

# PROVIDING POLICE BACKUP THROUGH SCIENCE AND TECHNOLOGY



Science and  
Technology

The [Department of Homeland Security Science and Technology Directorate \(S&T\)](#) works closely with first responders to improve their safety and effectiveness – lending expertise, providing funding, and conducting research and development to ensure our nation’s emergency services are well-equipped to provide aid in times of crisis. Those efforts are guided by invaluable insight from the [First Responder Resource Group](#). Experienced firefighters, paramedics, police officers, and other emergency management disciplines across our nation volunteer to help S&T focus on top-priority needs of responders in the field and assess that technology solutions meet end user needs. Thus, the law enforcement community is naturally considered a key stakeholder and S&T is proud to serve the men and women sworn to protect all of us. The following is a select sampling of programs showcasing our work in support of law enforcement.

## TECHNOLOGY DEVELOPMENT

- The [Safe Handling and Collection of Electronics \(SHAKE\) mobile application](#) allows U.S. Customs and Border Protection (CBP) agents to quickly and easily access information in the field about how to deal with intercepted drones that could be carrying illicit drugs or contain surveillance equipment.
- The [Urban Security Initiative](#) is a portfolio of collaborative projects with the City of New York to help protect high-density urban areas and transit systems from chemical and biological threats. S&T and a coalition of partners, including the New York Police Department, are developing and perfecting various sensor technologies to provide early warning for public transit.
- The [Vehicle Inspection for Early Warning \(VIEW\)](#) system is a low-cost, automated, fast and intuitive vehicle inspection solution developed by S&T in partnership with CBP and the Federal Protective Service. VIEW will help protect ports of entry, critical infrastructure, and soft targets such as special public events.
- The [QuickRoute mobile application](#) understands the conditions and constraints emergency vehicle operators face and helps them to respond efficiently while navigating to an incident. The app, which is available for download, addresses more challenges than a typical GPS application, including narrow lanes, inclement weather, downed power lines, and other hazards.
- The [Gunshot Detection, Localization, Alert, and Recording System](#) will provide real-time alerting of detected gunshots, enabling responders to approach a gun-related incident more safely and with greater awareness. This system allows law enforcement to adjust coverage of gun-related incidents and shorten response times to provide better evidence and lead to greater apprehensions and convictions. For additional information, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).
- [Wearable smart chemical sensor badges](#) will protect first responders by providing high sensitivity and selectivity to multiple toxic industrial chemicals at trace concentrations and triggering distinct alarms at set exposure limits. S&T is working with TDA Research, Inc. through a Small Business Innovation Research award to develop the small, simple, inexpensive, and rugged devices.
- The [Electronic Recovery and Access to Data \(ERAD\) Prepaid Card Reader](#) is a wireless, handheld device used to check the balance of suspicious prepaid cards. The ERAD Prepaid Card Reader has been transitioned and is currently in use. It has helped local, state, federal, and international law enforcement agencies seize tens of millions in fraudulent funds.
- The [Detect the Presence of Life through Walls](#) technology will provide law enforcement with the ability to detect individuals through typical building walls and locate criminals and/or human trafficking and kidnapping victims. This capability will improve officer safety and provide them with critical information that potentially enables more tactical options. For additional information, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).



- The [3D-Hawk crime scene mapping tool](#) turns incident scenes into interactive 3D models within minutes using high-definition video footage. 3D-Hawk was field tested with law enforcement and transitioned. It speeds up the process of documenting evidence and allows public spaces to resume normal activity sooner. S&T teamed up with Israeli Police to provide this capability as part of a bilateral agreement with the government of Israel.
- The **Data Upload Mechanism for Sharing Floor Plans & Site Safety Data** will enable first responders to upload floor plans and annotate where critical safety and/or hazardous assets are located within a facility. This will result in more effective responses as this information will be available prior to entering a facility and during response activities. For additional information, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).
- [Screener's Auto-Diagnostic Adaptive Precision Training \(ScreenADAPT®\)](#) is an X-ray image interpretation training system that uses eye tracking technology to examine visual search performance in real time. The technology, which was developed through S&T's Small Business Innovative Research program, helps diagnoses deficiencies/inefficiencies in visual search such as recognition errors.
- [ScreenADAPT®'s Eye-identify©](#) capability is an imposter identification training tool that leverages eye tracking to measure visual search performance of facial images. Eye tracking is used while trainees examine image pairs to determine whether they match. Trainees learn if their decision was correct and can review the thoroughness of their visual scan pattern. S&T transitioned 25 training systems over several years of this project.
- The **universal simulator and application program interface**, currently under development with support from Drexel University, will aid Federal Law Enforcement Training Centers (FLETC) researchers in understanding the cognitive, manual, and visual skills of law enforcement officers. The study uses physiological and neurological sensors to evaluate the ability to adapt to rapidly evolving high-stakes situations while simultaneously making critical decisions. For additional information, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).
- The [Pat-Down Accuracy Training Tool](#) features life-sized mannequins with pressure sensors embedded throughout the body to provide objective evaluation of the amount of pressure applied by a student or officer while practicing appropriate pat-down procedures. The resulting system visualizes deficiencies and inefficiencies in pat-down execution against performance thresholds. The training mannequins have been implemented at several major U.S. airports.

## ENHANCING PREPAREDNESS

- A third [First Responder Electronic Jamming Exercise \(JamX\)](#) is planned for April 2022. Previously held in 2016 and 2017, this event aims to assess the impact of illegal jamming on public safety communications systems and mission response, identify gaps in training, and evaluate tactics and technologies to help responders better identify, locate and mitigate the impact of jamming.
- [Methods for de-escalation of conflict in law enforcement encounters](#) are being researched by S&T in collaboration with the Federal Law Enforcement Training Centers and other partners. The aim of this effort is to identify effective conflict resolution strategies by reviewing video footage of police encounters, coding them to classify behaviors and outcomes, and detecting patterns that can inform future training.



- The **Training Environment of the Future Project** is a FLETC and S&T effort to study, research, design, and implement modern training technologies into the classroom, practical training, and e-learning environments. This multi-year effort includes studies, experimentation, applied research, program design, and transition assistance. The information obtained will aid FLETC and DHS component law enforcement academies in future curriculum design and technology modernization acquisition decisions. For additional information, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).
- S&T's **Advanced Decision Support for Public Safety—Preventable Law Enforcement Distracted Driving** project engaged supervisors and patrol officers across the United States and Canada to assess and analyze preventable law enforcement distracted driving events and facilitate solution-oriented discussions. Feedback from these workshops is being used to inform Drive-Safe, a new driving simulation system for responder training.
- The **Enhanced Dynamic Geo-Social Environment (EDGE)** free virtual training platform allows first responders, education institutions, and other key stakeholders to plan for a coordinated response to critical incidents. Built on a video gaming platform, EDGE is now commercially available and allowing first responders to collaborate to improve and reinforce coordination, communication, and critical decision-making skills.
- The **Classroom in a Box** research project leverages a commercial technology developed by the RiVR Corporation in the United Kingdom. This research will assess the use case for immersing a classroom of students into a single environment or multiple individual environments using 360-degree video and images. The use of this technology will be assessed in future developed immersive simulations to measure officer responses to stressful scenarios. For additional information, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).
- The **Regional Explosive Detection Dog Initiative (REDDI)** program provides a series of regionally-based events for detection canine teams in the law enforcement community. The events include classroom instruction and exercises demonstrating common issues, which improve explosives and odor knowledge and appreciation for the participating canine handlers. REDDI's goal is to improve explosive detection canine team training effectiveness and efficiency.
- The **Master Question List (MQL) for Synthetic Opioids** document was recently published on the DHS website as an information resource for law enforcement personnel who might encounter these substances in the field. This document provides information on synthetic opioid topics such as: exposure limits, personal protective equipment, personnel decontamination, medical countermeasures, and more.
- The **Clandestine Virtual Lab** research project will render a prototype training space resembling a typical drug lab for virtual immersion by students and instructors. The environment will provide teaching prompts and learning tools to further student ability to identify and safely interact within an actual lab. This research will provide a realistic law enforcement-based training environment for further assessment by S&T and FLETC e-Learning and Innovation Division staff. For additional information, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).
- The **Probabilistic Analysis for National Threats, Hazards, and Risks (PANTHR)** program provides decision support to the law enforcement and first responder communities through its annual production of the Chemical, Biological, Radiological, and Nuclear Strategic Risk Assessment. State, local, tribal, and territorial partners leverage the results of the risk assessment to help inform concept of operations and to allow the community to best prepare for, respond to, and recover from CBRN attacks.
- The **Sign Cutting and Tracking Training** solution is a three-part training solution combining 2D and 3D training videos filmed on the border with a 90-minute computer-based training course, and integrated U.S. Army-developed augmented reality technologies. Based on previous S&T efforts, the three components were combined to deliver a solution that maximizes the efficiency and effectiveness of agents in executing tracking along our nation's borders.
- In collaboration with the University of Louisville, **cyber training for law enforcement** is currently being assessed. Researchers are developing curriculum content that will enable law enforcement professionals with varying degrees of cyber security knowledge to help protect their local community and government agencies at risk from cyber vulnerabilities. For additional information, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).

# TESTING AND EVALUATION

- **FirstNet's Push-to-Talk application** is a standards-based, mission-critical push-to-talk app that S&T field tested in collaboration with multiple federal partners over the course of a month to see how it performed in real-world emergency scenarios. The app allows voice, video, and data communications with high priority and low delays with the press of a button.
- S&T has released a request for information on **multi-spectrum laser protective eyewear** that meets the needs of law enforcement and emergency response agencies. The technologies will be included in a market survey conducted by the National Urban Security Technology Laboratory.
- S&T is supporting **Counter-Unmanned Aircraft Systems (UAS)** research, testing, training and evaluation across multiple DHS missions and components to mitigate unlawful use of UAS. Several tests have been executed over the last year and more are planned in coordination with the U.S. Coast Guard, U.S. Secret Service, Federal Protective Service, and CBP.
- The **detection of synthetic opioids** is the focus of a multi-phase study by S&T and the Pacific Northwest National Laboratory to assess the performance of field detection equipment in the presence of fentanyl, fentanyl-related compounds, other drugs, and cutting agents. Participating vendors will obtain new reference spectra that enhance their products' marketability and end users of the equipment will receive system updates with the expanded libraries at no cost.
- The **System Assessment and Validation for Emergency Responders (SAVER)** Program provides knowledge products that help emergency responders make informed procurement decisions. SAVER has conducted over 100 assessments on everything from tactical body armor and ballistic helmets to search and rescue robots.



# FUNDING INNOVATION

- Recent **Broad Agency Announcement** topics include solicitations for a number of law enforcement-related technology solutions, such as Updated Law Enforcement Duty Uniform, Police Protective Helmet, Less-Lethal Options for Crowd Control, and Rapidly-Deployed Physical Barriers.
- The **Computer Assisted Pre-Coordination Resource and Database (CAPRAD) System**, which allows public safety officials to stay connected over open airways during major events, was awarded a grant by S&T through partners at the National Regional Planning Council and the Association of Public Safety Communication Officials International. This partnership will enhance public safety spectrum efficiency and improve interoperability.
- An **Integrated Justice Information Systems Institute** project received joint funding from S&T and the Cybersecurity and Infrastructure Security Agency to develop interoperability standards for Computer Aided Dispatch (CAD) systems used by our nation's public safety agencies. The project seeks to rectify the current inability of first responders to use their CAD systems to electronically exchange information with other CAD systems during a joint emergency response.





# Science and Technology

To learn more about S&T's support to law enforcement, please visit our website:



<https://www.dhs.gov/science-and-technology/first-responders-capability>

