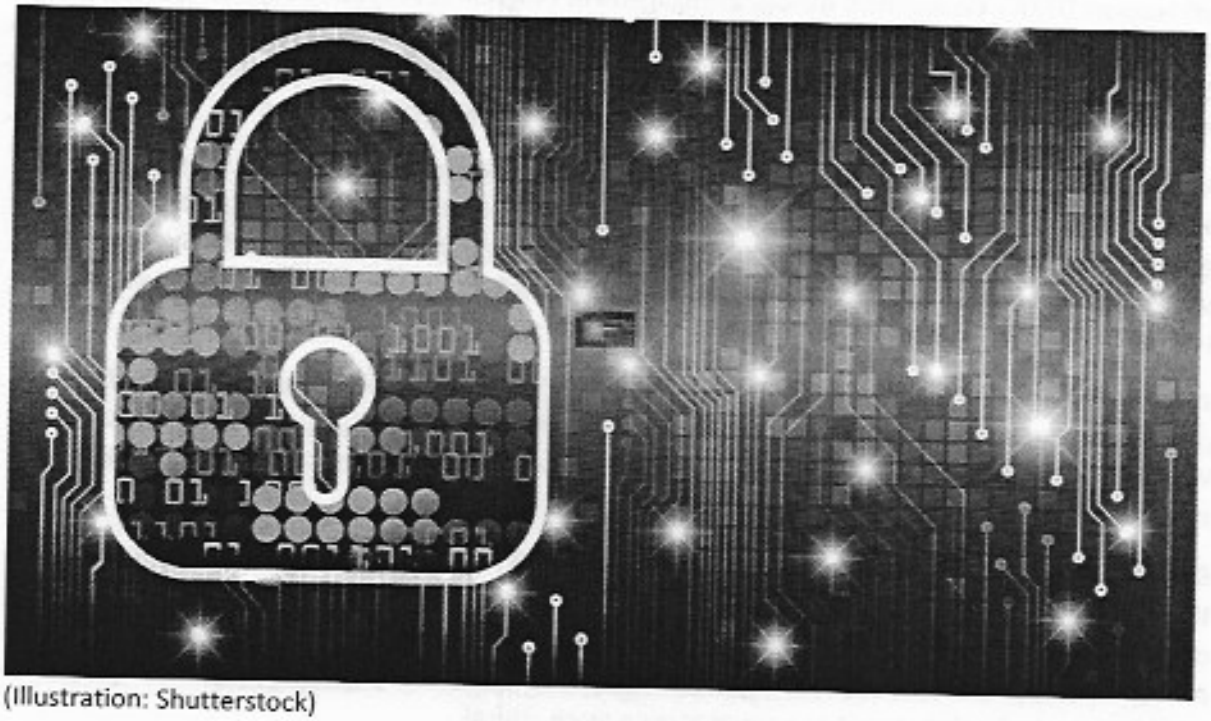
DTRA Brings Technology to Bear Against Chemical and Biological Warfare

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(Illustration: Shutterstock)

The Defense Threat Reduction Agency (DTRA), faced with a growing and diverse threat of chemical and biological attacks, is ramping up efforts to use technology to detect and, when possible, prevent attacks.

DTRA's Chemical and Biological Technologies Department recently held a demonstration called Perceptive Dragon that combined sensors with an algorithm-driven information architecture to inform decision making in response to attacks (including conventional kinetic attacks). The demonstration showed off the enhanced capabilities of its Integrated Early Warning (IEW) Advanced Technology Demonstration program.

During the demonstration, IEW software integrated light detection and ranging, fixed site sensors, and unmanned platforms. It also demonstrated advanced algorithms working between fixed sensors and autonomous unmanned platforms, according to DTRA. "Advancing these technologies may save warfighters' lives and ensure their ability to conduct successful military operations in a chemical or biological environment," the agency said.

DTRA, which also is working with the Department of Homeland Security on a cloud-based Biosurveillance Ecosystem to identify signs of pandemics, is pursuing a number of programs to put detection in the hands of units in the field. It has worked with the Marines on testing a portable biohazard detection system and is investigating using chemical weapons sensors on drones to limit the exposure to troops, but needs to get around the problem that most sensors are designed to be stationary or slow-moving – carried by hand – rather than flying at relatively high speeds. The DoD Chemical and Biological Defense Program's 2017 Annual Report to Congress, obtained by the

Federation of American Scientists via the Freedom of Information Act, mentions work with the Army Robotics Program Manager to integrate chemical and biological sensors into TALON IV ground robots.

The agency also is working with Leidos on an international program involving non-governmental organizations that underscores the breadth of efforts to counter chemical and biological threats. Under a contract valued at up to $170 million (a one-year base with four one-year options) Leidos will support DTRA's Cooperative Biological Engagement Program (CBEP) and Cooperative Threat Reduction (CTR) Program through a worldwide Scientific and Technical Engagement Partnership (STEP) program, according to the company. As part of its work, Leidos said it will partner with industry, research institutions, and other organizations to reduce biological threats.

As the CBEP points out in its strategic plan, defense against biological and chemical threats has become a cross-agency and international effort. The program's efforts intersect with other government programs, "including national security, force health protection, global health security, science, as well as development and engagement," and engages with international organizations such as the World Health Organization and international police.

The use of chemical and biological agents as weapons of mass destruction dates to the use of chlorine gas by German forces in World War I and the release of biological agents by Japan during World War II. Although various treaties have aimed to curb their use, some countries continued to stockpile them.

Recent events have renewed fears of their use, mostly notably Syria's use of sarin gas and reports that North Korea has accelerated its program to develop an arsenal of bioweapons. And, as pointed out in the CBEP plan, although chemical and biological capabilities have for decades remained the province of military forces, terrorist organizations now also potentially pose a threat, making the need for new technology to act as a counter even more critical.

Typically, if someone in the field is exposed to a biological threat, they may not even know it until they begin to get sick. It could take awhile to identify the pathogen through blood work, locate medicine and administer it. We need something that will work faster than that. [Maj. Daniel Davis, DTRA EBD ATD Coordinator]

DTRA Partners With the Marines to Detect Biological Threats

Portable detection systems are widely available in the private sector and are commonly used to detect various biological hazards. However, the military has relied on detection systems that are large, heavy, power-intensive and expensive to procure and support. These systems were able to detect and identify classical Biological Warfare Agents at low concentrations, and were used at fixed-sites for major installation protection. Their bulk—not to mention their expense—made them impractical for field use.

When the U.S. Marine Corps began looking for a biological threat detection system that was flexible, mobile and can be rapidly deployed for use by ground forces in a variety of environments, DTRA answered the call.

DTRA's Expeditionary Biological Detection Advanced Technology Demonstration (EBD ATD) is designed to further develop efficient, man-portable biological detection systems for use in the field by the U.S. Marine Corps.

Working side-by-side with the Marines of the 10th Marines Regimental, DTRA assisted with testing of portable biohazard detection systems at Camp Lejuene, N.C. in January 2008. For this field demonstration, the Marines demonstrated five samplers, two detectors and two identifiers, arranged in multiple configurations that make up a family of biological detection and identification systems.

These systems will not only weigh less and consume energy more efficiently, but will also allow warfighters in the field to immediately test the area for hazards, get results in minutes, get a list of the medicine that will work best against these threats and radio ahead for treatment. Rapid detection and treatment can be the difference between life and death for those who are exposed to biological threats.

Results and lessons learned from the EBD ATD will be incorporated into the Joint Biological Tactical Detection System (JBTDS) and its acquisition strategy for increased identification of biological threats