



Photo courtesy of ECU/Justice and Safety Center



NEWSLETTER

The Newsletter of the First Responder Technologies Program

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This Newsletter discusses technologies of interest to first responders that have received funding, in part, from the Federal government. Mention of these technologies should not be construed as an endorsement of either the technology, or the entity producing it, by the Federal government.

To download a copy of this newsletter, visit:
<http://www.firstresponder.gov/Pages/NewsLetterPage.aspx?NewsLetter=current>

CONCRETE ANSWERS:

New Breaching Tool Speeds Search and Rescue Efforts



Photo courtesy of Raytheon

The ultimate goal in an urban search and rescue operation is to save the greatest number of people from a collapsed structure in the shortest amount of time, so first responders greatly value tools that allow them to work more efficiently.

The U. S. Department of Homeland Security (DHS) Science and Technology (S&T) Directorate listened to first responders who identified the need for a faster method of breaching concrete. "One of the biggest requirements was for something that could breach concrete in 20 minutes or less," said Jalal Mapar, Program Manager at DHS S&T. "First responders also wanted the tool to be self-contained and to reduce the number of hoses or batteries they had to carry," Mapar said. DHS S&T solicited proposals from industry and conducted a competitive evaluation to develop such a technology. Raytheon Underground Technology Division (UTD), a company with experience in drilling and

underground operations, proposed a design that Mapar said was unique.

The device Raytheon UTD developed is called the Controlled Impact Rescue Tool (CIRT). "CIRT uses blank powder cartridges to drive an impacting head," said Luis Geraldo, Program Manager at Raytheon UTD, "When the head hits the concrete, it creates a concentrated shock wave that breaks up the concrete on the back side of the wall." CIRT does not require the hoses or support power equipment that traditional tools such as demolition hammers and saws use, so there is less to carry.

DHS and Raytheon UTD needed an experienced urban search and rescue team to put the device to the test. They went to Fairfax County Virginia Task Force 1 (VATF-1), one of only two teams in the United States with international urban disaster experience. Several task force members

(Concrete Answers continued)

used the tool in a controlled field test which pitted two traditional breaching methods – a rotary hammer and a jack hammer – against the CIRT. Each crew used a different tool and was timed on how long it took to breach a vertical five-and-a-half inch thick reinforced concrete wall and a horizontal seven-and-a-half inch thick reinforced steel and concrete floor.



Photo courtesy of Raytheon

Each team conducted what is known as a “dirty breach,” in which an 18- to 24-inch hole is created for rescue workers to crawl through. “With the CIRT we used 14 shots and cleared out the concrete in 6 minutes. It took 7 minutes to cut the rebar, and in 13 minutes we were done,” said Mapar, who noted that the rotary hammer took 29 minutes, and the demolition hammer took 32 minutes, to breach the wall. In the horizontal slab test, however, the traditional jack hammer performed slightly faster than the CIRT, which was only 90 seconds behind.

Kevin Dabney, a technical rescue specialist with VATF-1 who was part of the team that responded to earthquakes in Turkey and Taiwan as well as the plane crash at the Pentagon, was asked to participate in the demonstration. Although the jack hammer performed better than the CIRT, Dabney said it was important to note that the squad using the jack hammer was exhausted, while the crew that used the CIRT still felt full of energy. Dabney finds the lower exertion factor of the CIRT to be a major advantage. “Once the hole is made in the concrete, you still have to rescue someone on the other side and render

aid, and with the CIRT you still had most of your energy left to continue,” he said. The lower energy expenditure is a real benefit when one considers that search and rescue personnel must commonly carry out sustained operations over many hours without sleep or sufficient relief.

Dabney said the CIRT is also easier to control than the jack hammer, which has a tendency to bounce. However, Dabney believes in confined spaces the CIRT could also have some recoil, so rescuers may still have to use smaller tools. “This is not a silver bullet,” Mapar said, “but it is another tool in the arsenal, and in the appropriate situation it cuts [breaching] time in half.”

In the next phase of testing, DHS and Raytheon UTD will determine how the tool performs in other common rescue situations, such as an overhead breach or in a confined space. Dabney and his VATF-1 teammates are anxious to see how the CIRT performs in other applications. “Any device that aides us in what we’re doing is certainly a benefit, and if it shaves even ten minutes off, there’s a better chance of survival for the person who is trapped,” he said.

For more information on the CIRT, visit www.raytheon.com/capabilities/products/cirt/



Photo courtesy of Raytheon

PLAYING IT SAFE:

Mock Prison Riot Allows First Responders to Test Technologies



Photo courtesy of EKU/Justice and Safety Center

For the past 11 years, the National Institute of Justice's (NIJ) Office of Law Enforcement Technology Commercialization (OLETC) has staged a mock prison riot at the former West Virginia Penitentiary in Moundsville, WVa. The riot gives participants the opportunity to use new law enforcement and corrections technologies in standard, U.S. Department of Justice-approved training scenarios. Participants have the opportunity to see how the technologies perform in realistic situations, and vendors receive valuable feedback on product performance.

This year's mock prison riot attracted 31 teams, including two from Canada and one from Singapore (pictured). Observers from other nations included Norway, Ireland, Venezuela, the United Kingdom, El Salvador, and the Bahamas. Sixty-five vendors displayed their technologies.

Everything about the event is designed to be as realistic as possible, including the actual prison location. West Virginia Penitentiary saw two real riots during its years of operation (1876-1995) – one in 1973, and the other in 1986. While smaller than the Joliet, Ill. prison on which its design was based, the penitentiary is still large enough to allow several scenarios to run at the same time. OLETC conducts these scenarios in the dining hall, cell blocks, prison yards, basement, and apartments of the prison. It can also conduct scenarios involving K-9 tracking units in areas outside the prison, such as the nearby Ireland Mine.

Whether observing from the second floor of a cellblock, from behind a bullet-proof window in the dining hall, or from a safe distance in the prison yard, the scenarios seem very real. "Inmates," who are law enforcement student volunteers, use real resistance, and can sustain real bruises and injuries despite the use of non-lethal control methods and the best safety practices. "It's as close as you're going to get to reality while still keeping a strong concern for safety in mind," said Mike Lucey, OLETC Deputy Director.

The participants take the scenarios very seriously and try to make them as authentic as possible. Law enforcement officers responding to the riot are equipped with the latest protective gear and a variety of less-lethal technologies – flash-bang grenades, powder bombs, laser-equipped rifles, and less-lethal ammunition – provided by the vendors of these products. Using a combination of tactical skill and technological tools, order can be restored in a surprisingly short time. Once the smoke clears and the last inmate is handcuffed and led away, the teams of participants regroup to discuss and evaluate their performance.



Photo courtesy of EKU/Justice and Safety Center

(Playing it Safe continued)

Scenarios for the mock prison riot are written by the team leaders based on what they feel their unit needs to work on. "They tell us what they need and we accommodate them, as long as it isn't something too absurd," said Cindy Barone, OLETC Outreach Manager. Safety is stressed, and each scenario goes through a safety review before being added to the schedule. Vendors make different technologies available for use in the scenarios, and participants have the option of running their scenarios with or without these technologies. Those who opt to test a product will first run the scenario without the technology. The scenario is then run again with the technology in order to be able to assess its benefit. Product evaluators are on hand during the scenario and conduct interviews with participants at the conclusion of the exercise to evaluate what the teams thought about specific elements of

the product they used. OLETC compiles this information into an operational assessment report and provides it to the vendor. "Vendors get quality, pointed feedback, and practitioners get a better-performing product," said Lucey.

Teams come back to the OLETC Mock Prison Riot year after year. "It's a testament to the value of the exercise," said Lucey. According to Barone, OLETC's goal is to expand the program to offer training scenarios for these other disciplines. "It is an ongoing process and requires a great deal of planning," she said. "We would like to see more and more participants from other first responder groups."

For more information on the OLETC Mock Prison Riot, visit the OLETC Website at www.oletc.org.

DAZED AND CONFUSED

Less-Lethal Devices Help Incapacitate Suspects

Recently increased awareness about the benefits of less-lethal technology for military and law enforcement officers has prompted the development of several new devices to incapacitate suspects with a lower risk of death. Not only can these devices be used when lethal force is inappropriate, they can also minimize the risk of injury to bystanders. When the desired effect is to temporarily incapacitate, confuse, or stop a potential aggressor, new laser and light technologies provide a much-needed solution.

SPIDERWorks, a research unit in the Technology Application Division of the U.S. Air Force Research Laboratory's Directed Energy Directorate, has developed a prototype of the Personnel Halting and Stimulation Response (PHaSR) device. The PHaSR is a rifle-sized weapon that uses two low-power diode-pumped lasers to inhibit an aggressor's physical coordination.



Photo courtesy of Kirtland Air Force Base

"It floods the nerves in the eyes with light and provides a temporary pain sensation," said 2nd Lt. Curtis Crawford, PHaSR Project Officer at Kirtland Air Force Base in New Mexico.

(Dazed and Confused continued)

The PHaSR incorporates one short infrared wavelength to cause temporary pain and one visible wavelength to temporarily impair eyesight. The device also integrates an eye-safe laser range finder to ensure that the target is exposed to safe levels of laser energy, regardless of his or her distance from an officer.

SPIDERWorks hopes to begin military and law enforcement testing of the prototype later this year. The PHaSR is funded by the Joint Non-Lethal Weapons Directorate and the National Institute of Justice (NIJ).

An alternative to laser technology in incapacitating devices is the light-emitting diode (LED) Incapacitator, or LED-I, which uses high-intensity, multicolored LED clusters and complex optical concentrators. These result in differentiated patterns of flashing colored lights that temporarily blind and disorient an aggressor, giving an officer enough time to subdue the individual safely.

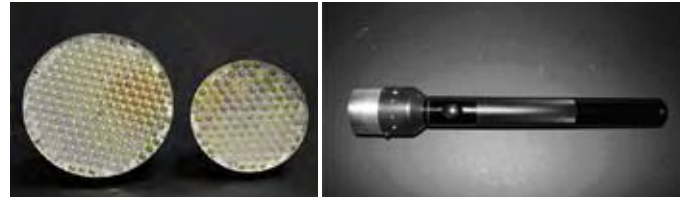
The U. S. Department of Homeland Security (DHS) Science and Technology (S&T) Directorate is funding the LED-I. The S&T TechSolutions program is providing funds to aid the Intelligent Optical Systems (IOS) in delivering the first production prototype to DHS later this year.



Photo courtesy of
Intelligent Optical Systems, Inc.

Similar to the PHaSR, the LED-I uses a range finder to measure the distance to a target's eyes. "The bright strobe light makes you want to close your eyes – similar to the flash from a camera, and the strobe effect is disorienting," said David Throckmorton, Program Manager at

S&T's Borders and Maritime Division. The device is meant to be used in bursts of 15 seconds. Even if the suspect shuts his eyes or turns away, the device continues to work, said Throckmorton. About the size of a large Mag-lite™, the LED-I also doubles as a flashlight.



Photos courtesy of Intelligent Optical Systems, Inc.

IOS also has plans to develop other less-lethal incapacitators, including an LED stun grenade for hostage situations and larger devices for fixed sites or vehicle-mounted applications. "The ability of modern LEDs to efficiently produce intense light gives us tremendous design flexibility," says Bob Lieberman, President of IOS. "We could build LED incapacitator devices in any form – from a prison doorjamb to a riot control shield."

For more information on the PHaSR, visit www.kirtland.af.mil/shared/media/document/AFD-070404-043.pdf.

For more information on the LED-I, visit www.intopsys.com/nonlethal.html.

For more information on the DHS S&T TechSolutions program, go to www.firstresponder.gov.



THE RESPONDER KNOWLEDGE BASE

Product Reviews: RKB Connects First Responders to Share Feedback

First responders who explore products on the Responder Knowledge Base (RKB) may wish to review feedback from an individual who has experience with a particular device. This option is now available through a popular feature that allows first responders to request "user opinions" on various RKB products.

RKB does not publish user opinions on the Website. Instead, it enables users to directly contact one another offline. This option is available only to RKB users who are registered as first responders and have had their responder privileges validated. For all others, the feedback sharing option remains invisible on the RKB Website.

You will see a red "talking head" icon on the product search results page or product detail pages next to products for which user opinions have been filed.

On a product search results page, you can request an opinion about a particular product by clicking on the red talking head icon on the right side of the page.

On a product detail page, the talking head icon appears within the gray "Knowledge Links" box on the right side of the page. You can click on the link "Go to User Opinion Page" and choose from experienced users based on their mission role and general location. Please note that no first responders' names are provided.

To submit a question or a comment, you must first read and agree to a disclaimer by checking a box. You may then enter your question or comment, along with your contact information. Once you click "Submit," the RKB site will send the request directly to the individual selected. Note that this is an entirely automated system; RKB staff is not involved in this process.

3M™ FR-15-CBRN Canister - 3M

This canister is designed for first responder applications commonly found in law enforcement, fire and emergency response (paramedics) environments. 40mm DIN thread 5 year shelf life.



3M™ FR-7800B Full Facepiece - 3M

This 3M™ Full Facepiece FR-7800B is NIOSH approved with the 3M™ Canister FR-15-CBRN for use in CBRN environments (Cap 1). Also approved with the 3M™ Canister CP3N (CS/CN/P100) for tear gas exposure.



(RKB continued)

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Products
Respiratory Protection Equipment | CBRN APP

3M™ F9170008 Full Facepiece Respirator

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Information Provided by: 3M
Manufacturer: 3M
Model Number: 3M F9170008
Part/Model Number: not provided

Description: This product was developed specifically for first responders and features a low-profile design to improve comfort.

Features/Benefits:

- Facepiece is NIOSH-approved with 3M™ Cartridge F9118-CBRN (TC-140-0071).
- Also NIOSH-approved with 3M™ Cartridge 6000 for use with 6001, 6002, 6003, 6004 and all P100 filter (TC-140-0080) in use conditions, including those with benzene (not-CBRN).
- Lens meets ANSI Z87.1 standards, providing high-impact protection.
- This facepiece can be used for primary eye protection.
- Lens has optical correction providing no left-right visual distortion.
- Dual airway seal for added secure comfort.
- Heavy designed protection valve cover to help protect the valve against chemical agents.
- Cartridge can be rotated to either side of the facepiece to ensure proper seating.
- Available in small, medium or large.
- Hood provides security, safety and comfort for the user. F9118-CBRN Cartridge Manufacturer's Data Sheet lists a wide range of chemical warfare agents such as:
- Nerve agents: Tabun(TN), sarin(SB), soman(SB), VX.
- Mustard/Sulfur agents: H (HD), L.
- Toxic agents: CN, CG, CW, CC.
- Blood agents: hydrogen cyanide (HCN), cyanogen chloride (CCl), arsenic (AS).
- Choking agents: chlorine, phosgene, chlorophosgene (PC), and diphosgene/diphosgene (DP).

Knowledge Links

Related Links: [3M™ Respiratory Protection](#), [3M™ Respiratory Protection](#), [3M™ Respiratory Protection](#)

Related Assessments: [3M™ Respiratory Protection](#), [3M™ Respiratory Protection](#)

Related ADL/CDL Items: [3M™ Respiratory Protection](#), [3M™ Respiratory Protection](#)

Related Publications: [3M™ Respiratory Protection](#), [3M™ Respiratory Protection](#)

Registered first responders who have used a product may volunteer an opinion to RKB by clicking the “Volunteer User Opinion” link located above the “Knowledge Links” box. You will be asked to comment briefly on your experience with the product. Once you submit this information, an RKB staff member will contact you to verify your submission. Your mission role and geographical location will then be added to the list of opinion providers for that product. When another user requests your opinion, you will receive an e-mail with that person’s contact information.

The RKB user opinion process was designed in consultation with first responders, and it attempts to provide the maximum benefit to users while operating within the publication constraints of a government-funded Website. If you have any suggestions, comments, or questions regarding this or any other feature of RKB, please do not hesitate to contact RKB by e-mail at info@rkb.us or telephone at (703) 641-2078.