, coding camps, internships with local industry, and paired programming operations with industry experts. Soldiers and civilians will operate as product teams in roles like product manager, user interface designer, and engineer to help solve existing and future Army problems. The goal of the Software Factory is to bring together concepts of agile methods and high levels of collaboration, to produce products that have direct value to Army users.



Engineer Research and Development Center PIA - ERDCWERX

ERDCWERX paves the way to collaboration and contracting with the ERDC, bringing innovation to the marketplace and Warfighter through technology transfer and transition. This is accomplished by expanding and simplifying outreach to industry and academia, utilizing ERDC's innovation strengths, and advancing research, IP commercialization, and other projects. ERDCWERX encourages establishment of partnerships with ERDC by submitting solutions to ERDC-specific initiatives. Current efforts between ERDC and ERDCWERX are focused on supporting spin-in/spin-out activities, utilizing user-friendly partnering platforms and mechanisms. The tech challenge platform, https://www.erdcwerx.org, solicits industry and academic partners to bring innovative solutions to the table to solve some of ERDC's toughest technology challenges.



The Air Force Technology Transfer and Transition (T3) Program Office currently manages two Partnership Intermediaries sponsored by the Office of the Secretary of Defense (OSD) with Montana State University (MSU), TechLink and MilTech.



DoD PIA – TECHLINK

TechLink was established in 1996 within Montana State University's Office of Research and Economic Development. In 1999, TechLink became the Department of Defense's first national Partnership Intermediary for Technology Transfer. TechLink's core activities occur between where laboratory intellectual property enters the public domain and where technology transfer agreements are executed between laboratories and businesses. TechLink's primary activity is marketing new inventions from the DoD and navigating businesses and entrepreneurs through the licensing process. TechLink has facilitated partnerships with DoD laboratories, connecting them with companies nationwide for technology licensing, transfer, and joint R&D activities. In FY 2022, TechLink assisted Army laboratories with 29 technology transfer agreements, including 11 license agreements, 15 CRADAs, and 3 other agreements (e.g., limited purpose CRADAs, material transfer agreements, other contracts).



DoD PIA – MILTECH

MilTech, located at Montana State University, was established as a DoD national Partnership Intermediary in 2004. The mission of MilTech is to accelerate the transition of new technology to the U.S. Government. MilTech has a broad network of industry partners and provides hands-on, industry experienced product design, prototyping and manufacturing expertise to help the DoD accelerate the transition of technology to the U.S. warfighter. MilTech has over 580 completed or active DoD projects.



CTAs allow Army laboratories to provide testing services for a fee to a private partner. CTAs provide access to unique, world-class Army laboratories and test capabilities and facilities. The Army averages 500 CTAs a year and averaged \$15M in CTA revenue in the last three years.

BENEFITS TO THE ARMY:

- Reduce costs by providing facilities or services for a fee;
- May transfer test materials, equipment, models, computer software, data and other technologies;
- Increase return from equipment and facilities investments; and
- Government purpose use of the testing data depending on terms in the agreement.

USE CASES FOR NON-FEDERAL ENTITIES:

- Access to unique test facilities and equipment;
- Access to Army expertise through test feasibility; developing test requirements; conducting test planning, scheduling, and budgeting; designing, building, and installing test hardware and equipment; and acquiring, processing, and analyzing test data;
- Army laboratory may provide samples, drawings, information, equipment, materials;
- Results of tests performed under a CTA and will not be disclosed to third parties without the consent of the customer; and
- Use of resources is on a noninterference basis of the laboratory supporting its mission and must not constitute undue competition with the private sector.





Intellectual Property (IP) and Patent License Agreements (PLAs)

Army laboratories generate IP by recognizing, identifying, reporting, and filing for patent protection for government use or to license to commercial partners where possible. IP plays an important role in the Army's ability to modernize its weapons systems, maintain technological overmatch, and support long-term sustainment. Army laboratories have established policies for the creation, protection, use, maintenance, and licensing of IP. PLAs are an important mechanism for commercializing inventions developed in Army laboratories. Each Army laboratory maintains a collection of patents covering inventions by its scientists and engineers. When licensed and commercialized, the inventions benefit consumers with new or improved products. Royalties are shared by the inventors and the Army laboratory. In FY22, Army laboratories reported 121 new invention disclosures, 118 patent applications filed, 118 patents issued, and 1,517 active patents. In addition, Army laboratories reported 220 active licenses, 25 new licenses, and over \$2M in total income on all active licenses.

BENEFITS TO THE ARMY:

- Leverage commercial interest in Army technologies resulting in private investment for further development and commercialization;
- Benefit from products made by industry from technology licensed by the Army–a sizable number of Army license agreements result in military sales;
- Contribute to U.S. economic growth and impact new job creation. For example, a recent economic impact study conducted by TechLink reported sales from Army license agreements exceeding \$6 billion; and
- Royalties are shared between the inventor and the laboratory.

USE CASES FOR LICENSEES:

121

FY22

- Profits and sales of new products and services, including both commercial and U.S. military sales;
- Potential for outside investment funding directly related to the licensed Army technology; and

118

Potential royalties from sublicensing the licensed Army technology.

FISCAL YEAR	New Invention Disclosures	Patent Applications Filed	Patents Issued	Total Active Patents	Active License Agreements
FY20	178	196	166	1,709	204 / \$2.5M Income
FY21	131	153	135	1 595	233 / \$3 1M Income





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FY22 Army Technology Transfer Program Success Stories

T2 agreements help to leverage shared research interests, capabilities, expertise and identify research products (e.g., inventions, innovations, knowledge) which may have commercial or public value. The success stories that follow in this report provide examples of how T2 is supporting Army modernization.



Cybersecurity Anomaly Detection 1000X Faster with Less False Positives

The Army Analytics Group (AAG) provides analytical services for various organizational operations and functions, including cybersecurity. AAG signed a Cooperative Research and Development Agreement (CRADA) with Entanglement, Inc., and strategic partner Groq, Inc., a US semiconductor company, to determine an optimal cybersecurity anomaly detection capability.

Due to the diversity and complexity of data systems and network architectures, computation remains one of the most limiting factors when scaling cybersecurity solutions today. The research partnership focused on three areas: improving auto-encoder functionality and performance over existing systems, accelerating generative adversarial network (GAN) functionality, and integrating a quantum-inspired optimization SVM algorithm using Quadratic Unconstrained Binary Optimization (QUBO). The work by Entanglement and Groq under the CRADA demonstrated cybersecurity anomaly detection faster than traditional methods and better performance measured by Key Performance Parameters (KPPs). The KPP's covered metrics related to total inferences per second, percentage of threats detected, accuracy, recall, precision, other confusion matrix-based metrics, and Area Under the Curve (AUC). Previous AAG efforts detected 120,000 inferences per second, the benchmark and standard achievable using a QUBO model. Within six months, Entanglement achieved an anomaly detection rate of 72 million inferences per second and demonstrated the potential of attaining 120 million inferences per second across a broad domain of data processing systems.

In 2022, AAG and Entanglement moved the cybersecurity system toward Technical Readiness Level (TRL) 7. The system has added capabilities to process, stream and automatically ingest log files from Zeek, NetFlow, Sflow, and Amazon Web Services Virtual Private Cloud flow. A log normalization framework was created, enabling the system to take on new data types to support changes in customer environments. An Application Programming Interface (API) and user interface have been developed, allowing the end user to configure and interact with the system.

The system now utilizes a stacked ensemble of unsupervised models combined with a weighted voting technique to predict class labels for each data vector in the dataset. These class labels are used in training deep-learning models deployed on specialized software-defined hardware for high-speed computing well beyond what NVIDIA offers for similar size and power specifications.

Each method is run independently and in parallel, and results are aggregated with a weighted voting method. The system's modular design allows additional unsupervised algorithms to be integrated easily. In addition to unsupervised algorithms for labeling unseen data, the API provides a mechanism for fixing incorrect predictions (false positives), which are incorporated back into the training data for the supervised methods.

The development of the platform has positioned the project to now be ready to accept live data feeds or recordings of real network traffic from organizations like Army Cyber Command Technical Warfare Center (ARCYBER TWC). AAG will be able to further validate the system's capabilities and continue to increase the TRL of the project to make it operationally ready. AAG has signed a CRADA with ARCYBER to test the system capability against the ARCYBER data environment in 2023.

Original Article: https://www.prnewswire.com/news-releases/us-army-analytics-group-confirms-1000x-performant-cybersecurity-technology-by-entanglement-ai-run-on-groq-hardware-advancing-national-security-systems-301658012.html



Army Teams with UK to Transfer Technology for Heat Injury Avoidance

As part of his research in support of the U.S. Army, Dr. Mark Buller, a research physiologist from the U.S. Army Research Institute of Environmental Medicine (USARIEM), developed an algorithm called ECTemp to estimate core body temperatures based on an analysis of heart rate changes over time. Subsequent work with Dr. Simon Delves, an applied thermal physiologist in the United Kingdom's Royal Navy Institute of Naval Medicine resulted in a joint invention known as the Individual Heat Acclimation Training Tool (iHATT). This jointly invented training tool provides personalized training and real-time feedback using data from the ECTemp algorithm and a smartphone app. iHATT coaches individuals through exercising in hot and humid conditions in ways that help them acclimate to the heat. The two inventors jointly collaborated on field testing iHATT in the jungles of northern Borneo with the UK Jungle Warfare Division's jungle instructor courses.

With help from the technology transfer and intellectual property offices at the U.S. Army Medical Research and Development Command (USAMRDC) and the UK Ministry of Defence, the scientists were able to transfer the ECTemp/ iHATT technology to the Royal Netherlands Army, which sought new solutions to protect Dutch warfighters. In November 2021, the Royal Netherlands Army became the first licensee of the ECTemp/iHATT package for use on

Injury Risk Management & Performance Optimization



Garmin smartwatches customized for military use with purchasing and use of the watches beginning in 2022.

USARIEM and USAMRDC achieved another key technology transition milestone in 2022 with the incorporation of ECTemp into a DOD Program of Record. ECTemp is now part of the Dismounted Reconnaissance Sets Kits and Outfits. This is the standardized set of equipment for outfitting all DOD personnel involved in Chemical Biological Radiological and Nuclear (CBRN) operations.



U.S. Army Yuma Proving Ground Hosts Cutting Edge Artillery Demonstration

In mid-September, U.S. Army Yuma Proving Ground (YPG) hosted a demonstration showcasing the use of the United States' most cutting edge 155mm artillery munitions with the South Korean K9A1 Thunder Self-Propelled Howitzer and K10 Ammunition Resupply Vehicle.

Both platforms are manufactured by Hanwha Defense Corporation (HDC), South Korea's largest defense contractor. Recently, the U.S. Army Combat Capabilities Development Command Armaments Center signed a



Cooperative Research and Development Agreement (CRADA) with HDC to assess the feasibility, performance and capabilities of carrying and firing the American munitions by the two platforms.

"The purpose of our partnership is to check the compatibility of our munitions with those two vehicles," said Sam Perez, who serves as principal investigator for the CRADA. "We've been working on this effort for the last year and a half to ensure we can safely fire the munitions from those two vehicles."

On the demonstration day, about 60 visitors from across the Army and several friendly foreign nations observed the K9A1 undergo loading from the K10 and then embark on multiple realistic fire missions across two adjacent gun positions. The K9A1 demonstrated its ability to shoot and scoot, in which a self-propelled howitzer fires artillery, then immediately departs to a different location to evade possible counter-fire from an adversary.

"These are the things within the scope of work of the CRADA with Hanwha that they wanted to demonstrate in terms of the capabilities," said Anthony Sebasto, Acting Director of Combat Capabilities Development Command's Armaments Center at Picatinny Arsenal. "While the systems were here, they also wanted to have the opportunity to show the US and other foreign nations the capability of their system."

The K9A1 is used by nine other nations in addition to South Korea, and more may acquire the platform in the future. "There will be opportunities for countries that are acquiring the K9A1 to see that the U.S. munitions are compatible with the system," said Perez. "This is just the beginning of our collaborative efforts. There is the potential for more demonstrations like this in the future at Yuma Proving Ground."

Original Article: *https://www.army.mil/article/260877/u_s_army_yuma_proving_ground_hosts_cutting_edge_artillery_ demonstration*



Blackbridge Defense Offering Blast-Proof Cooler, Patent Licensed from US Army

Blackbridge Defense, a small company specializing in military equipment, has expanded its product offering with a blast-proof cooler built for combat.

Three sizes of the soft-sided cooler were designed, prototyped, and tested at the U.S. Army's Combat Capabilities Development Command (DEVCOM) Soldier Center in Natick, Massachusetts, where it was known as the Insulated Container for Bottled Water.

The large system holds 36 water bottles or 28 MREs. The medium bag holds 15 water bottles or six MREs, and the small individual bag holds five water bottles.



"We've done drop testing, vibration testing, flammability testing, performance testing at the Doriot Climatic Chambers, and abrasion testing, said Ben Williams, project officer, in a 2014 article. "We also linked up with Johns Hopkins University's Applied Physics Lab to conduct in-vehicle blast testing, because our customer's number one requirement was that these bags needed to be blast-proof in an [improvised explosive device] scenario."

The Army applied for and received U.S. Patent 9,265,318 on the cooler in 2016. On June 9, 2022, the Army exclusively licensed its patent rights to Blackbridge Defense, enabling manufacturing and sales.

"Having cold water on hand is a morale boost for troops," Burnett said. "And having it safely contained is common sense. The coolers can collapse for storage and will never knock somebody if they go airborne or break during resupply drops."

The coolers attracted strong interest at the SHOT Show in January, and the production schedule is being finalized.

"The versatility of this cooler, along with the unique blast and fireproof capabilities, will allow for expansive market reach in both the federal and private sectors. Our team is excited to begin U.S.-based manufacturing in late September," Burnett said.

Original Article: https://techlinkcenter.org/news/blackbridge-defense-offering-blast-proof-cooler-patent-licensed-from-us-army



Army Partners with Triton Systems to Commercialize the FastCastTM (Spray Polyurethane Foam Splint)

Orthopedic injuries, such as bone fractures, that occur in military combat or emergency situations often requires prompt medical attention and stabilization to avoid further damage to the injured extremity. However, in these types of settings, it is difficult to provide prompt and efficient medical treatment that can address the residual effects of the injury, such as swelling and blood loss while simultaneously stabilizing the injured limb. Current techniques require multiple steps with multiple components, thereby prolonging pain, swelling, and potential secondary injury. Additionally, a high level of training is required to administer existing techniques which could pose problems when time is of the essence. Splints, more common in field settings, can be difficult to align and offer less protection to the injury area. Air splints and malleable aluminum splints require a medic to move the fractured limb, which can cause pain and additional damage.



In response, Dr. Kevin D. Martin, MD, an orthopedic surgeon, formerly assigned to William Beaumont Army Medical Center,

El Paso, TX developed a novel technique for splinting and casting injuries in emergency settings with a onestep process. The spray polyurethane foam is applied directly to the patient's limb to create a contoured cast in minutes. Pressure is evenly distributed throughout the immobilized limb to minimize pain, blood-loss, and potential secondary injury. Therapeutic agents such as antibiotics, analgesics, or clotting compounds can be added to the foam. Additionally, any needed access ports are easily formed by placement of a plastic lid that is sprayed around. The fracture can be immobilized without being manipulated thereby decreasing the potential for secondary tissue injuries, bleeding, and infection. Also unique to this novel process: wounded areas can be left exposed through masking before the foam is applied. Removal of the foam is also fast, as it can be broken apart by hand.

In a comparative study between the foam and a malleable aluminum splint on a lower extremity fracture, the spray foam technique provided superior longitudinal traction and fracture site immobilization.

In August 2020, with assistance from the technology transfer and intellectual property offices at the U.S. Army Medical Research and Development Command (USAMRDC) a Commercial Evaluation License Agreement (CELA) was signed with Triton Systems, Inc., Chelmsford, MA. In August 2021 a CELA Extension for further evaluation was signed resulting in a partially Exclusive License Agreement in 2022.

Original Article: https://techlinkcenter.org/technologies/fastcasttm-spray-on-polyurethane-foam-to-immobilize-bone-and-soft-tissue/a72405f0-8784-45bd-bbc5-b29fdfa31882



U.S. Army Intelligence Center of Excellence Teaches Artificial Intelligence and Machine Learning to Warrant Officers

The Warrant Officer Advanced Course (WOAC) at the U.S. Army Intelligence Center of Excellence (USAICoE) will incorporate artificial intelligence and machine learning (AI/ ML) into its warrant officer intelligence training.

During a pilot seminar in November 2021, Dr. Eric Holder of the Army Research Laboratory told students, "Humans and AI working together make kind of a power team." While AI/ML can reduce the amount of analytic manpower required to process battlefield information and can improve analytic rigor, Holder stressed that although it's good at some processes, AI is also very bad at other processes and is vulnerable to deception. This makes It necessary for



students to learn the capabilities and limitations of AI/ML within the field of military intelligence.

"The goal of the lecture [is] to introduce the [military intelligence] warrant officers to the terms and concepts of AI/ML to increase familiarity and create a more informed user population, especially on the capabilities and limitations and their ability to treat AI input and output as you would any other source," said Holder.

USAICoE's WOAC now features a day-long AI/ML seminar intended to serve as a primer for military intelligence Soldiers on artificial intelligence, machine learning, and data science. The seminar's curriculum is a collaborative effort by USAICoE, the Army Research Laboratory (ARL), and Arizona State University (ASU).

"We realized that we did not have the resident experience and expertise with the scientific AI/ML applications and techniques to teach, train, and increase the literacy of our students, but we could leverage the existing ecosystem of academia and other mission partners already operating and advancing in the AI/ML and data science fields," said Peter Don, Senior Advisor for Multi-Domain Operations Intelligence and Training at USAICoE.

The CRADA between ARL and ASU allowed teams to frame the problem, scope the requirements, curate a solution, and eventually map out the way forward and develop a program of instruction for the one-day AI/ML pilot course for the WOAC.

"Our adversaries are certainly focused on implementing AI in their military," said Chief Warrant Officer 3 Jonathan Berry, a WOAC student from the Utah National Guard's 142nd Military Intelligence Battalion, "so in order to stay relevant in future conflicts, AI certainly does need to be implemented."

Original Article: *https://www.army.mil/article/253606/usaicoe_teaches_artificial_intelligence_and_machine_learning_to_warrant_officers*



Army Leverages Innovative Industry Partnerships Partnership to Support Ebola Response

The Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense (JPEO-CBRND) worked with the Centers for Disease Control to support the 2022 Ebola response in Uganda.

JPEO-CBRND puts capable and supportable systems in the hands of service members and first responders, when and where needed. JPEO-CBRND supports all the Services and the Army is the executive agent through the Assistant Secretary of the Army for Acquisition, Logistics, and Technology (ASA(ALT)). JPEO-CBRND works closely with interagency, academic, and international partners to provide



the best CBRN defense equipment and medical countermeasures.

In 2022, JPEO-CBRND executed Cooperative Research and Development Agreements (CRADAs) to partner with the Regional Medical Centers in the continental U.S. in case any patients who are U.S. citizens require diagnosis and treatment of viral hemorrhagic fevers (i.e., Ebola, Marburg, Lassa).

The CRADAs are with Denver Health Medical Center, the University of Texas Medical Branch in Galveston, Fairview Health Services at the University of Minnesota, the Johns Hopkins University Hospital, Massachusetts General Hospital, Cedars-Sinai Medical Center, Emory University Hospital, University of Nebraska Medical Center, New York City Health and Hospitals Corporation at Bellevue, and Providence Sacred Heart Medical Center and Children's Hospital. These Regional Medical Centers are the only institutions possessing the medical expertise, physical infrastructure, and steady-state operational readiness allowing for successful treatment of sick patients with viral hemorrhagic fevers.

Under these CRADAs, the Next Generation Diagnostics System Increment 1 Program Management Office provides Warrior Panels and Sentinel Panels to aid in the diagnosis and treatment of biocontainment unit patients infected with high-consequence pathogens. The CRADAs provide immediate and measurable improvement in military and domestic medical response capability through the provision of Warrior and Sentinel Panels to the Regional Medical Centers, while providing valuable clinical performance information to the Program Management Office.



Aviation and Missile Center Signs Partnership Agreement with Cyber School

The U.S. Army Combat Capabilities Development Command Aviation and Missile Center (DEVCOM AvMC) and the Alabama School of Cyber Technology and Engineering (ASCTE) officially signed an Educational Partnership Agreement on February 22, 2022 formally establishing a relationship between DEVCOM AvMC's Software, Simulation, Systems Engineering and Integration Directorate (S3I) and the magnet high school.

Beginning in the fall of 2022, ASCTE will select students to participate in an internship at S3I. Interns will work in a team environment while experiencing laboratory environments, learning project management and project lifecycles and applying risk management framework principles as they pertain to present cyber rules and regulations, among other integral real-world skills.



They will become well-versed in high-level cyber understanding, system administration understanding and network engineering, as well as time management, personnel management and conflict resolution.

"I have an ulterior motive here," said DEVCOM AvMC Director Jeff Langhout, speaking to the ASCTE students. "You do not have to wear a uniform to be a part of the United States Army. Now I know what you see on television are young men and women that have volunteered and put on the uniform and we are so thankful for every one of them. But there's also 350,000 or so people like me that wear a suit, well, not many of us wear suits. But I want you to know that our Army can't do what they do without the great civilians. So my agenda here is I want you to see that you have an opportunity to also contribute to the security of the nation."

ASCTE was founded in 2018 as the nation's only high school focused on the integration of cyber technology and engineering into all academic disciplines. The public, residential magnet high school serves more than 150 students grades 9-12 from the state of Alabama. Tuition for the school is free.

The relationship with ASCTE will allow AvMC to strengthen students' understanding of cyber and engineering technology, especially as it pertains to supporting the Warfighter and national defense. It also exposes students to the vast career opportunities at DEVCOM AvMC, which in turn may influence their future career decisions.

"Cyber shouldn't necessarily be its own discipline, it should be integral to everything that is engineering," Langhout said.

The partnership has been two years in the making, but it is just the beginning, said ASCTE President Matt Massey. "We don't want to just be the lighthouse here," Massey said. "We are going to be the model for other schools in Alabama, but also be a national model too. We have schools across the nation looking at what we're doing. And it will be a ripple effect."

Original Article: https://www.army.mil/article/254175/center_signs_partnership_agreement_with_cyber_school



Improved Ice Removal Methods Lead to Patent for ERDC CRREL Inventor

U.S. Army Corps of Engineers Research and Development Center's (ERDC) Cold Regions Research and Engineering Laboratory (CRREL), research materials engineer Dr. Emily Asenath-Smith received a patent in August 2022 for her invention, "Vertical draw system and method for surface adhesion of crystalline materials," a foundational component of her ice adhesion research program.

CRREL, located in Hanover, New Hampshire, has extensive environmental laboratories that allow for temperature control below freezing. Asenath-Smith is the lead investigator for CRREL's Ice Adhesion Facility, where much of her innovative research is conducted.



"Ice wreaks all kinds of havoc on cold weather operations. The

best-case scenario is that our troops have to shelter in place, an approach that has many risks of its own," Asenath-Smith said. "Worst-case scenario is loss of life and critical assets. In civilian sectors, utilities lines are lost, communications severed and transportation halted."

"There currently exist methods to mitigate ice, but they are either energy intensive or environmentally unfriendly; referred to as active methods," she explained.

"The true holy grail is to develop passive ice mitigation methods, which prevent ice adhesion, or facilitate ice removal without any energy input or increase in mass," Asenath-Smith said. "Such passive methods are generally coatings or surface treatments, which function based on the chemistry and physics of the surfaces, allowing them to operate without additional energy or mass. There are some very promising surface treatments and coatings for ice mitigation that have been developed and tested at the lab scale."

"However, few of these technologies have been transitioned to military applications. The barrier stems from the lack of an analytical framework for assessing the ice mitigation performance of a coating," she said, adding that "with my research team, I am working on developing quantitative metrics that describe the performance of ice mitigation technologies, across length scales, so that stakeholders can make informed decisions about whether to deploy these new coating technologies on their assets."

Asenath-Smith's invention enables the growth of ice directly on surfaces without the use of molds and produces, an outcome that reduces uncertainty and scatter in the experimental ice adhesion data. "With our invention, we can precisely control the microstructure of the ice layers during growth on surfaces to produce single crystal ice layers or polycrystalline ice layers, with randomly oriented or ordered columnar microstructure," Asenath-Smith said.

Citing the advantages of this now-patented method and device, Asenath-Smith said that growing ice with consistent microstructures on surfaces for adhesion studies is a fundamental enabler of other research.

Original Article: https://www.erdc.usace.army.mil/Media/News-Stories/Article/3243781/improved-ice-removal-methods-lead-to-patent-for-erdc-crrel-inventor



FY22 Army Technology Transfer Program News

Update to Army Regulation 70-57, Army Technology Transfer

A mandatory revision to Army Regulation 70-57 (AR 70-57) Army Technology Transfer, was published in March 2022. This regulation prescribes policies and responsibilities for T2 within the Department of the Army. This mandated revision incorporates policy mandated by Army Directive 2018-26, Enabling Modernization Through the Management of Intellectual Property. IP plays a critical role in the Army's ability to modernize weapons systems and maintain technological over-match. Army laboratories provide unique capabilities in the form of personnel, services, facilities, equipment, and patentable inventions. These capabilities can be effectively leveraged by the acquisition community through T2 mechanisms to meet the technology requirements of acquisition programs.

This revision also incorporates agreement closeout summary requirements. After agreement completion, Army technical leads will document R&D transitions to acquisition programs, publication, demonstrations, maturation to advanced development, invention disclosures, licensing for further development, manufacturing, military and/or commercial sales.

Foreign CRADA Standard Operating Procedure Developed

Collaboration with foreign owned or controlled institutions (FOCI) requires special considerations in order to maintain security assurances and export controls. Per AR 70-57, the ADTT must review agreements with foreign entities that license Army-owned IP and all CRADAs that are with a foreign entity as defined in Executive Order 12591. In the spring of FY22, the ADTT initiated a working group to generate a Standard Operating Procedure (SOP) for interdepartmental review of foreign CRADAs. This review includes U.S. trade considerations, export control considerations, defense export and cooperation considerations, research and business process considerations, and statutory considerations. Army T2-designated laboratories will follow the procedures outlined in the SOP before finalizing a CRADA with foreign-owned or foreign-controlled entities.



Army T2 Laboratory Internal Control Evaluations

All Army T2-designated laboratories meet quarterly in the Army LQEP-T2 forum. In addition, AR 70-57 requires laboratory internal control evaluations (ICE) to understand T2 business priorities and practices, and ensure program policies and responsibilities are followed. These ICE meetings have revealed innovative T2 practices, drivers of R&D collaborations, successful outreach events, award programs, and workforce training events. ICE meetings have also helped field questions, define challenges, develop potential courses of action, propose solutions, and administer correction.

Army T2 Professionals Attend TechLink T2 University

In the fall of 2022, TechLink offered the first online ORTA Foundations course and capstone event, designed to equip ORTAs with the tools and knowledge to succeed, in support of the T2 Army and DoD missions. The content in this course is geared toward those new to the ORTA profession and is a great opportunity to gain best practices for conducting T2 activities, from start to finish and learn various approaches for successfully engaging with stakeholder groups, such as S&Es, legal counsel, and industry partners. The in-person capstone event allowed participants to engage with other ORTAs with similar challenges, hear from DoD and Service leaders and T2 experts, problem solve, and connect with peers from across the country.

The fall 2022 ORTA Foundations course had 17 Army enrollees representing 13 different Army T2 laboratories. The Army had 10 participants in the in-person capstone event. There was strong participation from the DEVCOM and ERDC laboratories where T2 is more established, as well as participation from organizations such as the USACIL, the AI2C, and the ATEC, where T2 is a relatively new activity.





The Federal T2 Community

Federal Laboratory Consortium for Technology Transfer (FLC)



FEDERAL LABORATORY CONSORTIUM FOR TECHNOLOGY TRANSFER (FLC)

The FLC was organized in 1974 and formally chartered by the Federal Technology Transfer Act of 1986 to promote and strengthen T2 nationwide. The FLC is now a nationwide network of more than 300 federal laboratories, agencies and research centers that fosters commercialization best practice strategies and opportunities for accelerating federal technologies from out of the laboratories and into the marketplace.

The FLC's mission is to promote, educate, and facilitate federal T2 among its member laboratories and institutions so they can easily reach their commercialization goals, and create social and economic impacts with new innovative technologies. The FLC provides various resources, education and training, tools, and services to ensure federal laboratories are better able to create partnerships, navigate the commercialization process, and achieve market success.



The FLC recognizes outstanding work in accomplishing T2 from the national laboratories to the public and private sectors with several prestigious awards. The FLC Awards Program annually recognizes federal laboratories and their industry partners for outstanding T2 achievements. The FLC's 30 plus years of advancing T2 would not have been possible without the creativity and dedication of the federal scientists and inventors recognized through the FLC Awards Program.

Each year, the FLC presents numerous awards to federal laboratory employees, including Technology Transfer Innovation, Impact, Excellence in Technology Transfer, Interagency Partnership, State and Local Economic Development Award, Rookie of the Year, Outstanding Technology Transfer Professional, Technology Focus, and Laboratory Director of the Year. The FLC awards are ranked as some of the most prestigious honors in the T2 field.

In FY 2022, the Army received three FLC Awards, including an Excellence in Technology Transfer Award, an Interagency Partnership Award, and a Laboratory Director of the Year Award.





DEVCOM CBC AND PENDAR TEAM UP TO TAKE HAND-HELD CHEMICAL THREAT DETECTION TO THE NEXT LEVEL

U.S. Army Combat Capabilities Development Command, Chemical Biological Center



Above: The Pendar X10 owes its exceptional functionality to a CRADA between Pendar and DEVCOM CBC.

The individuals whose job involves keeping others safe from chemical threats now have some extra protection of their own, as the result of a partnership between the U.S. Army Combat Capabilities Development Command Chemical Biological Center (DEVCOM CBC) and chemical analysis company Pendar Technologies.

The Pendar X10 is a hand-held Raman spectrometer that detects and identifies explosives, hazardous materials, chemical warfare agents and narcotics with new levels of safety, accuracy and speed. Raman spectroscopy is a chemical analysis technique in which scattered light is used to measure the vibrational patterns of molecules within a sample.

Close contact can inadvertently expose an investigator who touches or inhales a toxic substance, which is a limitation of most hand-held devices that require being within a few inches of the sample. The Pendar X10 identifies substances from "standoff" distances up to three feet, and can "see" through transparent materials, such as a clear plastic bag or a window.

Other systems take minutes to identify fluorescent materials, such as colored explosives, narcotics and degraded chemicals. In comparison, the Pendar X10 takes 10 to 20 seconds and identifies many chemicals even faster.

Some chemicals ignite or explode when they get too hot, posing a safety hazard for a detection system that focuses a laser on one small spot. The Pendar X10 instead moves the laser across a larger sample area, preventing any single point from reaching the ignition threshold.

While Pendar developed the spectrometer device itself, DEVCOM CBC vastly expanded and customized the digital chemical threat library powering Pendar devices to include data for hundreds of chemicals of interest to the Department of Defense and the Department of Homeland Security.

DEVCOM CBC leveraged the Raman technology and the expanded chemical threat library for a Portable



The Pendar X10 reads and identifies a variety of hazardous threats

Chemical Fingerprint Identification System (PCFIS), a device that is positioned over objects to identify trace chemicals. The PCFIS, more compact and affordable than stationary lab spectroscopic microscopes, is perfectly suited for fieldwork and mobile labs.

DEVCOM and Pendar entered into a Cooperative Research and Development Agreement (CRADA) in July 2017 for the enhanced chemical threat library. In December 2019, the CRADA was expanded to include a partnership with the Chemical Analysis and Physical Properties Branch at DEVCOM CBC to test infrared aerosol and gas sensors developed under a U.S. Army Small Business Innovation Research (SBIR) Phase II contract.

While the immediate impact of the technology is evident for military components, this dual-use technology also benefits the general public through its use in law enforcement, customs and border control, emergency response, and screening of travelers and postal mail. It could also be used for purely commercial purposes, such as analyzing plastic components for recycling applications, identifying minerals in soil and determining pigments for art conservation.®

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PANDEMIC PARTNERSHIP ESTABLISHES STRATEGIES TO NEUTRALIZE CURRENT AND FUTURE CHEM-BIO THREATS



U.S. Army Combat Capabilities Development Command Chemical Biological Center Environmental Protection Agency



A partnership between the Army Combat Capabilities Development Command Chemical Biological Center (DEVCOM CBC) and the Environmental Protection Agency (EPA), formed in response to the COVID-19 pandemic, established

strategies that can help protect the nation against future chemical and biological threats across multiple industry and service sectors.

The collaboration included the development of standardized viral sampling procedures and safe methods for testing the performance of decontamination products against highly infectious coronaviruses. During the presidential inauguration in January 2021, these processes were deployed to protect attendees from potential chemical and biological threats — an achievement that DEVCOM CBC Director Eric L. Moore hailed as a milestone for the partnership.

The new detection and disinfection protocols developed for emergency response situations also have wide-ranging government and civilian applications that can benefit hospitals and nursing homes, grocery chains, tourism, transportation, building maintenance and security, and delivery services.



Detection and confirmation of COVID-19 virus. The graph illustrates virus genome increase as a function of time (cycle number) using molecular techniques. The Y axis indicates the quantity of virus detected in a sample; a value greater than 100,000 (1E05) is a definitive indication of virus presence.

When the COVID-19 pandemic began unfolding in early 2020, the role of surface contamination in viral infection spread was unclear. Quantifying the risks associated with contaminated surfaces, and developing effective methods for decontaminating public, military and federal buildings — including the White House — were high priorities for government and military leaders.

Studies of SARS-CoV-2, the highly contagious virus that causes COVID-19, are restricted to high-containment labs that have special protections for scientists working with dangerous materials. But federal, state and private labs can develop diagnostic, detection and disinfection technologies for SARS-CoV-2 by studying closely related surrogates — coronaviruses that behave like SARS-CoV-2 but are less debilitating and infectious. The partnership between DEVCOM CBC and EPA filled that critical research need, identifying a low-risk coronavirus called HuCoV229E as a suitable viral surrogate.

DEVCOM CBC provided the design, supervision and reporting for sampling and assay protocols and validated the selection of effective antiviral and antibacterial technologies. EPA then made the test results available to inform emergency response decisions at federal, state and local levels using its Electronic Data Exchange and Evaluation System (EXES).

Two Interagency Agreements (IAA) made this collaboration possible. One allowed DEVCOM CBC to provide technical support and emergency response needs to EPA's Office of Emergency Management, including validation of EPA's environmental sampling and analysis procedures for SARS-CoV-2. This agreement took effect June 1, 2020, and runs through May 31, 2023.

The second IAA allowed EPA to request DEVCOM CBC's help in developing and verifying tests to assess how well pesticides and other decontamination products neutralize the threat of SARS-CoV-2 on surfaces. It took effect May 1, 2020, and runs through April 30, 2023. Under this IAA, DEVCOM CBC provided the technical expertise, personnel and testing facilities necessary, and EPA contributed funding, technical input, oversight and prioritization of the projects.®

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BARTLEY P. DURST: BRINGING EXPERIENCE AS AN INNOVATOR TO HIS SUPPORT FOR GSL TECHNOLOGY TRANSFER

U.S. Army Corps of Engineers, Engineer Research and Development Center, Geotechnical and Structures Laboratory

As a longtime researcher with the U.S. Army Corps of Engineers (USACE), Bartley P. Durst earned a reputation for innovation. Now, as director of the Geotechnical and Structures Laboratory (GSL) within the USACE Engineer Research and Development Center (ERDC), he's known for championing partnerships that turn innovations into impactful opportunities.

GSL tackles some of the world's toughest civil and military engineering challenges by developing technologies that prioritize structural resilience. Durst can relate: A USACE researcher since 1982, he holds more than 20 patents related to survivability and protective structures research.

That experience forms the foundation of Durst's commitment to technology transfer (T2).

"I'm very passionate about T2, not only for my own team, but also for those at other ERDC labs," Durst said. "It can be hard to let go of something you invented, nurtured, prototyped, tested and evaluated. At the same time, letting go is an essential step in moving the technology forward so that it can change lives."

In five years under Durst's leadership, GSL has nearly doubled the total number of licenses issued, more than doubled the number of Cooperative Research and Development Agreements (CRADAs) and nearly tripled the total number of patents issued.

Durst appreciates cross-pollination and collaboration outside ERDC's walls. The Soft Asset Protection in Critical Environments (SPICE) Initiative, established by GSL and ERDC in 2018 in partnership with the Department of Homeland Security and other federal agencies, continues to commercialize technologies aimed at protecting civilians from mass casualty attacks in public spaces.

Durst was a major player in two T2 agreements that have enabled the lab to engage with small businesses and other partners that are new to federal collaborations. ERDC's first-ever Partnership Intermediary Agreement (PIA) with DEFENSEWERX created ERDCWERX, an innovation hub that has connected ERDC technology with more than 10,000 companies in three years. ERDC's first Other Transaction Authority (OTA) mechanism facilitated its work with the System of Systems Consortium, which connects the GSL with more than 200 industry and academic partners.

The best testament to Durst's personal and professional commitment to leveraging T2 is the Modular Protective System (MPS). The MPS technology, and the strong interagency partnership with the U.S. Department of State associated with it, has led to multiple impactful spinoff technologies that protect U.S. soldiers and civilians from firearms, projectiles and blasts.

MPS technologies include Ready Armor Protection Instant Deployment, patented in 2020, and the Expedient Retrofit for Existing Buildings, patented in 2021.

"It can be hard to let go of some-thing you invented, nurtured, prototyped, tested and evaluated. At the same time, letting go is an essential step in moving the technology forward." — Bartley Durst

Thanks to Durst's efforts to transition MPS technologies out of the lab, these military innovations will be used in law enforcement, urban security and operations, crowd control, roadways, school security, embassies, ports, areas prone to natural disasters, and other civilian applications.



ERD





Army Technology Transfer Program Plans for FY23

Army T2 Website Development and Launch

A new website dedicated to the ATTP is expected to be completed by the end of FY23. This platform will provide the Army T2 community, current and prospective partners, and the public up-to-date information regarding the ATTP. Specifically, the site will be a resource for non-Federal entities to learn how they can collaborate with Army T2-designated laboratories by way of various partnership mechanisms as well as find information and resources on Army research priorities, laboratory core competencies, facilities, opportunities, and outreach events. This site will also provide ORTA resources including information on T2 education and training opportunities, best practices, policy references, and annual Business Plans.

Training for Scientists and Engineers

In FY23, the ATTP will begin the development of T2 training for S&Es at our T2 laboratories in order to promote T2 activities and improve familiarity with engaging and working with external partners. The training is intended to help S&Es understand the importance of T2 and that T2 activities are always an implicit part of any research or engineering activity. Raising the awareness of Army scientists, engineers, and other technical professionals to the statutory and regulatory requirements to include T2 considerations in their technical work is the purpose of this training.

Army CRADA Economic Impact Study

TechLink is currently assessing the economic and mission impact of approximately 6,500 Army CRADAs executed between 2001 and 2021. The data gathering phase is approximately 10% complete and the final report is expected to be delivered at the end of FY24. The assessment is expected to reveal significant impact to the U.S. economy and defense mission and demonstrate the effectiveness of CRADAs with industry to advance Army laboratory technology towards military transition as well as commercial end use.

IP and T2 Data Management Software Pilot Program

Beginning in FY23, the ATTP will conduct a pilot program to procure and implement a cloud-based commercial off-the-shelf (COTS) IP/T2 data management system across all Army T2-designated laboratories to track all IP and T2 agreements, and to provide reports and metrics to the Department of Army, the Office of the Secretary of Defense, and Congress. This pilot program will assess the achievability, feasibility, and affordability for deployment of a cloud-based enterprise-wide COTS IP/T2 data management system across the Army S&T enterprise and perhaps, the U.S. Army.



Acronyms

DoD	Department of Defense
EPA	Educational Partnership Agreement
FAR	Federal Acquisition Regulations
FLC	Federal Laboratory Consortium
FOCI	Foreign Owned or Controlled Institutions
FY	Fiscal Year
HQ	Headquarters
HQDA	Headquarters Department of the Army
IP	Intellectual Property
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NDA	Non-Disclosure Agreement
NIST	National Institute of Standards and Technology
ORTA	Office of Research and Technology Applications
ΟΤΑ	Other Transaction Authority
PEO	Program Executive Office
PIA	Partnership Intermediary Agreement
PLA	Patent License Agreement
PM	Program Manager
PO	Program Office
POC	Point of Contact
R&D	Research and Development
RDT&E	Research, Development, Test, and Evaluation
S&T	Science and Technology
SBIR	Small Business Innovation Research
SME	Subject Matter Expert
STEM	Science, Technology, Engineering, and Mathematics
STTR	Small Business Technology Transfer
Т2	Technology Transfer

Army Technology Transfer Program

Cooperative Research and Development Agreement

Cross-Functional Teams

ATTP CFT

CRADA



