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NEWSLETTER

The Newsletter of the First Responder Technologies Program

Volume 2 • Issue 10 • October 2009

To contact R-Tech
E-mail: RTech@DHS.gov

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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>

HEALTH LINE ON THE SCENE

Portable Bioharness Measures First Responders' Vital Signs

In high-stress and hazardous situations, first responders have a hard time determining if they are at risk for dehydration, fatigue, or other dangers from overexertion. Stress and cardiac overexertion can lead to cardiac arrest, which is the principal cause of death for firefighters in the United States, according to the United States Fire Administration. As a result, when the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) released a report about the technology needs of first responders, personal physiological status monitors were listed as a top priority for 2009.

The Zephyr First Responder System (FRS 1000) is a new commercially available system that monitors the physiological and biomechanical conditions of first responders in real time. The system gives EMTs, firefighters, and incident commanders information to protect first responders' health and safety, as well as improve their work performance at an incident scene or while in training.

Previously, technology of this kind was not available in the field. According to Division Chief Jim Campbell of the Pike Township Fire Department in Indianapolis, Indiana, where field tests were conducted for Zephyr, incident commanders relied largely on verbal feedback from their crews. Campbell added, "Most departments now include some type of rudimentary medical monitoring such as a blood pressure check, but certainly nothing approaching what would be available through this technology."

The FRS 1000 was developed by Zephyr Technology Corporation under a contract funded by the Technical Support Working Group (TSWG). The system is designed to work with first responders' existing radio systems, including the Motorola XTS 1500/2500/5000, which eliminates the need for purchasing additional electronics. The system is designed for use by any first responder deployed to high-stress events, such as firefighters, hazmat teams, and Civil Support Teams (CSTs).



The FRS 1000 is interoperable with existing data radio equipment. It can monitor up to 16 first responders' health statistics on one screen; 64 total responders can be monitored across four tabbed screens. Photo courtesy of Zephyr Technology.

Steven Small, Vice President of Business Development and Sales at Zephyr Technology, explained that the physiological status sensor improves decision-making and remote triage. "It's designed so incident commanders have insight into the vital signs of their personnel," said Small. "If it looks like [personnel] are getting into trouble, they can get them out to rehab."

The system's sensors measure heart rate, breathing rate, and skin temperature. The FRS 1000 sensors also include accelerometers that measure first responders' postures and activity levels. Combining this data provides a meaningful picture of a responder's health status. Moreover, incident commanders can be alerted if a first responder is bent over, crouched, or inverted, as such distressed positions elevate heart and breathing rates.

Campbell reported, "Commanders can, in real time, better evaluate the workloads assigned to various crews and call

Health Line on the Scene (continued)

in additional resources based on the feedback they are receiving on crew members' heart rates, respiration rates, temperatures, and movements. No longer do we have to work crews past the point of total exhaustion and potentially compromise their safety due to the lack of medical monitoring while performing assigned fireground tasks."

The FRS 1000 sensors collect data about first responders' vital signs and immediately deliver it to incident commanders via the first responders' radios. The commanders can monitor up to sixty-four subjects simultaneously on software running on a laptop or personal digital assistant (PDA). The software presents easy-to-understand red/orange/green indicators to help commanders assess every team member's individual physiological status. According to TSWG, it also provides trend data, through a graphic user interface, to help determine responders' conditions that may include heat stress, fatigue, and trauma.

"The incident commander sees either green, which means the responder is fine, orange, which means they are getting close to the edge and should be watched, or red, which means really keep an eye on them," said Small. "For the firefighter, the FRS 1000 can provide the data to determine when they are recovered enough to go back into the fight. It can make the difference from being worked too hard and into light duty or the hospital, and going back into the action."

"After this technology is in place and people are comfortable with it, I see it likely changing the way we assign fireground tasks. It could be that after seeing several incidents we



Four first responders' heart and breathing rates are measured through the FRS 1000. Responder Bravo's statistics are shown to be in the orange, meaning he should be watched carefully for possible fatigue. Image courtesy of Zephyr Technology.

realize that it might be more effective to assign additional personnel to the fire attack line based on the physiological loads required of them," explained Campbell.

The FRS 1000 was developed with two designs: a chest strap, similar to a heart rate monitor, and a shirt with the sensor integrated into the fabric. Regardless of the format, the sensors have no external wires. The system is designed for comfort, unobtrusive wear, and quick deployment. Once the strap/transmitter is turned on, it communicates via a Bluetooth link with the first responder's radio.

Small said the system's range is the range of the responder group's radio system. While current designs of the FRS 1000 are compatible with the Motorola XTS 1500, 2500, and 5000 and the Thales MBITR, the product's design is being adapted to work with other data-capable radios.

For more information on the physiological monitoring system, visit www.zephyr-technology.com or www.tswg.gov/subgroups/tos/tactical-communications-systems/zephyr-physiology-monitoring-system.html?KeepThis=true&TB_iframe=true&height=500&width=600.



The FRS 1000 chest strap format is designed with no external wires. Photo courtesy of Zephyr Technology.

HANDHELD HISTORIES

Electronic Medical Records Provide Paramedics with Real-Time Patient Histories

Paramedics treating victims of a mass casualty incident have little time to determine whether a patient has previously diagnosed conditions that could affect treatment, but they need such detail to ensure patients receive the best care. For example, if a victim has diabetes or allergies, he or she might be a higher priority during triage. This information may also change the way their condition is treated.

To contend with potential mass incidents and even everyday ambulance runs, an electronic medical records system is providing patient histories in real time to paramedics and EMTs in the Indianapolis metropolitan area. For the first time, local EMTs and paramedics can carry handheld touch-screen computer tablets that allow them to access patient records from previous hospital visits or ambulance transports via a secured wireless network. As with all medical records, the patient's privacy is protected and only pertinent information is shared with authorized paramedics.



A computer tablet runs electronic patient care reporting software. Image courtesy of Medusa Medical Technologies, Inc.

EMTs and paramedics can gain access to more than fifteen emergency departments and more than thirty hospitals, giving them “a better picture of the whole patient medical record instead of what’s just right there in front of them,” said Tom Arkins, paramedic and Special Operations Manager with local hospital operator Wishard Health Services EMS.

Wishard Health Services teamed up with the Indiana University School of Medicine and the health research organization Regenstrief Institute, Inc. to compile a records database. With an Urban Areas Security Initiative (UASI) grant funded by the Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA), the partners built a system from the database for emergency responder use.

The \$5 million electronic medical records project distributed about 200 Panasonic Toughbook computer tablets to the local paramedics. EMTs and paramedics can review a patient's recent vital signs and labs in the field from this database, said Dr. Charles Miramonti, assistant professor of clinical emergency medicine and deputy medical director for Indiana University School of Medicine's division of out-of-hospital care. Additionally, the system will soon be able to display prior electrocardiograms.

The new system also improves upon previous recording practices, where paramedics had to take notes on paper, Arkins said. With the system, records can be organized, searched, and stored much more quickly and effectively. Another improvement from this system is that Indianapolis-area paramedics can now start entering information during a run before they even see a patient, said Dr. John T. Finnell, associate professor of emergency medicine at Indiana University School of Medicine and Regenstrief research scientist. The large buttons, graphics, and the touch-screen interface of the computer tablets make it easy to stay organized and document patient treatment.

The electronic patient care reporting and data management system has built-in security features. The Siren ePCR Suite software, developed by Medusa Medical Technologies, Inc., requires a paramedic to enter four data points – first name, last name, date of birth, and sex – to access a patient's history. If these

Handheld Histories (continued)

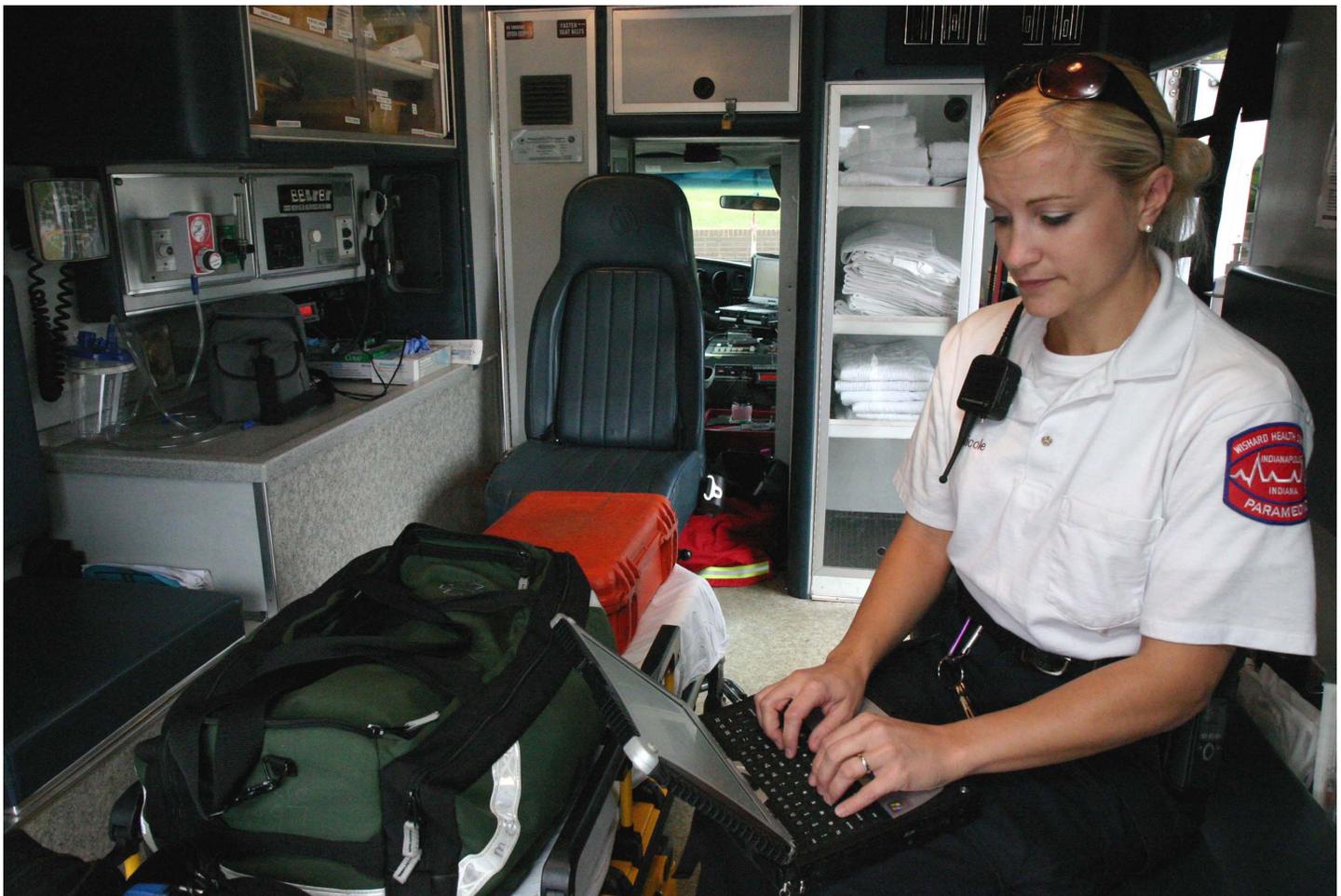
criteria are not met, if the data are not unique to a patient, if a patient does not have medical records, or if a patient is unconscious paramedics cannot access the patient's history.

Paramedics receive training in the system, but Arkins said it is easy to learn. "Functionally, if you can read and push a button, it's that simple to use," he said.

Medusa Medical Technologies and Indianapolis initiated the specialized patient care reporting and data management project five years ago, Arkins said. The Carmel and Fishers fire departments in suburban Indianapolis began testing the software in 2006. Wishard Health Services fully implemented the system in July 2009.

Indiana was the first state to share medical information from multiple sources this way. Medical recordkeeping systems can differ among hospitals, and sometimes non-compatible systems are used within a single hospital, said Dr. Finnell. The Indianapolis area system collects information in a format that paramedics, doctors, and other medical personnel can share. About 80 percent of the Indianapolis-area agencies and departments that agreed to adopt the system have gained access to the electronic patient records database, Arkins said.

For more information, visit www.wishard.edu or www.regenstrief.org.



A Wishard Health Services paramedic types notes on a computer tablet. Photo courtesy of Wishard Health Services.

AT YOUR FINGERTIPS

Arizona Police Have New Handheld Device that Accesses Crime Data

Police in southern Arizona have a new tool to fight crime, a technology that gives them instant access to vast amounts of crime data through commercially available smartphones: AZLink, an Internet-based law enforcement information sharing program. The project, launched in 2007, is a growing statewide initiative that was developed through funding from the U.S. Department of Homeland Security Science and Technology (DHS S&T) Directorate.

The AZLink program provides access to both state and federal law enforcement data as part of a collaborative information sharing effort among agencies. AZLink is partnered with DHS Immigration and Customs Enforcement (ICE) and the U.S. Department of Justice (DOJ).

The technology enables law enforcement personnel to find, access, and share information, such as mug shots and incident reports, from several law enforcement agencies, via their smartphones while still in the field. AZLink will soon progress to the point where users will be able to access information from across the country.

AZLink will connect to OneDOJ/N-Dex, a federal storage project for DOJ. OneDOJ stores information



Tucson officer accesses information provided by AZLink from his smartphone while in the field. Photo courtesy of Tucson Police Department.

for the Bureau of Prisons (BOP), the Drug Enforcement Administration (DEA), and the Federal Bureau of Investigation (FBI), as well as participating tribal, state, and local agencies. The project shares the information it stores with all of its partnering law enforcement agencies.

Before AZLink, officers could only access vital criminal data from police radios and computers located at their headquarters. The new system helps them exchange secure data through a public cell phone network, saving resources and time.

Bruce Baicar, manager of the project at the DHS S&T Command, Control and Interoperability Division (CID), said, "AZLink represents a significant step toward improving information sharing not only among emergency responders in Arizona, but nationwide. By working with state and local public safety to develop systems, our federal partners benefit as users of those systems."

James Wysocki, administrator of the information technology department in the Public Safety Division of the City of Tucson, has worked with Tucson Police Department users of AZLink. He said the program has considerably decreased the time spent on criminal investigations and removed jurisdictional limitations on the information that can be accessed.

"Since AZLink uses cellular telephone providers which have a national footprint, the officers, deputies, agents, detectives, and crime analysts of our member agencies can do their work anywhere in the United States," said Wysocki.

Wysocki also praised AZLink's ability to let users access its information nationwide and how it allows for investigating officers to not be limited in where they use the program. "AZLink has saved many work hours of effort, since our staff can do their work in the field," said Wysocki. "They don't have to go back to the substations or relocate their patrol cars to use their investigative systems."

AZLink Southern is administered by the Tucson Police Department. Officers in Tucson have said that pooling

At Your Fingertips (continued)

information resources has led to more and faster criminal arrests and successful prosecutions. In 2008, investigators in Tucson used smartphones to look up criminal histories and comb through police reports in real time, which allowed them to arrest both a murder suspect and several fraud suspects who might otherwise have eluded them. Officers in southern Arizona and ICE agents in the area have also used the system to access maps and aerial photographs to assist their investigations.

“The technology is very beneficial. [Criminal justice agents] don’t have to depend on having access to a police department-provided data signal to use computer systems. This means officers can be anywhere their PDAs [personal digital assistants] receive a cellular data signal,” said Wysocki.

According to ICE Senior Special Agent Timothy Westlove, AZLink also played a critical role in protecting officer safety in an ICE investigation in Tucson. ICE agents investigating a suspected marijuana smuggling ring used AZLink to determine that individuals involved in the investigation had a history of weapons possession and violence. Forewarned by this information, ICE deployed the Tucson Special Response Team to serve a high-risk warrant, and agents recovered numerous weapons, more than 1,000 pounds of marijuana, and \$21,000 in cash.

Based on the technology’s performance in various trials, including one at the 2008 Fiesta Bowl in Glendale,



Tucson officer uses AZLink to check a suspect’s background. Photo courtesy of Tucson Police Department.

Arizona, DHS S&T provided more than 200 AZLink-enabled wireless devices to around 20 law enforcement units at the federal, tribal, state, and local levels throughout Arizona. Baicar noted that law enforcement agencies in other states also want to be connected to AZLink or a similar product.

The project is considering expanding the mobile devices using AZLink to next-generation PDAs or Netbook laptop computers. Baicar said that the new generation of PDAs and Netbooks can provide and capture detailed imagery and video to assist all incident responders on the scene.

For additional information on the Tucson Police Department, visit <http://tpdinternet.tucsonaz.gov>. For more information on the Arizona Counter Terrorism Information Center, visit <http://cid.dps.state.az.us>.

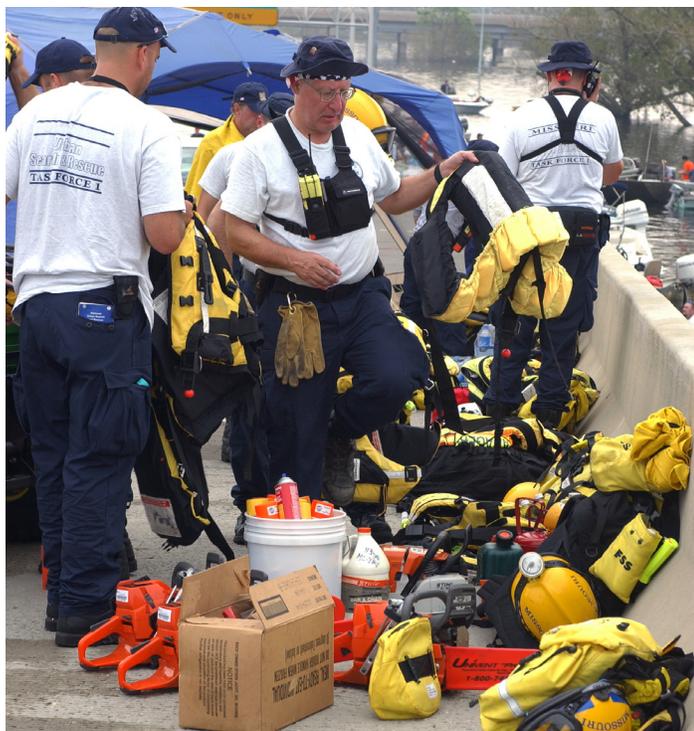


THE RESPONDER KNOWLEDGE BASE

PPE Section Updates

The Responder Knowledge Base (RKB), located at www.rkb.us, provides an enormous amount of information to the emergency response community. The largest section of the Website, the Products Module, contains information about equipment marketed towards first responders. Responders and equipment purchasers can visit RKB to view commercially available equipment via this single source, saving time.

Containing over 1,600 product records, the personal protective equipment (PPE) product category is particularly popular and is continually monitored for accuracy. Subcategories of the PPE section include ensembles, respiratory protection equipment, explosive ordnance disposal (EOD), water operations, body armor, and other clothing items.



New Orleans, LA, 2005 - Members of the FEMA Urban Search and Rescue task force prepare their gear prior to going into areas impacted by Hurricane Katrina. Photo courtesy of FEMA Photo Library.



Baton Rouge, LA, 2005 - Emergency Medical Technician personnel undergo response and rescue training similar to that undergone by teams cleaning up chemical and other hazmat spills caused by Hurricanes Katrina and Rita. Photo courtesy of FEMA Photo Library.

RKB recently reorganized its PPE ensembles subcategory to be categorized by certification, allowing users to identify more easily what ensembles meet particular certifications. The reorganization also includes clear references to the appropriate year for each certification (e.g., National Fire Protection Association (NFPA) 1971, NFPA 1991, NFPA 1992, or NFPA 1994).

Other product categories on RKB include operational and urban search and rescue equipment, information technology, communications, detection, decontamination, medical equipment, and more.

For more information, please visit www.rkb.us. For questions or suggestions, please e-mail the RKB at RKBMailbox@us.saic.com, or call 1-877-FEMA-RKB (1-877-336-2752).

The screenshot shows the FEMA Responder Knowledge Base website. The top navigation bar includes "Home", "Products", "FEMA Preparedness Grants & AEL", "Other Grants", "SEL & Integrated Display", "SAVER", "Other Content", and "News Archive". A search bar is located in the top right corner. The main content area is titled "Products" and shows a search result for "Personal Protective Equipment (PPE) (1597)". The results are listed in a table with columns for "Title" and "Display". The table lists several PPE ensembles, including "Ensemble: CRI Frontliner Protection Coverall (NFPA 1994-2001, Class 3)", "Ensemble: Blauer HZ9420 Multi-threat Suit (NFPA 1994-2007, Class 2)", and "Ensemble: DTAPS® Non-Encapsulating Level B Coverall (NFPA 1994-2001, Class 2)".