



Photo courtesy of ODF Optronics

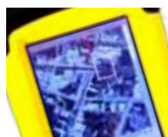
NEWSLETTER

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://FirstResponder.gov/Pages/NewsLetterPage.aspx?Newsletter=current>

THE BIG PICTURE

Wireless Communications System Helps Team Members Share Information

First responders on the scene of an emergency rely on shared information to form a “common operating picture.” This ensures all responders correctly understand the mission priorities and the realities of the situation which may impact responders’ ability to safely and effectively mitigate the incident. In an increasingly electronic world, the variety of devices on which responders receive and transmit critical, real-time information can make collaboration and communication difficult.



Photo courtesy of Drakontas LLC

With project funding from the Defense Advanced Research Projects Agency (DARPA), Drakontas LLC developed DragonForce, a situational awareness tool that allows first responders to communicate using both text and graphical data. The software application framework was first developed for military operations overseas before being deployed in public safety field trials through the U.S. Department of Justice, Office of Justice Programs, National Institute of Justice. Tactical field teams tested the software to ensure it achieved multi-agency requirements and that the devices could be operated intuitively by first responders.

More than a voice communications device, DragonForce is also a visual tool. It has a collaborative white board for sharing drawings and images, sensor and database information that link a number of platforms, and a global positioning system (GPS) tracking tool that will show the position of every team member using the software.

“If a SWAT team is responding to a barricaded subject or hostage incident, they can easily upload building floor plans via the mobile command

center, distribute them immediately to field personnel, and mark where each team member is to be positioned to ensure the safest and most effective response to that situation,” said Drakontas’ Michael Mitkus. “Everyone sees the common operating picture in real-time.”

DragonForce also employs shared imagery and data, which allows command staff to send out a mug shot of the suspect. This feature has led to a number of arrests on the campus of Drexel University in Philadelphia, which equipped its Public Safety personnel with DragonForce in 2005. The tool set also includes a camera for taking and sharing pictures on-scene.

Chief Charles Korman, of the New Kensington, Pennsylvania Police Department, used a number of the features during field tests in a mock school-shooting scenario in December 2007. “We used the floor plan of the school with the white boarding tool to direct and position officers,” Korman said. The high school had security cameras in hallways and classrooms, which the SWAT team was able to view in the field using DragonForce. “By using a local command post, we were able to tap into the live feed of the video cameras and take still shots of the suspects from the video to send to all the officers,” Korman added.

DragonForce also has a “quick-text” application, which allows more than twenty pre-typed messages to be recalled and sent as needed. Responders can pre-load standard phrases, graphical tools, and icons which can be selected from a drop down box to share the information quickly with other responders.

DragonForce is hardware and software agnostic, meaning users do not have to have a wireless network set up in advance. First responders can rapidly set up a secure,

(The Big Picture continued)

disruption-tolerant network using a BreadCrumb wireless network. A BreadCrumb network employs small, self-configuring, battery-operated wireless network nodes that link to nearby nodes automatically to form a robust wireless network. The nodes can be carried into an area by first responders and dropped to form a trail (much like the proverbial trail of breadcrumbs) that supports secure wireless network connectivity.

Drakontas is now in the middle of a major effort to put DragonForce onto cell phones, including Treo and Blackberry smart phones, and other everyday communications devices. Many of the software's features (e.g., text messaging) are available on other platforms, so most people know how to

use them, but the devices are not typically interoperable. DragonForce integrates the different data collection devices, such as sensors, cameras, and monitors into one information space, so that it is more interoperable than existing data and hardware streams. "One of the things we pride ourselves on is the intuitiveness of the interface, and we find training a new customer only takes 10 to 15 minutes," said James Sim, Drakontas' President and Chief Operating Officer.

For more information on DragonForce visit www.drakontas.com/products.html

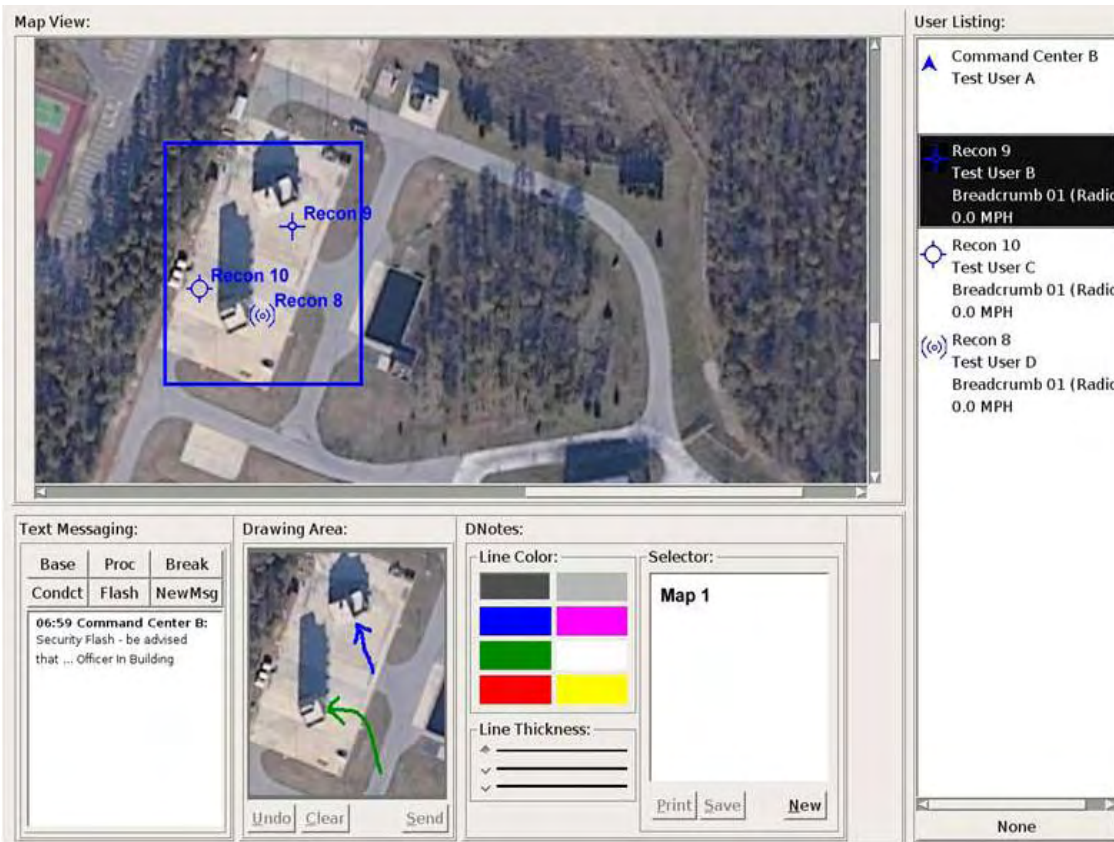


Photo courtesy of Drakontas LLC

ROLL YOUR EYES

New Surveillance Tool Gives Law Enforcement the Optical Advantage



Photo courtesy of ODF Optronics

Every day, law enforcement officers face potentially life-threatening situations, and the dangers of a barricade or hostage situation are magnified by the unknown. But new surveillance technologies are giving officers an extra set of eyes and providing real-time intelligence to lower their risk.

The Eye Ball R1 surveillance device contains an omni-directional camera and microphone and can be rolled, tossed, or thrown into a room to give law enforcement officers a 360-degree view of the scene. Encased in rubber for durability, the device is about the size of a baseball and weighs just over a pound. It transmits audio and streaming video to a handheld personal display unit up to 200 yards away, providing actionable intelligence to the operator in a safe, standoff location. It also has night-vision capability for limited visibility situations.

The concept for the device was first brought to the attention of the Department of Defense (DoD) Combating Terrorism Technology Support Office (CTTSO) Director Ed McCallum, by the former Commander of the U.S. Special Operations Command, who needed something soldiers could throw into a room, roll down a hallway, or use to clear a cave. CTTSO's mission is to provide counterterrorism capabilities to the DoD and to law enforcement

agencies. "Whether you're dealing with a terrorist or a criminal suspect with a gun — the missions of the military and other agencies may differ — but the tools they need are very much the same," said Mike Trexler, Acting Program Manager for CTTSO's Tactical Operations Subgroup (TOS) under the Technical Support Working Group (TSWG). Trexler, a former Special Forces operative whose father was a police officer, understands firsthand the need to share military technologies with law enforcement.

As part of its International Counterterrorism (CT) bilateral program, CTTSO consulted its partners in the War on Terror and found a similar interest in Israel. Funded by both the U.S. and Israeli governments, ODF Optronics developed a prototype of the Eye Ball R1. CTTSO provided a number of Eye Ball R1s for testing and training to its Interagency CT Tactical Users community, which includes U.S. Special Operations Forces, the U.S. Marine Corps, the U.S. Army Rapid Equipping Force, and Federal, tribal, state, and local law enforcement agencies. Eye Ball R1s have been deployed by tactical forces in real-world operations domestically and in Afghanistan and Iraq with impressive results.

Sheriff Sam Page of Rockingham County, North Carolina was among the first to test the device. "When the suspects know you're on the scene and the element of surprise [for a tactical entry] is gone, the last thing you want to do is stick any part of your body in the room," said Page.



Photo courtesy of ODF Optronics

(Roll Your Eyes continued)

Currently the wireless device is analog and runs in a digital band. The manufacturer did not make the Eye Ball R1 digital because it would have to be a much larger ball, making less likely that officers would carry it. The analog device also has a much longer battery life. The device fits on a duty belt, but also comes in a ruggedized case with accessories.

The versatility of the device was influenced largely by first responders who field-tested the Eye Ball R1. Sheriff Marshall McDonald of Oklahoma County, Oklahoma said his deputies often encounter suspects hiding in attics, and the only way his deputies could see inside — prior to the development of the Eye Ball R1 — was to enter head-first. He suggested that the device be modified to permit it to be screwed onto a pole to be used as a pole-cam. He also suggested clipping a nylon fishing line to the ball so it could be lowered into the center of a stairwell, allowing law enforcement officers to clear corners safely when chasing down a suspect. Both of Sheriff McDonald's ideas are now part of the test kit.

The developer of the Eye Ball R1 has incorporated a number of ideas for other uses for the ball from first responders in the field. When teams first started using the device, they threw the ball into a room and waited for a full revolution. When the room was cleared, they would go in and retrieve the ball. Clearing rooms on a long hallway takes a fairly long time, so ODF Optronics developed a door hook to hang the ball upside down, giving an immediate view of the room. A ball can also be mounted on a spike for long-term surveillance of a location.



Photo courtesy of ODF Optronics

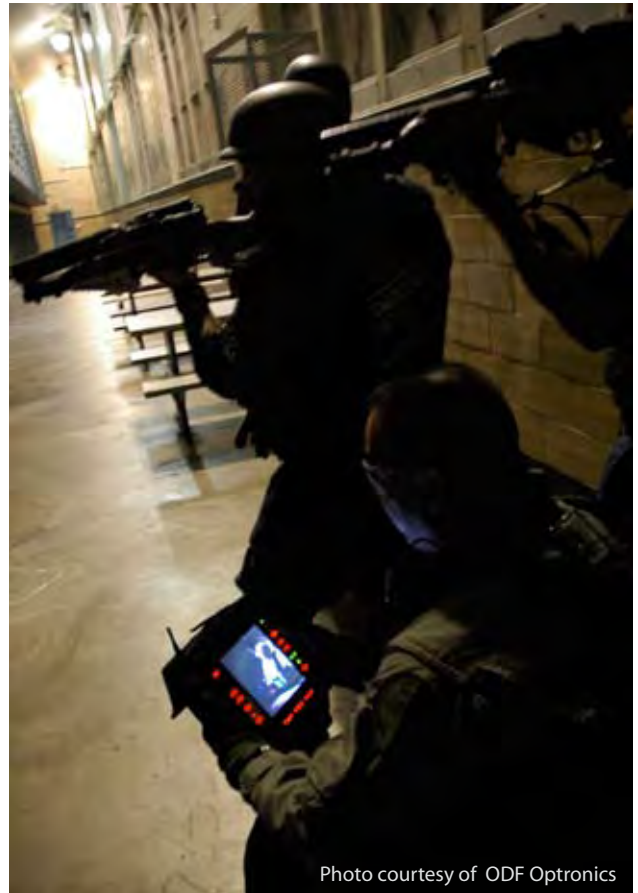


Photo courtesy of ODF Optronics

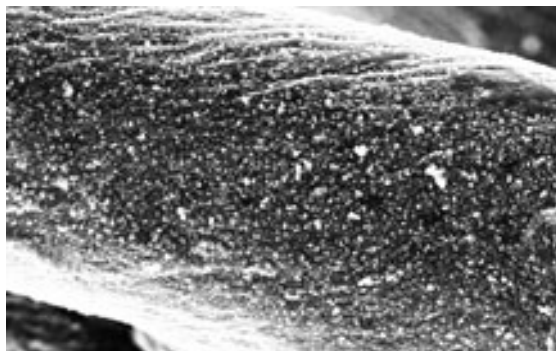
Operational improvements to the device are aggressively being pursued to increase its performance and tactical versatility. "In the next phase, we plan on making [the Eye Ball R1] digital to reduce interference and increase range, provided we can keep it the size of a baseball," said Trexler, who acknowledged that a small device is essential for tactical operators who already have a heavy load of operational gear. In the future, the Eye Ball R1 may also protect officers by incorporating sensors to detect hazardous chemicals.

For more information on the Eye Ball R1, visit www.odfopt.com.

Operational assessments for the Eye Ball R1 by the SAVER project and the National Tactical Officers' Association (NTOA) can be viewed on the Responder Knowledge Base (RKB) Website at www.rkb.us/contentdetail.cfm?content_id=81694 and www.rkb.us/contentdetail.cfm?content_id=193152.

DRESSED TO KILL

Microfiber Helps First Responders Fight Toxins



A scanning electron microscope image shows a cotton fiber with palladium nanoparticle coating.

Photos on this page courtesy of Hong Dong (post doctoral researcher) and Cornell University

The war against terror is being taken to the microscopic level. Researchers are now developing clothing containing fibers so small that they can alert first responders to hazardous substances, or even act as a barrier against chemical warfare agents or biological toxins.

The innovation of “smart” textiles is possible because of nano-fibers—fibers as small as one-billionth of a meter (the width of three or four atoms). Electrospinning, the process that creates nano-fibers, has been around since 1934, but researchers have recently modified nanotechnology to help keep first responders safe from chemical and biological hazards.

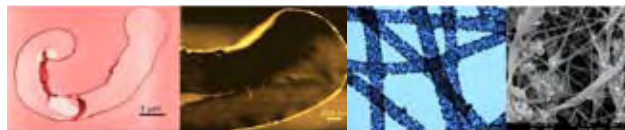


With funding from the National Science Foundation and the U.S. Department of Commerce, Dr. Juan Hinestroza of Cornell University created a fabric using a new approach of bonding metal nano-fibers to wool or cotton. The tiny metal fibers act to decompose harmful gases and organic compounds without increasing the weight or performance

characteristics of the fabric. “Because of the small size of the fibers, and the tiny electrical fields between them, we are able to capture particles in the 100- to 300-nanometer range,” says Dr. Hinestroza, “which happens to be the size of viruses and bacteria.” To view a sample of Dr. Hinestroza’s fabric, visit www.news.cornell.edu/stories/May07/nanofibers.fashion.aj.html.

Researchers at the Massachusetts Institute of Technology’s Institute of Soldiering Nanotechnologies, which is funded by the U.S. Army, took a different approach to protect first responders. They modified fabrics on the molecular level by anchoring a chain of hydrogen atoms to a nitrogen molecule that is attached to the clothing. Negatively charged bacteria are attracted to the positively charged nitrogen atoms and become impaled on the hydrogen molecules, which renders them harmless.

The challenge for the future is to make these technologies commercially viable, which is the goal of the Nonwovens Cooperative Research Center (NCRC) at North Carolina State University’s College of Textiles. Developed through funding from the National Science Foundation and the Army Research Office, NCRC has created a process to produce a one-piece chemical-biological protection suit and is now seeking a plan to produce it commercially. The process, called Robotic Fiber Assembly and Control, uses high-velocity air stream to produce thin filaments that form a fibrous web. The web is then applied directly to a mannequin, creating a custom-molded garment which does not have seams. Further



Transmission Electron Microscopy TEM images of cotton fibers coated with gold and palladium nanoparticles.

research into combining electrospinning technology with the process could reduce the weight of the suit and increase its ability to protect. Eventually, it may be possible to manufacture a high-strength, low-cost disposable suit that can be carried in a first responder’s pocket.

Nanotechnology has already been applied to make commercially available clothing more stain and wrinkle resistant. However, the potential applications of this amazing science have only begun to be explored. Billions of dollars are already committed to research of “smart” textiles, and this trend will likely continue in an effort to safeguard first responders and military personnel.



THE RESPONDER KNOWLEDGE BASE NEW FEATURE

Side-by-Side Comparison of Products

The Responder Knowledge Base (RKB) recently added a feature to enable users to compare similar products. This helpful tool allows users to differentiate among the attributes and specifications of up to three products of interest.

To perform an online comparison, visit the RKB homepage at www.rkb.us, and click on the "Products" tab to access a full list of RKB products. A menu of search results organized by product category will appear on the left side of the screen. Users can click on links for product categories, which are broken down into product types and subtypes.

For example, if you are interested in comparing respiratory protection equipment click on the first product category, "Personal Protective Equipment (PPE)," and then click the

expand button (the plus sign) beside the category to develop a list of product types. Choose the product type "Respiratory Protection Equipment," and click the expand button to reveal a list of subtypes. Clicking on the subtype, "CBRN SCBA/SAR," would list all the products of that subtype in the center of the screen. You can review product summaries and compare up to three products by checking the boxes next to the products and clicking any of the "Compare" links on the page (see screenshot.)

At the bottom-left side of the page there is a blue arrow next to the word "Logistical." Clicking this link will allow the user to reveal logistical data for the products being compared.

You may also use the RKB product comparison feature directly from individual product pages. On the right side of each product page, above the "Knowledge Links" box, is a small, red icon of a scale next to the word "Compare." Clicking this icon will take the user directly to a list of other products of that subtype. The product that was previously being viewed will already be checked. You may select up to two additional products for comparison and click the word "Compare" to view the results.



RKB developed its side-by-side product comparison feature in response to feedback from first responders. For more information, visit www.rkb.us. For questions or suggestions, please email RKB at info@rkb.us or call (703) 641-2078.