

TechBeat November/December 2014

The following stories are from the November/December 2014 issue of *e-TechBeat*, the newsmagazine of the National Law Enforcement and Corrections Technology Center System, a program of the National Institute of Justice under Cooperative Agreement #2010-MU-MU-K020 awarded by the U.S. Department of Justice.

Analyses of test results do not represent product approval or endorsement by the National Institute of Justice, U.S. Department of Justice; the National Institute of Standards and Technology, U.S. Department of Commerce; or Lockheed Martin. Points of view or opinions contained within this document are those of the authors and do not necessarily represent the official position or policies of the U.S. Department of Justice.

The National Institute of Justice is a component of the Office of Justice Programs, which also includes the Bureau of Justice Assistance; the Bureau of Justice Statistics; the Office for Victims of Crime; the Office of Juvenile Justice and Delinquency Prevention; and the Office of Sex Offender Sentencing, Monitoring, Apprehending, Registering, and Tracking.

Body Armor for Female Officers: What's Next?

By Michele Coppola

Body armor for law enforcement and corrections officers should provide a balance of protection and comfort. For both men and women, if body armor does not fit correctly and provide adequate coverage, it can affect safety and effectiveness. Designing and building armor for female officers can present issues of particular concern.

The National Institute of Justice (NIJ) is in the process of updating its standards for stab-resistant and ballistic-resistant body armor. How to ensure that female-designated models of body armor provide adequate protection is a primary concern for both the stab-resistant and ballistic-resistant standards revision efforts.

NIJ develops standards using Special Technical Committees (STCs), which bring together law enforcement or corrections practitioners and technical experts. Members of these committees are investigating how best to improve testing of body armor for women in the revised standards, as design of female-designated armor continues to evolve.

Soft body armors designated as female differ from male and gender-neutral vests in that they can incorporate curved or shaped protective panels to accommodate the female bust. Flat male or gender-neutral models may be suitable for female officers with smaller busts. Depending on design and materials, they may not be suitable for those with larger busts, as the busts push the front armor panel forward, enlarging the underarm gap and therefore lessening the area of coverage between the front and rear panels.

Manufacturers have a variety of methods available to them to create bust cups, including cutting and stitching the material, or darting the material to form bust cups. When a ballistic-resistant female-designated armor model is tested, the laboratory is instructed to locate the seams or other areas of potential weakness that may be created by folding and/or stitching the material to make the bust cup, and to place one of the shots on that seam. This is done to ensure the formation of the bust shape does not introduce weaknesses into the vest, and that the shaped vest continues to provide the minimum level of protection required. Types and styles of female-designated vests vary, as do ways of fitting vests to accommodate the various sizes and shapes needed for female officers. Some manufacturers have developed methods which 'mold' the bust cups into the material, negating the need for cutting and stitching to create a bust cup. These armors are also subjected to additional testing to ensure that the molding process does not introduce vulnerabilities in the armor. (Adapted from http://ojp.gov/bvpbasi/bvpfaqs_vestseligibility_15.htm.)

“The original test methods for body armor were designed around a flat torso, and obviously the female anatomy is different from that. Body armor designed for female officers incorporate unique seams and folds that aren't present in male body armor models. We would like to investigate the role these differences play in determining the performance of a vest,” explains David Otterson, a materials engineer with NIJ's National Law Enforcement and Corrections Technology Center (NLECTC), which administers the NIJ body armor Compliance Testing

Program. At the request of NIJ, NLECTC began investigating how a test might be conducted for the bust area.

“Designing, manufacturing and testing female-specific body armors presents a complex technical challenge, for example, a material that works perfectly well as a flat armor may not perform well when subjected to folding, cutting, stitching or even changes in the stresses in the materials as it is shaped to provide protection,” says Daniel Longhurst, a mechanical engineer with NLECTC who is coordinating the effort to revise the NIJ stab-resistant and ballistic-resistant body armor standards.

“Additionally, there are comfort factors that impact the wearability of armor, and if an armor is uncomfortable, it is less likely to be worn, leaving the officer unprotected,” Longhurst adds. “For both ballistic- and stab-resistant armors, the STCs are investigating ways of accurately and consistently testing female armors. Once the baseline performance and test requirements are established, the armor industry will be able to focus their design efforts in providing safe and comfortable armors for female officers.”

Currently, female-designated ballistic-resistant armor is either tested flat or with clay built up behind the bust area of the armor. NLECTC staff have been researching and experimenting using alternative methods of supporting the female armor during both ballistic-resistant and stab-resistant testing as a possible way to better represent the female form. Staff have investigated several possible materials including silicone; clay; foam; ballistic gelatin; and Perma-Gel™, which is a synthetic ballistic gelatin. Research is also being done on sizing criteria to define the appropriate size and shapes to possibly be used in testing; however, more research is needed.

“The existing testing methods can lead to inconsistencies in how laboratories prepare the female front armor panel for testing,” says Debra Stoe, NIJ standards policy advisor. “Depending on the size of the armor, sometimes armor is pressed flat or tested with clay built up in the bust area. Because of anatomical differences, we have specific areas of concern, but we don’t have data. We need to look at what is the short-term and long-term impact of being shot in the breast area.”

Data collection is needed to determine the differences in testing for female-designated armor among laboratories. Also, in ballistic-resistant armor testing, backface deformation (BFD) is the measurement on the indent in a clay backing material when a bullet that does not penetrate a vest makes an impression on the clay. BFD testing of very small panels of armors, as well as whether the amount of allowed deformation should be different for the breast area, could be areas for study.

“Investigating the impact of ballistic backface deformation in the bust area is a research topic that has had limited research, and we are looking at existing research and exploring other areas, including the international armor research community, to try and leverage available funding to investigate this area further,” Longhurst says. “I would like to see future research in this area to give a greater understanding of BFD on the bust area, specifically, what level of BFD injury must we protect against? Currently, depending on shot location, a BFD injury can be anything from reddening and bruising to lacerations and necrosis of tissue. By engaging with the international community and utilizing an advisory panel being established by Debra Stoe, we

hope to be able to answer some of these questions and develop testing methodology that serves the needs and requirements of female armor wearers.”

Armor designated as female could be tested to male armor requirements to gauge baseline performance, with additional testing in the bust area to ensure confidence that the armor continues to work in areas where it has been changed to accommodate the female form.

“The idea is to use a supplemental test technique to ensure that when rounds impact areas of the female anatomy that they have the same level of protection as existing male armors, but when striking the bust area, we want to make sure that we provide a more biofidelic test method that specifically addresses the unique female anatomy,” Otterson says.

Estimates of the number of female law enforcement officers in the U.S. vary between about 12 and 20 percent. In discussions, body armor issues expressed by some female officers include improper fit, riding up or shifting out of place, skin abrasions, bust cups too large and bust cups too small. For men and women, armor that is too long and rides up is a problem as well as armor that is too short. To protect the sides of the torso, the ballistic vest should be worn with the front panel overlapping the rear panel, and NIJ recommends an overlap of approximately two inches front to back.

“The coverage of armors is of key concern, and armor that is too small leaves areas such as the shoulder blade, armpit, sides and waistline vulnerable; armor that is too big is uncomfortable, rides up and could restrict access to an officer’s weapon,” Longhurst says. “We want to avoid both of these potentially life-threatening situations.”

Improvements have been made in body armor for women, but more needs to be done. The protection levels and test threats will be the same for armor for female officers as for male officers. The challenge is fit and testing.

“I think many times female officers are asked if they prefer male or gender-neutral vests and they said yes because they don’t have female-designated armor that is comfortable and fits right,” Stoe says. “There are not enough female designs out there to address the need. A standard should be based on requirements, which are based on need, and the needs of the female officers in law enforcement are not being addressed sufficiently.”

In addition to the STC activity, NIJ has held workshops focused on concerns surrounding armor worn by female officers in an effort to identify issues that can be addressed in the short-term and issues that require long-term study. NIJ, in coordination with its sister agency the Bureau of Justice Assistance, is exploring forming an advisory panel to guide research, development, testing and standards for ballistic-resistant body armor worn by female officers. The advisory panel would include representatives of federal agencies and nonfederal organizations that can inform the process.

ASTM Body Armor Standards Efforts

Body armor manufacturers do not measure wearers in the same way; much like clothing manufacturers, not all small or medium sizes are the same. ASTM International developed a standard that provides measurement guidance to assist in fitting ballistic-resistant body armor and stab-resistant body armor covering the torso. The aim of *ASTM E2902-12 Standard Practice for the Measurement of Body Armor Wearers*, published in 2012, is to facilitate consistency of measurement across the body armor industry and help wearers understand proper measurement.

The document addresses measurements for concealable (normal duty) and tactical (special duty) armor for both male and female wearers. It does not address area of coverage (how much of the torso is covered by the vest). ASTM is working on other body-armor related standards, including a follow-up effort to the measurement standard to address measurement and fitting of body armor; body armor terminology; and a standard specification for the clay backing material used in ballistic-resistant armor testing.

“What ASTM is providing us with is an opportunity to breakdown the very complex body armor standard into separate test methods and components that will be looked at independently, and then NIJ will have the ability to pull these independent components together,” Stoe says. “The advantage of these smaller, separate test methods is that they can be adopted by a number of different standards, such as the Department of Defense or NIJ, but the process remains the same, and this results in developing better and more consistent testing practices within laboratories, resulting in more robust and repeatable body armor standards. The ASTM effort will have a huge impact.”

For more information, contact Debra Stoe, NIJ standards policy advisor, at debra.stoe@usdoj.gov. For general information on NIJ's standards and testing program, contact Mike O'Shea, NIJ senior law enforcement program manager, at michael.oshea@usdoj.gov.

SAVER Program Assesses Equipment for First Responders

By Michele Coppola

First responders pondering what equipment to buy can turn to the U.S. Department of Homeland Security (DHS) SAVER Program, an online resource that can inform purchasing decisions on myriad types of emergency response products.

“SAVER exists to provide information to first responders on commercial off-the-shelf technologies,” says Brian Warner, SAVER program manager.

The SAVER, or System Assessment and Validation for Emergency Responders program, comes under the First Responders Group of the DHS Science and Technology Directorate. The Web-based information service operates with no cost to users.

The program tests and evaluates commercially available equipment that falls under DHS Authorized Equipment List categories, such as information technology; medical; personal protective equipment; decontamination; explosives device mitigation and remediation equipment; and chemical, biological, radiological, nuclear and explosives (CBRNE) operational and search and rescue equipment.

Examples of the specific types of equipment for which information is available include automated vehicle location systems, tactical goggles, ballistic shields, portable x-ray systems for suspicious package screening, multi-casualty incident kits, and mobile x-ray systems for search and inspection.

Performance Evaluation Process

The process begins with a focus group composed of first responders experienced in a specific discipline or technology to discuss what they need. The budget for the program fluctuates from year to year and is currently about \$3 million, according to Kathleen Higgins, SAVER program director. The program prioritizes projects each fiscal year based on needs and requirements expressed by first responders. Evaluation criteria include usability, maintainability, capability, affordability and deployability. The focus group also provides information on operational scenarios for the equipment.

“The focus groups generate responder input to define the functionality and equipment they need to do their job,” Higgins says. “So we then research what is out there and also send out a request for information and ask if anyone has equipment that meets the stated requirements. Manufacturers get back to us and that forms our market survey.”

Market survey reports list manufacturers, contact information and significant technical characteristics.

“We can take a snapshot in time of what is in the marketplace and what meets the current criteria,” Warner says. “We then compare the available technologies against what the first

responder expectations were. We are not verifying vendors' claims or making quantitative measurements. We look at whether the expectations of the first responders were met or exceeded, and then we produce an assessment report."

Assessment reports can include a comparative analysis of tested equipment, based on focus group criteria; an overview of tests conducted; results; and weighted scores.

"Products are evaluated according to the performance requirements defined and the operational needs expressed during the initial focus group," Higgins says. "It's like a *Consumer Reports* for responder gear. I attended one assessment and the response of the first responders was phenomenal, and they saw the value of the effort they were part of."

"We get a budget, prioritize our projects, and hand the projects to technical agents to execute. We also have a SAVER program support office that provides the administrative backbone of the program," Warner says.

The technical agents coordinate, set up and carry out the evaluations and write various documents related to the technologies. The agents also provide recommendations on which projects to evaluate, and priorities are determined with the help of two user groups, the First Responder Resource Group and the Interagency Board (IAB).

In addition to assessment reports, the program includes a number of other informational publications, such as technical reports, application notes, and handbooks, which go in-depth into the technology. Summary documents, such as highlights, are also available.

SAVER documents are available on the program's website at <http://www.firstresponder.gov/SitePages/Saver/AboutSaver.aspx>. If the information is sensitive, users will be directed to a secure site that will require a login, and users will need to be with a state, local, federal or tribal first responder agency with a .mil or .gov email to gain access. About 1,000 documents are currently available.

The SAVER program will not perform an assessment on a technology that is being produced by only one manufacturer. The technology has to be commercially available and there needs to be at least two, and preferably three, companies that make the equipment in a particular category, according to Warner.

Because technologies and requirements continuously evolve, the program leaders would like to reassess some equipment every two years, but that is not always financially feasible.

"If future funding allows, we would also like to evaluate emerging technologies in addition to what is already available on the market," Warner says.

For more information, visit <http://www.firstresponder.gov/SitePages/Saver/AboutSaver.aspx>, or email saver@hq.dhs.gov.

Online Certification Takes Training “Off the Road”

By Becky Lewis

No more one-week sessions on the road, living out of a suitcase. No more packing up extensive and expensive training equipment. No more manually correcting exams. Not since Minnesota has converted its Breath Alcohol Certification (BrAC) training to an online system, thanks to assistance from a program funded by the National Institute of Justice (NIJ).

Using funding from NIJ, the research, development and evaluation agency of the U.S. Department of Justice, RTI International developed the original concepts for the online training and then customized training for several states, starting with New Hampshire in 2009. Additional NIJ support allowed for several more states to receive the training.

Dr. Peter Stout, senior research forensic scientist, explains that every state has legislated regulations for officers conducting breath testing analysis.

“It’s one of the few areas in the forensic sciences where there is a widespread licensure framework,” Stout says. “There are an estimated 100,000 to 200,000 certified officers in the United States, and probably 50,000 need recertification or recurring training every year. States go about this in various ways, but they all share the challenge of getting people to the training, or training to the people.”

By creating the capability for online recertification, the program helps states implement their training in a more cost-effective manner.

“Take a big state like Arizona. Officers are very spread out geographically and there’s a lot of cost involved in getting an officer to Phoenix,” Stout says. “You have to think about hotels, overtime, all of that.”

The online training packages mirror the basics of onsite training. There’s a lecture component that covers changes in procedures and the law, an assessment test and a practical demonstration of instrument usage. Stout says the practical demonstration “was the part we really had to work on developing, creating something close enough to reality so that it is an effective tool for online delivery.”

Each state training package follows the same framework, he says, but with each subsequent iteration, the simulated instrument test became more complex. Staci Bennett, forensic science supervisor for the Toxicology Section and Calibration Laboratory of the Minnesota Bureau of Criminal Apprehension’s Forensic Science Laboratory, says the programming and the simulations are effective and efficient.

“Before, officers had to come to our lab for training, or several times a year, we packed up all of our instruments and left the office for a week to do training in a regional location,” Bennett says. “Either way, officers had to travel and their departments had the expense of paying for lodging,

per diem and overtime to cover for them. We believe the savings involved for Minnesota law enforcement agencies outweigh the development and ongoing maintenance fees.”

Stout says the savings is a difficult concept for states “to get their hands around. A lot of the cost for training is on the agency, and it can be difficult for a state to grasp its full scope. But if you stop and think about it, if you can get an officer to do this online and not take up staff time, it obviously costs the state less too.”

Initial certification in Minnesota does continue to take up staff time, as it involves a three-day class, with approximately half the training time spent doing hands-on work. The state recertifies operators on a two-year cycle, and in-person recertification training takes a half-day. The online training also takes about the same amount of time, but can be done at the officer’s convenience.

“We spent a lot of time on the workflow, not only on whether they can stop and start at their convenience, but how many times do they get to give a wrong answer. Is it just once and you’re done? What do you do with people who fail, and you will have people who fail,” Stout says. “The design is so much more than just the content, and we also want to make the end user experience easy, from registration until finish. You need to have customer support in place for the challenges, because there will be challenges.”

New Hampshire, as the first state to launch the training program, has the most experience in dealing with those challenges, but according to Nancy Mobile of the New Hampshire State Police Forensic Lab, the challenges that have come up have been handled by the developer, working in conjunction with the state.

“We expand this course just about every year,” Mobile says. “When we started, the ‘practical’ portion was slides with questions. Now it’s a two-dimensional demo, and we’re working toward three-dimensional practical training.”

New Hampshire has fewer than 2,000 certified operators, all of whom must be recertified annually. Mobile says that in the first year of the project, approximately 10 to 20 percent of officers took online training rather than travel to Concord for face-to-face instruction. Now, 75 to 80 percent of operators prefer the online alternative.

“Departments are pushing the online training because it’s such a savings to them in gas and time,” Mobile says. “As for the state, we’ve been able to eliminate in-person training sessions and realize some cost-savings that way.”

Stout says, “Our goal is to try to find ways to save states money and get the training out there for the end user. Every state has budget problems, and we can help by leveraging high-quality training and getting it out there.”

For more information on the online BrAC training project, contact Dr. Peter Stout at (919) 316-3450 or email pstout@rti.org. For more information on NIJ’s forensics technology portfolio, contact Gerald LaPorte, Director, Office of Investigative and Forensic Sciences, at Gerald.LaPorte@usdoj.gov.

Utah Agency Converts Former Military Vehicle for Use as Ambulance

By Ron Pierce and Becky Lewis

Utah's Salt Lake County, an area that encompasses highly congested urban stretches, rural mountain terrain and everything in between, can now provide rescue and medical assistance in any of those areas by using its specialized extreme emergency ambulance.

Converted from a surplus mine-resistant ambush protected (MRAP) vehicle obtained through the U.S. Department of Defense 1033 Excess Property Program, the ambulance has been completely demilitarized, and the Unified Police Department of Greater Salt Lake and the Unified Fire Authority of Salt Lake County have no plans to use it for tactical purposes.

“Our tactical element already has vehicles for team movement,” says Salt Lake County Sheriff James Winder. “The purpose of this vehicle really is to be able to go into any location, locate victims, get them inside the vehicle and then begin to treat them.”

The Greater Salt Lake Valley encompasses 247 square miles of extremely variable terrain that includes both municipal and unincorporated areas, and is populated by approximately 450,000 people, factors that can combine to create numerous challenges for first responders. Winder explains that in order to prepare the former MRAP for its new purpose, the county removed elements not needed for its civilian application; gave it a new look with a makeover paint job; added an extensive lighting package, a backup camera and beeper; and refurbished the gutted interior with medical equipment.

“The purpose of this vehicle is not to be subtle. It is to be very obvious,” Winder says. “When it arrives at a scene, we want people to recognize it as a rescue vehicle and be drawn to it.”

“Usually, the faster we can get to victims, the better the outcome in a trauma situation,” says Unified Fire Authority Chief Michael Jensen. “Getting in as fast as we can, while still keeping our personnel in a safe environment, has been key in developing this partnership with the Unified Police Department. Because of its nature, we can get into areas we’ve never been able to get into before. We’ll be able to get victims out of a warm zone and get them the care they need.”

A warm zone is the area where a potential threat exists, but the threat is not direct or immediate. Examples of this are an unknown location of suspects in a given area already cleared, and an area near, but not directly exposed to, hazardous material from a spill.

“Current emergency operational guidelines do not allow for a normal ambulance or fire truck to enter a warm zone where officers believe the potential for an active threat still exists,” says Mike O’Shea, senior law enforcement program manager at the National Institute of Justice. “This means that injured people might not receive the timely treatment that they might need. This vehicle allows rescuers the ability to enter such an area to retrieve injured people for treatment.”

The two agencies worked together closely to design the vehicle’s new look and equipment package, which includes a complete communications array, two biomedical emergency litters,

and cardiac and trauma equipment. When those costs are added to the fee for transporting it from Denver on a flatbed trailer, the total expense to the residents of Salt Lake County came to only around \$24,000. That's in part because local businesses Unique Auto Body, HG2 Emergency Lighting and VLS all donated time and materials to the project. The former MRAP itself cost nothing.

“We recognize that the taxpayers of Salt Lake County have contributed significant funds to support operations abroad, and now the military is decommissioning some of these vehicles for conversion to civilian use,” Winder says. “So why would we not take an essentially free asset and convert it into a civilian function? I think the citizens of this county realize that a \$24,000 investment is worth it to save lives.”

Part of converting the vehicle to civilian use involved developing response protocols, which include using regular duty fire personnel, not tactical medical staff, for emergency response, with a firefighter driver as well. Smaller municipal agencies located within the response area may also request access and have developed their own callout procedures.

The two lead agencies also worked together on a planned publicity approach to deal with the misperceptions that often surround the use of former military equipment, an approach that included presentations to specific community groups and area political leaders.

“One of the big mistakes that municipalities often make is to deploy former military equipment without communicating with the community,” Winder says. “This is a piece of equipment that is designed to save citizens’ lives. Once they understand that, I believe they will embrace that and they will appreciate it.”

For more information on Salt Lake County’s conversion project and its use of the emergency ambulance, contact Salt Lake County Sheriff James M. Winder at (385) 468-9901 or United Fire Authority Chief Michael Jensen at (801) 743-7200.

Protecting K-9 Partners

By Michele Coppola

Like their human counterparts, police K-9s can face great risks on the job. The dogs sniff out suspects, explosives and drugs; track down missing persons; search buildings; chase down criminals; and protect their handlers. Their presence can be a deterrent to crime.

Depending on a canine's duties, a handler can feel the need to provide a dog with protective gear. Desired features for protective vests for K-9 are similar to those of their handlers: comfort, proper fit, ease of movement, breathability and manageable weight. Coverage can include a dog's vital organs, back, spine and chest. The cost of a vest can vary depending on quality, material, protection level and weight.

According to data extracted from information provided by the United States Police Canine Association, in the U.S., five K-9s died from hostile gunfire in 2013 and one from stab wounds. As of July 2014, five more died from hostile gunfire and one from stab wounds. Other causes of K-9 line-of-duty deaths included vehicle crashes.

Often, law enforcement agencies don't have funds to purchase protective gear for their canine members. Sources of financing can include fundraising drives, grants, and donations from organizations and private citizens.

Police officers seeking protective vests for their K-9 partners at no cost can find help with the click of a computer mouse. An online search can produce a number of groups that can help, some founded by police officers and others by private citizens. Two examples of organizations that facilitate obtaining protective vests for police dogs are Vested Interest in K9s, Inc. and the Capital K-9 Association.

Vested Interest in K9s, Inc.

Vested Interest in K9s, Inc. is a nonprofit fundraising organization that donates protective vests for police dogs across the United States. Through a network of volunteers, officers seeking vests for their K-9 partners are paired with corporate or private sponsors that pay for the protective gear, each of which cost \$950. The organization provides vests the manufacturer says provide stab and ballistic protection.

The organization, located in East Taunton, Mass., was incorporated in 2009 as a 501(c)(3) charity. The group's founder and president, Sandy Marcal, is a self-described longtime animal lover devoted fulltime to the organization.

"No one is in law enforcement in my family, I just happen to love animals," says Marcal, who began working as a volunteer to benefit police dogs in 2000, then formed the organization to help raise money for vests. Initially focused on police dogs in Massachusetts, the organization now provides K-9 vests to agencies nationwide.

“Donations come from either corporations or private sponsors,” Marcal says. “People feel very strongly. They just want to help. They contact us about fundraising or making a donation. We have over 100 volunteers across the U.S. who locate dogs needing vests. We help to match up the need for a vest with a sponsor in an area.”

Since 2009, the organization has provided more than 1,000 vests to agencies. The organization will advise interested groups or individuals on how to go about fundraising.

Officers interested in obtaining a K-9 vest first need to fill out online paperwork on the organization’s website, <http://www.vik9s.org/>, to establish if they meet the following three criteria: the K-9 must be actively employed in the United States, certified, and at least 19 months old. Marcal explained that 19 months is when a dog is considered fully grown. The vests are made to order, so a dog must be finished growing before a vest is fitted.

If they meet the criteria, the officer is given an application to fill out. Receipt of a vest is dependent on completion of the application and available funding. The application does not guarantee a K-9 vest will be awarded. If a K-9 currently has a vest, an application may be submitted once the vest is out of date. To date, all applicants with qualifying K-9s have been provided with a vest.

When Ptl. Brian Berdine of the Johnson City Police Department in New York needed a protective vest for his 8-year-old K-9 partner C.J., he turned to Vested Interest in K9s after doing some research.

“From the time I inquired to the time I was told I was going to get a vest was only about one week,” Berdine says. “It was a very quick turnaround time.”

Delivery of the vest took about six weeks because the vest was custom fitted. C.J., a Dutch Shepherd, began wearing his vest in March 2013. Berdine has also assisted other law enforcement agencies obtain vests for their K-9s.

“The dogs are the frontline and will come in close contact with whatever we come across,” Berdine says. “The vests can also be helpful in tracking missions. My dog was going through a brush pile and the vest protected him from sticks and other things. It’s great all-around protection for dogs.”

To learn more about the vest program, go to <http://www.vik9s.org/> or contact Sandy Marcal at (508) 824-6978.

Capital K-9 Association

Officer Michael Lucchesi is a K-9 officer with the Trenton Police Department and vice president of the Capital K-9 Association, which he helped found in 2011.

“The city could not afford to buy vests for our dogs so our unit decided we were probably not the only K-9 unit struggling so we began the Capital K-9 Association. We sat down with the city and

the city agreed to cover half the expenses and the association covered the other half to buy vests for the Trenton K-9s,” Lucchesi says.

The Trenton unit purchased K-9 vests the manufacturer says are stab and ballistic resistant. The group raises money to purchase K-9 vests for other law enforcement agencies through a variety of fundraising efforts. It hosts an annual “Quest 4 Vests” event at a New Jersey restaurant, which has netted as much as \$10,000 in one day. The association is represented at street fairs and festivals in New Jersey, and encourages officers who need vests for their K-9 partners and on whose behalf the association is working to reach out and hold fundraisers in their respective cities and towns.

“We fundraise anyway we can. We rely solely on donations from corporations and individuals. The officers are not buying the vests,” Lucchesi says.

While the association’s initial focus was on obtaining K-9 vests for the Trenton unit and other units in New Jersey, its reach has grown. The group has assisted K-9 units in Georgia and Washington state.

“We have grown quite a bit and into something we never expected, but it has grown into something amazing,” Lucchesi says.

Lucchesi says the Trenton unit went through a trial-and-error process to eventually obtain K-9 vests they are satisfied with, working with the second vendor they tried. Features include a handle on the back of the vest to hold the dog, two D-rings at the base of the neck and tail, and pockets to hold a flashlight or a tracking device. In general, Lucchesi is happy with the features the vests provide and says they are fitted so the dogs still have the ability to run and make an apprehension.

“The only disadvantage is heat in the summer,” Lucchesi says. “When the temperature reaches peak in the summer the dog gets hot so I periodically pull the vest off and let him cool off when taking a break and not responding to a call. Maneuverability has been good. My dog can complete an agility course with his vest on.”

For information on the Capital K-9 Association, contact Officer Michael Lucchesi at (609) 209-0838 or mike@capitalk9association.org, or visit www.capitalk9association.org.

Note: The National Institute of Justice (NIJ) Compliance Testing Program tests ballistic-resistant and stab-resistant body armor worn by people for compliance with NIJ standards. While this program does not cover K-9 vests specifically, the “human” standards are commonly used in the manufacturing of these vests. For information on NIJ’s body armor compliance program, contact Senior Law Enforcement Program Manager Mike O’Shea at michael.oshea@usdoj.gov.

TechShorts November/December 2014

TECHshorts is a sampling of the technology projects, programs and initiatives being conducted by the Office of Justice Programs' National Institute of Justice (NIJ) and the National Law Enforcement and Corrections Technology Center (NLECTC) System, as well as other agencies. If you would like additional information concerning any of the following TECHshorts, please refer to the specific point-of-contact information that is included at the end of each entry.

In addition to TECHshorts, *JUSTNET News*, an online, weekly technology news summary containing articles relating to technology developments in public safety that have appeared in newspapers, newsmagazines and trade and professional journals, is available through the NLECTC System's website, www.justnet.org. Subscribers to *JUSTNET News* receive the news summary directly via email. To subscribe to *JUSTNET News*, go to <https://www.justnet.org/app/puborder/subscribe/subscribe.aspx>, email your request to asknlectc@justnet.org or call (800) 248-2742.

Note: The mentioning of specific manufacturers or products in TECHshorts does not constitute the endorsement of the U.S. Department of Justice, NIJ or the NLECTC System.

Short Tandem Repeat Study Released

Forensic Technology Center of Excellence

A recent study completed by the research and development group at the University of North Texas Health Science Center, a partner in the National Institute of Justice Forensic Technology Center of Excellence, evaluated a new method of short tandem repeat (STR) typing that represents a major improvement in the time interval between sample collection and STR profile generation.

The RapidHIT[®] system, a self-contained, automated instrument configured to perform DNA extraction, bead-based DNA normalization, amplification, electrophoresis of PCR amplicons and data analysis of five reference swabs simultaneously, provided reliable STR profiles from reference buccal swabs in approximately 90 minutes with nominal "hands-on" sample loading time and no evidence of contamination between samples. Its overall success rate was comparable to standard typing systems. Also, in the event of a failed run due to instrument failure, the swab can be reanalyzed. Although the interpretation of the data should be performed by a trained DNA analyst, the ease of use and the instrument's self-contained nature could hypothetically allow for remote generation of profiles at a mobile crime scene unit. Data could then be transmitted to an analyst at a central laboratory facility for interpretation. (RapidHIT has not yet been approved for uploading to the FBI Combined DNA Index System.)

Analysts routinely use STR typing for associating or excluding individuals based on biological evidence left at a crime scene. Improvements such as partial automation, direct amplification and rapid thermocycling have reduced the turnaround time and labor involved with profile generation, but several hours lag time still exists between sample collection and interpretation of results. Additionally, current best laboratory processes require a large amount of dedicated laboratory space with separate pre- and post-amplification areas to properly generate the profile.

You can read more about this study in “An evaluation of the RapidHIT[®] system for reliably genotyping reference samples,” published in the November 2014 issue of FSI:Genetics at <http://www.sciencedirect.com/science/article/pii/S1872497314001306>.

Exploring the Line Between Public and Private Policing

National Institute of Justice/Harvard Kennedy School

The boundary between public and private policing is complex. A recent paper, *Managing the Boundary Between Public and Private Policing*, explores the benefits and risks of cooperating with private police through four hypothetical scenarios in order to make recommendations on policy and operational challenges.

This paper provides a framework that police executives can use to examine their interactions with private policing and to determine more readily how to maximize the benefits to society while minimizing the associated risks. The hypothetical scenarios illustrate common dilemmas and challenges that confront police executives. Each scenario raises a different combination of benefits and risks to be recognized and managed.

This paper is from the Executive Session on Policing and Public Safety (2008-2014), sponsored by the National Institute of Justice and the Harvard Kennedy School’s Program in Criminal Justice Policy and Management. The publication is part of the New Perspectives in Policing series.

To read the paper, visit <https://ncjrs.gov/pdffiles1/nij/247182.pdf>.