

# TECHBeat

*Dedicated to Reporting Developments in Technology for Law Enforcement, Corrections and Forensic Sciences*

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**NLECTC**  
National Law Enforcement and  
Corrections Technology Center  
A Program of the **NIJ**  
National Institute of Justice

TechBeat is the bimonthly newsmagazine of the National Law Enforcement and Corrections Technology Center System. Our goal is to keep you up to date on technologies for the public safety community and research efforts in government and private industry.

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# POLICING MODEL *seeks to reduce* TRAFFIC CRASHES *and* CRIME

**By Michele Coppola**

*A policing model that makes a connection between crime and traffic safety is being used in some communities to curb law-breaking and reduce crashes, with promising results.*

Data-Driven Approaches to Crime and Traffic Safety (DDACTS) uses analysis of location-based crime and traffic data to establish effective methods for deploying law enforcement resources. It is a collaborative effort between the National Highway Traffic Safety Administration (NHTSA), the Bureau of Justice Assistance (BJA) and the National Institute of Justice (NIJ).

DDACTS uses data collection, analysis and geographic information system (GIS) mapping to identify areas that have a high incidence of crime and traffic crashes (hot spots), then employs traffic enforcement strategies that target those areas.





Crimes often involve motor vehicles. Criminals use vehicles to get to and from crime scenes. A residential area might be near a busy traffic corridor, which serves as a means for criminals to easily enter and leave the neighborhood. Traffic stops can lead to an arrest. Intelligence gathered during traffic stops on the driver, the vehicle, and the time and location can prove valuable in criminal investigations. The presence of patrol cars in a traffic corridor can make motorists more attentive to their driving, which can reduce traffic crashes and deter would-be criminals.

The International Association of Directors of Law Enforcement Standards and Training (IADLEST) provides project management and implementation workshops for DDACTS through a contract with NHTSA. Since 2011, IADLEST has conducted 78 workshops involving 582 law enforcement agencies throughout the United States, along with some workshops and presentations in Canada, Mexico City, Kuwait and London, according to Peggy Schaefer, DDACTS national program manager.

“We conduct training workshops where agency participants learn to use the model, and then we help them develop agency-specific implementation plans,” Schaefer says, emphasizing that DDACTS is a fluid, flexible type of approach that can be adapted by any law enforcement agency, regardless of size or resources. Sites have included the Philadelphia Police Department, which has 6,700 officers, and the Porterdale Police Department in Georgia, with seven officers.

DDACTS can be a helpful tool as law enforcement agencies face increasing demands with fewer resources.

“We train a lot of agencies with small sworn staff and limited resources. They all have to do more with less and DDACTS is the perfect model to show them how to do that,” Schaefer says. “We have worked with agencies that don’t have an analyst and we have achieved success training an officer, detective or a records clerk to do the initial data collection and analysis. We can get them up and running, even if it they are just using pushpins on a map.”

Christopher Bruce, DDACTS analytical director, says preferably, at a minimum an agency should have software that allows data analysis and mapping, but there is no single technological solution an agency has to pursue. Most agencies are already gathering information

through CAD or records management systems. Microsoft® Access, which many agencies already have, can be used to gather and analyze data. Common desktop GIS solutions such as ArcGIS or MapInfo can be used for mapping and identification of hot spots.

Bruce moderates DDACTS implementation workshops, and between workshops, he and a team of analysts are available to provide support to agencies, either through onsite visits, or for simpler questions, via email or phone.

“We have found that police agencies are very eager to implement quality analysis solutions after attending the workshops,” Bruce says. “It’s important that a police agency have an internal analytical function. We’ve seen many agencies either hire an analyst if they don’t have one or get more training for their analyst, or if they can’t afford an analyst, assign someone in the department to learn.”

“I’ve been in law enforcement for 33 years and I have never seen a model as effective as this one,” says Schaefer, who was with the Fayetteville Police Department in North Carolina for two decades and is still sworn as a reserve officer with the department. “Out of all my contacts with all of these departments, I don’t know of anyone having a negative experience.”

Chief Howard Hall of the Roanoke County Police Department in Virginia has been applying the DDACTS model to his department for about one year. Officers are asked to go into the target areas during their routine patrol time.

“No extra manpower is needed for DDACTS, which is a pretty key point,” Hall says. “It’s more about realigning the resources you have more effectively, which is a huge advantage of the model. It gives an opportunity to maximize efficiency. We try to direct our available patrol





time into target areas where officer activity is needed the most. The model works because it adapts to what the needs are of an individual community.

“We try to get at least 20 hours of police activity in our target areas each week. Other agencies will have different action plans. It depends on the agency.”

## DDACTS and the Shawnee Police Department

The Shawnee Police Department in Kansas became interested in DDACTS after attending a presentation at a traffic conference in 2010, and hosted the first DDACTS implementation workshop. The department later received a grant from BJA’s Smart Policing Initiative to evaluate its DDACTS implementation and results, according to Chief Larry Larimore.

The study covered July 2010 to July 2013, compared to the three previous years, and examined the effects of DDACTS on robberies, vehicle thefts, burglaries and motor vehicle collisions in a selected target zone, a 2-mile-long street corridor that had a disproportionate amount of crime and crashes compared to the rest of the city. It also examined officer attitudes toward the implementation of DDACTS and business and resident perceptions.

In the target zone, robbery dropped by 70.4 percent, vehicle theft by 40.3 percent, commercial burglary by 34.8 percent, residential burglary by 27 percent and vehicle burglary by nearly 33 percent. Total crashes fell by 24 percent and crashes involving injury dropped by 24.4 percent.

“I am a true believer. I think it works really well,” Larimore says. “It’s not just one-time data collection, it is continuous data collection and analysis and making operational adjustments based on that. Some cities don’t have the crime and crash overlap areas, but I think most people would probably find it in their cities.”

Shawnee implemented DDACTS one month after receiving training. Larimore emphasized that it is important to involve all levels of the department from the start and explain clearly how it affects each person’s job responsibilities.

Police notified businesses and residents in the target area that police presence and traffic patrols would be increased.

The model uses data to direct enforcement, and represents a shift from operations based on random patrol and responding to calls for service, to crime prevention-focused operations.

“It’s a change of culture that can take time for people to buy into it,” Larimore says. “The mindset is to put officers in the places where you need them.”

*For information on DDACTS and implementation workshops, contact Peggy Schaefer of the International Association of Directors of Law Enforcement Standards and Training at [peggyschaefer@iadlest.org](mailto:peggyschaefer@iadlest.org). For information on individual departments’ experience with DDACTS, email Shawnee Police Chief Larry Larimore at [llarimore@ci.shawnee.ks.us](mailto:llarimore@ci.shawnee.ks.us) or Roanoke County Police Chief Howard Hall at [hhall@roanokecountyva.gov](mailto:hhall@roanokecountyva.gov).*

*To read the DDACTS Operational Guidelines, go to [http://www.smartpolicinginitiative.com/sites/all/files/Webinars/DDACTS\\_OpGuidelinesMarch14.pdf](http://www.smartpolicinginitiative.com/sites/all/files/Webinars/DDACTS_OpGuidelinesMarch14.pdf). To listen to a webinar conducted earlier this year on DDACTS, go to [www.smartpolicinginitiative.com/tta/ddacts-webinar](http://www.smartpolicinginitiative.com/tta/ddacts-webinar).*



## Partner and Stakeholder Participation

This is important for building support and can involve neighborhood associations, local government agencies, and local civic and business organizations.

## Data Collection

Data should be timely and accurate and at a minimum include crime, crash and traffic information by type of incident, date, time and location. It can also include warnings, citations, arrests, citizen complaints, suspended or revoked licenses and wanted persons.

## Outcomes

Identify measures of effectiveness such as reduction in traffic crashes or in Part 1 or Part 2 crimes (e.g., robberies, burglaries, vehicle thefts). Outcomes will be agency-specific and depend on the problems in the community.

## Monitoring, Evaluating and Adjustments

Once the plan is implemented, internal and field operations can be adjusted to promote effectiveness.

# DDACTS Principles

The Data-Driven Approaches to Crime and Traffic Safety model is based on seven guiding principles:

## Data Analysis

Analysis of data allows agencies to identify areas with a high incidence of crime and traffic crashes and where they overlap.

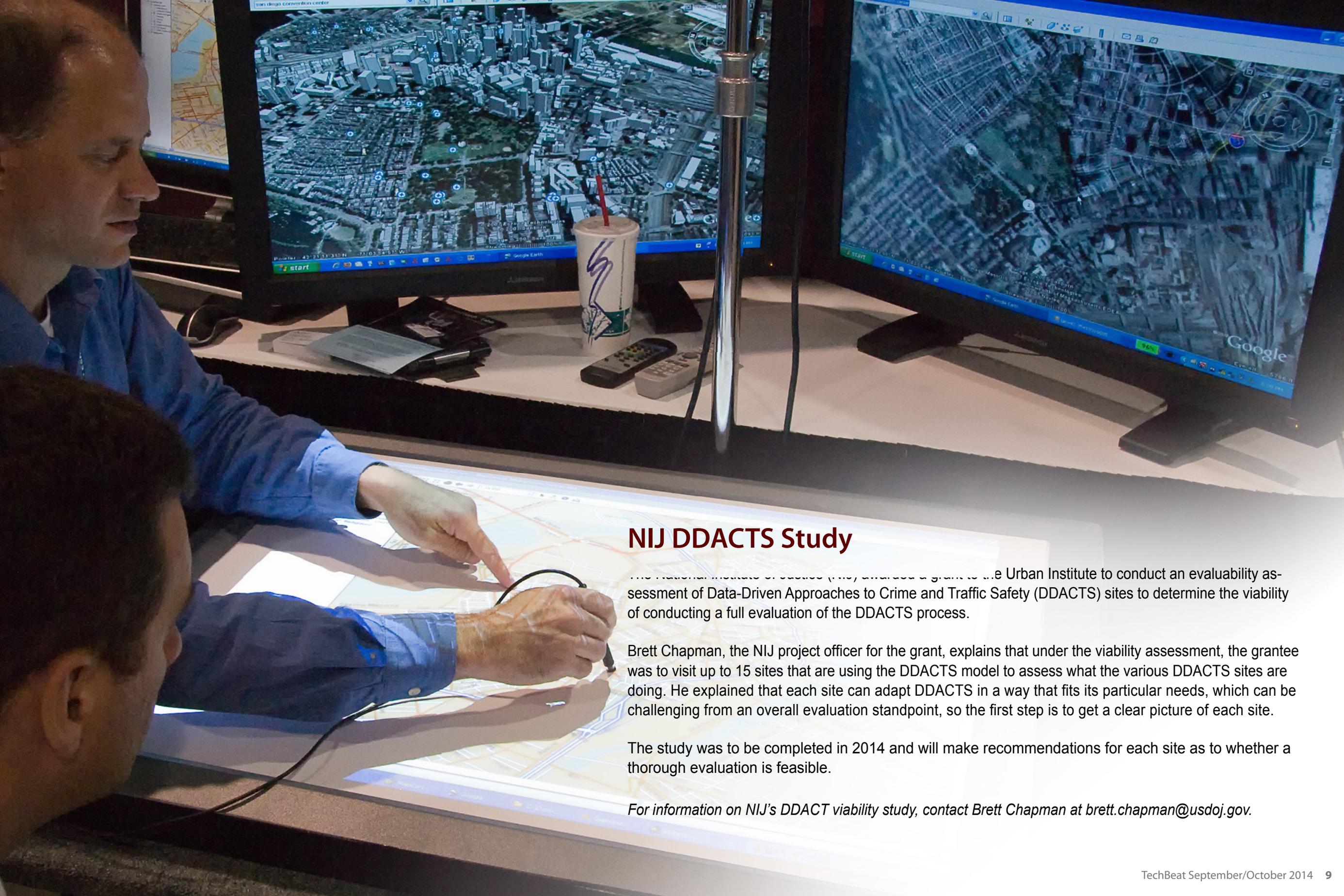
## Strategic Operations

Based on the analyses, agencies can identify enforcement activities, operational assignments and tactics.

## Information Sharing and Outreach

Routine information sharing with officers, the community, media outlets and other partners and stakeholders can build support and increase understanding.

To read the formal descriptions of the principles and for more information, see the DDACTS Operational Guidelines at [http://www.smartpolicinginitiative.com/sites/all/files/Webinars/DDACTS\\_OpGuidelinesMarch14.pdf](http://www.smartpolicinginitiative.com/sites/all/files/Webinars/DDACTS_OpGuidelinesMarch14.pdf).



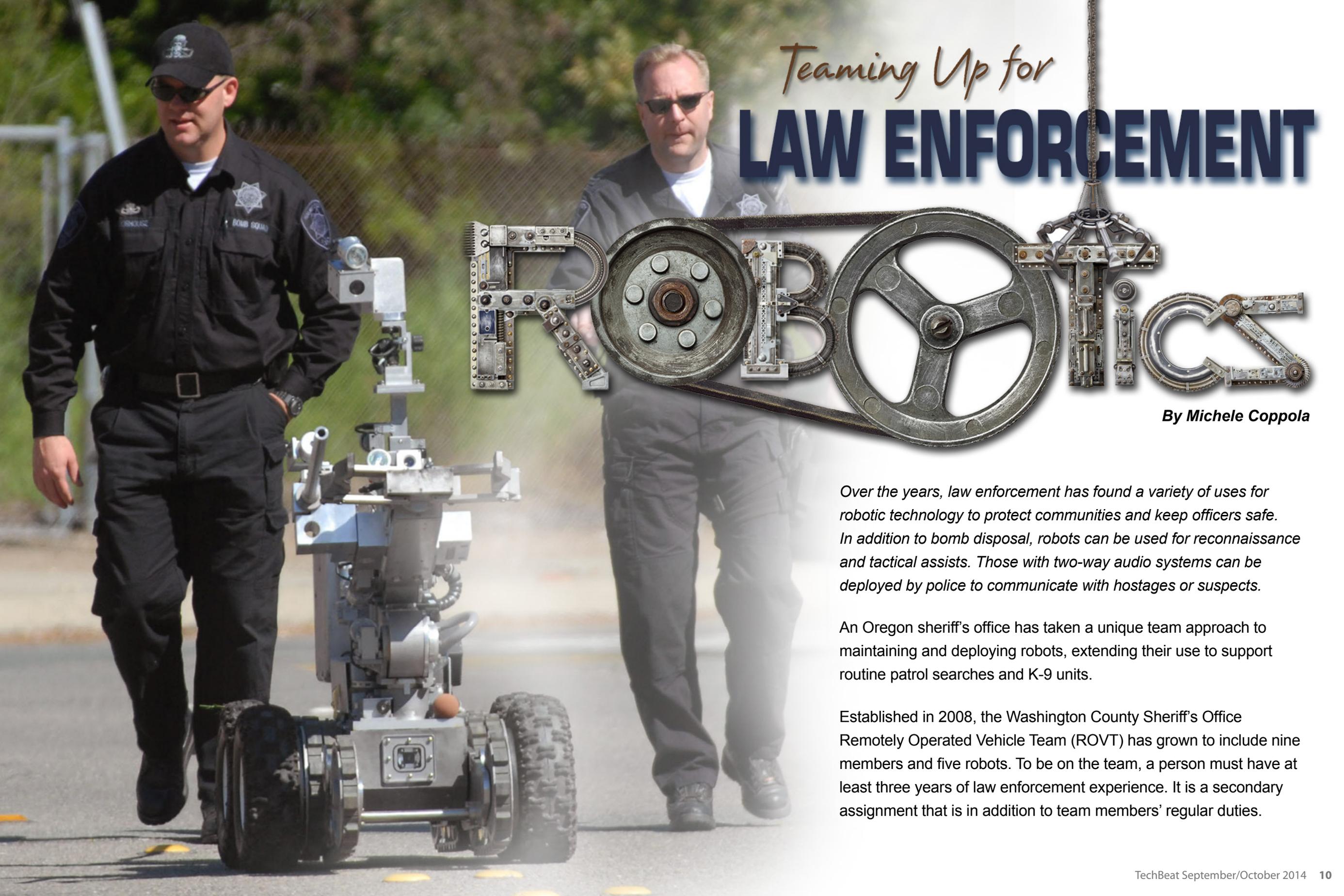
## NIJ DDACTS Study

The National Institute of Justice (NIJ) awarded a grant to the Urban Institute to conduct an evaluability assessment of Data-Driven Approaches to Crime and Traffic Safety (DDACTS) sites to determine the viability of conducting a full evaluation of the DDACTS process.

Brett Chapman, the NIJ project officer for the grant, explains that under the viability assessment, the grantee was to visit up to 15 sites that are using the DDACTS model to assess what the various DDACTS sites are doing. He explained that each site can adapt DDACTS in a way that fits its particular needs, which can be challenging from an overall evaluation standpoint, so the first step is to get a clear picture of each site.

The study was to be completed in 2014 and will make recommendations for each site as to whether a thorough evaluation is feasible.

*For information on NIJ's DDACT viability study, contact Brett Chapman at [brett.chapman@usdoj.gov](mailto:brett.chapman@usdoj.gov).*



# Teaming Up for LAW ENFORCEMENT

By Michele Coppola

*Over the years, law enforcement has found a variety of uses for robotic technology to protect communities and keep officers safe. In addition to bomb disposal, robots can be used for reconnaissance and tactical assists. Those with two-way audio systems can be deployed by police to communicate with hostages or suspects.*

An Oregon sheriff's office has taken a unique team approach to maintaining and deploying robots, extending their use to support routine patrol searches and K-9 units.

Established in 2008, the Washington County Sheriff's Office Remotely Operated Vehicle Team (ROVT) has grown to include nine members and five robots. To be on the team, a person must have at least three years of law enforcement experience. It is a secondary assignment that is in addition to team members' regular duties.



“I have people from just about every division on the team: three from the patrol side, two detectives, one drug team guy and three of us from the jail side,” says Sgt. Tristan Sundsted.

“When the lieutenant decided to set up the team, they asked who in the agency was interested in applying police robotics,” he explains. “Most are people who have played computer games or have a similar connection. It’s been interesting over the years. There are basically three disciplines that people fall into on my team. There is the mechanical aspect, one guy had a mechanic background working on small engines. A few members are robot drivers who have a video game type of background and who are good at manipulating the robots and knowing where the robot is in relation to other objects while in operation. Then there are the technical folks like me who do the electronics and maintenance.”

The team trains once a month to keep skills sharp. The team’s five robots were all purchased with grant money. All can transmit video/audio. The team uses two small, lightweight, throwable, wirelessly controlled robotic cameras. Weighing little over one pound and quiet, they can be thrown into a building and stealthily provide video/audio reconnaissance. The team also has two rugged, water-resistant, micro-tactical robots weighing about 25 pounds that have pan/tilt/zoom cameras and can climb stairs, climb over loose clothing, right themselves and transmit video/audio. The team’s largest robot, weighing about 225 pounds, transmits video/audio and has a manipulator arm and can be used to open doors and push furniture around if necessary.

“I have discovered that our team is pretty unique in the Northwest and people are interested in how we operate our robots and developed our team,” Sundsted says. “I belong to the Association of Unmanned Vehicle Systems International and I began talking to other agencies and realized most have their robots assigned to their SWAT or bomb squads. As far as I know we are the only ones in the Northwest who have a robot-specific team. We do all the maintenance on them and train with them so the tactical guys can worry about tactics.”

*“I have discovered that our team is pretty unique in the Northwest and people are interested in how we operate our robots and developed our team.”*

**-Sgt. Tristan Sundsted,  
Washington County Sheriff's Office**

Sundsted says the “workhorses” for his group are the two micro-tactical robots, which as part of the field search robot (FSR) program, are carried in the patrol cars of on-duty ROVT members for use in tactical as well as routine patrol situations, such as responding to a building alarm. They allow a rapid way to get a first look at an incident. They are also used in a program that trains K-9s to work with robots.

“I was fairly impressed. The dogs have responded well to the robots and have adapted to it,” Sundsted says.

The two smallest robots are employed mostly by the tactical team, but can be used to supplement the FSR program for patrol operations as well. All robot team members go about their usual duties and respond to situations requiring the robots and their expertise as needed. The robot team automatically responds to SWAT situations.

*Photo courtesy of the Washington County Sheriff's Office*





*Field search robot calls average two or three calls a month*

*"Using robots keeps our deputies much safer"*

*Robots were used to search the building and record him with a rifle*

"Our guys run the robot and search and the tactical guys can concentrate on their tactical work," Sundsted says.

The amount of robot use by the department fluctuates from year to year. Sundsted says field search robot calls average two or three calls a month, but there are times they have been deployed one or two times a week.

"Using robots keeps our deputies much safer," Sundsted says. "They don't have to go in blind. They can send the robot in and see the layout before they go in. A lot of times you can communicate with the suspect or hostage using a robot."

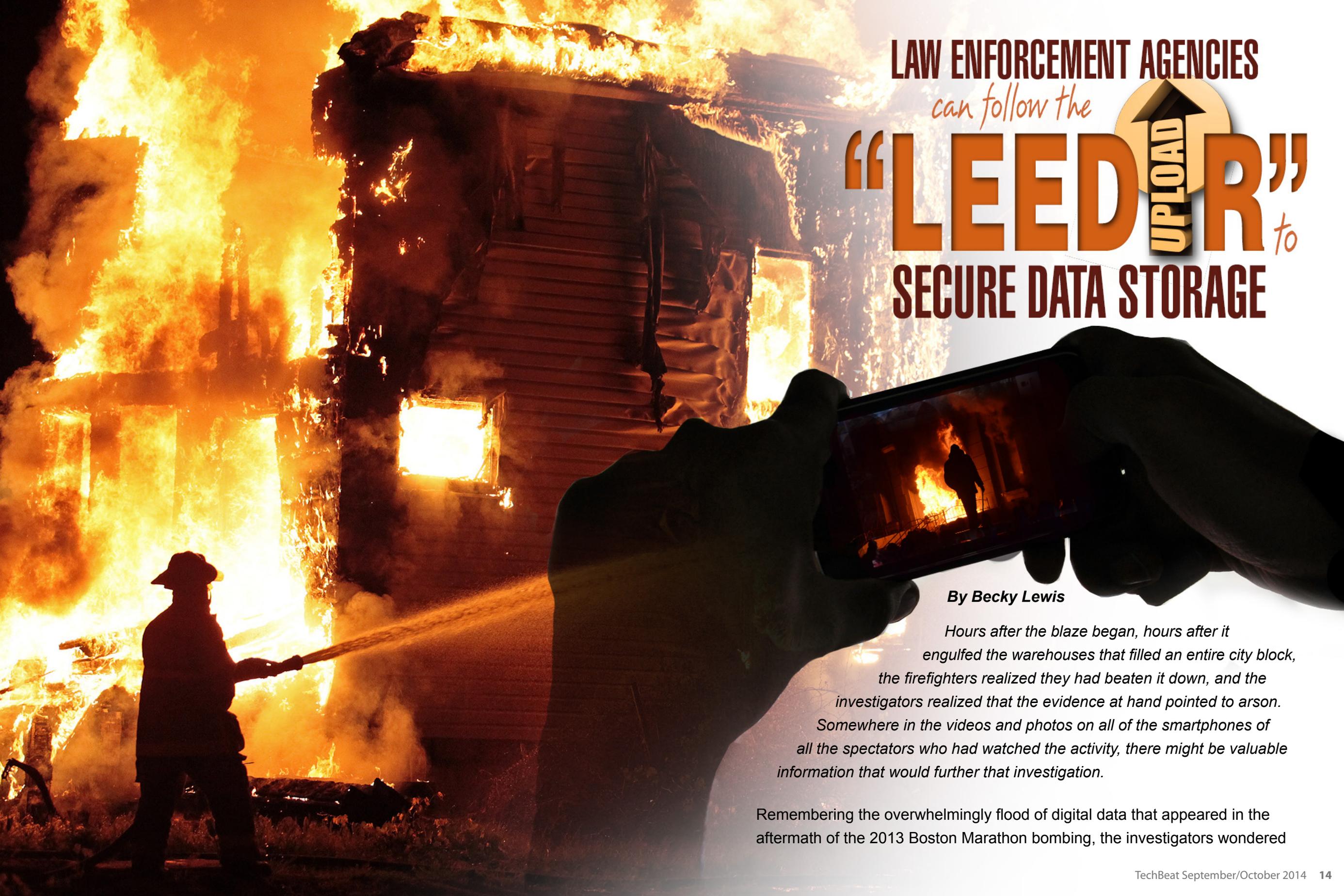
Earlier this year, a man who attempted to rob a car dealership surrendered after a six-hour standoff with law enforcement. Robots were used to search the building for him and recorded him with a rifle, according to Sundsted.

The Washington County Sheriff's Office has about 375 certified jail and enforcement staff and 540 staff overall. According to the U.S. Census Bureau, Washington County has an estimated population of 554,996. Located approximately 20 miles to the west of Portland, the county has a total area of 726 square miles.

For more information, contact Sgt. Tristan Sundsted, at [tristan\\_sundsted@co.washington.or.us](mailto:tristan_sundsted@co.washington.or.us) or (503) 846-2383.



Video



**LAW ENFORCEMENT AGENCIES**

*can follow the*

**“LEED R”**



*to*

**SECURE DATA STORAGE**

***By Becky Lewis***

*Hours after the blaze began, hours after it engulfed the warehouses that filled an entire city block, the firefighters realized they had beaten it down, and the investigators realized that the evidence at hand pointed to arson. Somewhere in the videos and photos on all of the smartphones of all the spectators who had watched the activity, there might be valuable information that would further that investigation.*

Remembering the overwhelmingly flood of digital data that appeared in the aftermath of the 2013 Boston Marathon bombing, the investigators wondered

whether to ask the public for help. Then one of them remembered a project he had recently read about: “Hey,” he asked the rest of the team, “have you heard about this thing called LEEDIR?”

The Large Emergency Event Digital Information Repository (LEEDIR, [www.leedir.us](http://www.leedir.us)) is, in a nutshell, an app that helps law enforcement gather evidence from smartphones and surveillance cameras belonging to the public and store it in the Cloud for investigative use. Provided as a free service by Amazon Web Services and CitizenGlobal Inc.,

LEEDIR is the brainchild of Cmdr. Scott Edson of the Los Angeles County Sheriff's Department (LASD), who came up with the concept in the aftermath of the Boston Marathon bombing.

Any law enforcement agency in the country with a qualifying event can access and activate LEEDIR through an easy-to-use Web interface; members of the public can go to the same site and download an app that lets them upload their digital data to a secure, remote central storage repository. Using LEEDIR keeps an agency's own servers from being flooded and keeps storage free for other uses.

“In Boston, they were overwhelmed by citizens who wanted to help,” Edson says. “When you have a situation so serious that the public is willing to get involved in helping you catch the bad guys, you want to be able to handle it. I went to the private sector, and found willing partners who built the back and front ends necessary to support LEEDIR. We came up with the qualifying criteria of an event that has more than 5,000 witnesses and involves multiple types of first responders and multiple jurisdictions, or a natural disaster like Hurricane Katrina that covers at least five square miles. Any agency with an event of that scope can access and use LEEDIR absolutely free.”

The lead law enforcement agency need only go to the website and fill out a form to request that the site go live, and put the word out to the public to download the app, which is

available in both iPhone and Android versions, and start submitting information. Users have the option of uploading digital data anonymously or leaving contact information for followup. Designated investigators receive administrator access, and can access and manage the data as it is submitted. The agency can download leads for followup to its own servers if it wants; the original submissions also remain in the Cloud, timed and validated by hashtags should verification be needed for court.

Agencies interested in participating can obtain a username and a password “just in case”; the producers will then provide training and certification free of charge. Agencies can then simply go to the site and activate LEEDIR if a qualifying event occurs, rather than going through the sign-up process at that time. (Agencies interested in using the service for nonqualifying events also can negotiate fee-for-service arrangements with the vendors.)

“Even extremely large agencies like ours don’t have the bandwidth to support a larger event. Smaller agencies might not even be able to gather data on a small-scale event without assistance from some type of service,”

## Santa Barbara Sheriff’s Office First in Nation to Try Out LEEDIR

On April 5, 2014, the annual Deltopia party in the Isla Vista area of Santa Barbara County, near the University of California-Santa Barbara, turned into a riot when partygoers refused to disperse in the face of an order from the Santa Barbara County Sheriff’s Department. Before the department cleared the streets, one officer was injured after being struck in the face with a backpack, and deputies had to deploy less lethal devices and call on SWAT Team resources.

After hearing that Santa Barbara planned to request the public to help with the investigation by submitting digital data, Cmdr. Scott Edson of the Los Angeles County Sheriff’s Department approached Det. Adam Reichick with an invitation to try LEEDIR. Thus, Santa Barbara became the first jurisdiction to officially use the free service, and that initial activation coincided with the planned beta test event.

“We were able to use submissions to identify several additional suspects, and we received both audio and video of our crowd dispersal order, which we can use in court if need be,” Reichick says.

“We’re not a very big agency compared to the sheriff’s departments in surrounding counties. We have roughly 400 sworn deputy sheriffs, while Los Angeles, for example, has more than 9,000. For us, it was a major force multiplier, because we didn’t have to send personnel out searching for the information; it came to us,” he adds.

Santa Barbara found CitizenGlobal to be “super helpful” in ensuring that the live activation ran smoothly. The public information office issued a call to citizens asking them to submit digital data, and Reichick says, “For the most part it worked seamlessly. It was a great way to get big files, because we have a 25-meg limit on email attachments, and decent video files are much larger.”

A group of Santa Barbara detectives received administrator access to the submissions about the event and reviewed them in real time, deciding whether each one merited downloading to the department’s servers. Reichick says they found this method definitely preferable to a system that used filters to eliminate some data as irrelevant.

“This was a really smart way to package the submissions. If we needed to use it again, we definitely would,” he says.



Edson says. “We’ve been making presentations and we’ve been sending out tweets, we’ve been doing whatever we can do to promote this. We had a successful exercise on April 10 that tested the system, and promoting it will be an ongoing process.”

That first test activation originally was set to take place at a November 2013 press conference, but FBI concerns surrounding the November 1 Los Angeles International Airport shooting delayed the exercise until April 10, 2014. Ironically, although one major incident delayed the initial test, investigation following a second event, the April 5 Isla Vista riots in Santa Barbara County (see sidebar), resulted in the first actual live use of LEEDIR, simultaneously with the exercise.

“For the exercise, we asked the 250 participating jurisdictions to submit photos and videos between 9 a.m. and noon as if they were citizen witnesses,” Edson says. “We had 12 LASD investigators logged in to receive submissions and work the system. Adding Santa Barbara’s actual activation gave us a really great opportunity to see how the system would work.”

*For more information, visit <http://www.leedir.us/> or contact Cmdr. Scott Edson at [SDEdson@lasd.org](mailto:SDEdson@lasd.org). For information on National Institute of Justice information sharing technology programs, contact Steve Schuetz at [steve.schuetz@usdoj.gov](mailto:steve.schuetz@usdoj.gov).*

Survey Results in



# IMPROVED AFIS

Information

By Becky Lewis

*Before you can solve a problem, you need to know its parameters. Without that information, proposed solutions aren't true solutions, they're only guesswork.*

*Strengthening Forensic Science in the United States, a 2009 National Academy of Sciences report, identified a need for interoperability among the automated fingerprint identification systems (AFIS) in use by state and local law enforcement agencies. Without knowledge of who uses which systems in what manner, finding a way to achieve interoperability would be no more than a guessing game.*



# AFIS



**AFIS Vendor Information**



**Tenprint and Palm Print Records**



**Latent Records**



**Searching Characteristics**

An extensive research project by the Sensor, Surveillance, and Biometric Technologies Center of Excellence (SSTB CoE), which concluded earlier in 2014, could prove the game-changer in that search for interoperability, which is the ability of different systems or devices to seamlessly share information or results.

The Latent Fingerprint Interoperability Survey is the only comprehensive effort to measure the level of interoperability of AFIS maintained by state and local law enforcement agencies for the electronic exchange of latent fingerprint data to support criminal investigations. Staff developed and refined the survey questions through a pretest effort, and obtained Office of Management and Budget approval before launching the effort.

SSBT CoE Director Lars Ericson says that, “Contrary to what some people might think, there is no central registry listing the systems that criminal justice agencies use. Most states don’t even know what the local agencies within their state are using. So a secondary benefit of the effort is, in addition to providing important data, we’ve also generated an extensive list of AFIS points of contact that the National Institute of Justice can use to engage in a continuing dialogue.”

Each participating agency responded to core questions on topics including AFIS vendor information, tenprint and palm print records, latent records and searching characteristics. State agencies responded to additional questions geared to state agencies, while local agencies responded to questions geared to local agencies.

“If you don’t know the extent of the problem, it’s hard to make recommendations on how to fix it,” Ericson says. “This gives us a baseline snapshot as far as who is talking to whom and

who can't talk to anyone. It shows us where interoperability is increasing and where it is lacking, and it gives us a picture of what is in place.”

The data collection period lasted from January 2013 to January 2014. At the conclusion of data collection, 48 state agencies responded fully, with one state partially responding with some information. Of the local agencies, 78 responded fully, with eight partially responding.

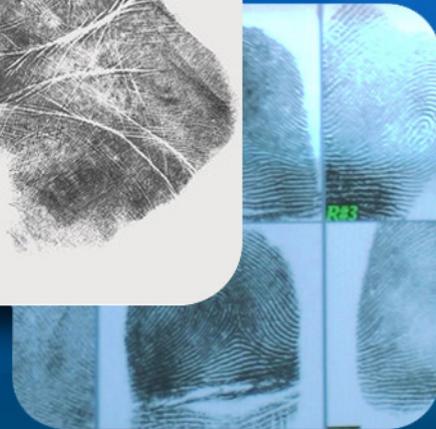
Researcher Mark Persinger, who took the lead in completing the project, notes that not every agency had to answer every one of the 272 core questions, and some responses led to skipping the remainder of a question. Still, he estimates that it took two to three hours to complete, and that most agencies took it piecemeal, visiting the survey website several times.

“This was effectively a full-time effort on Mark’s part in communication outreach, shepherding this survey through the planning, implementation and execution stages,” Ericson says. “We would have had a much lower number of responses if we just waited for them to come in. We had the foresight and the ability to commit the proper resources to the task to see it through, and I think that’s reflected in the breadth and depth of information that the survey has produced.”

Findings are expected to be published in 2015. Some of the outcomes of the survey data analysis will be to quantify and understand interoperability at different levels of geographic or jurisdictional granularity, as well as vertical and horizontal search patterns.

“Even in the short term, an agency could achieve potential benefits by looking at the data,” Ericson says. “If another agency submits a latent print to them to match against their repository of unsolved cases, they can see how this type of evidence is being handled elsewhere. The data might also inform policies and the information process flow, which in turn could improve data sharing and increase interoperability.”

*The National Institute of Justice (NIJ) developed this survey in cooperation with the AFIS Interoperability Task Force, which was part of the Subcommittee on Forensic Science that served the Committee on Science under the National Science and Technology Council. For more information regarding the survey, and the resulting report and dataset, or other NIJ programs in the area of biometrics, contact Program Manager Mark Greene at [mark.greene@ojp.usdoj.gov](mailto:mark.greene@ojp.usdoj.gov). More information on the survey results can also be found at <http://www.nij.gov/topics/forensics/evidence/impression/pages/survey.aspx>.*



# MAGNETO-OPTICAL TECHNOLOGY

*Shows Promise In*

## “UNERASING” SERIAL NUMBERS

*By Becky Lewis*



*Often, unsolicited email ends up making a quick trip to the recycle bin or at most generates a quick “thanks, but no thanks” reply. But every once in a while, an unsolicited email might lead to a major breakthrough.*

That could be the case with an email sent by a vendor to the Midwest Forensics Resource Center (MFRC) in Ames, Iowa, a partner in the National Institute of Justice (NIJ) Forensic Technology Center of Excellence (FTCoE). The vendor suggested that magneto-optical sensor technology could prove a better method of recovering obliterated firearms serial numbers than those currently in use.

That email led to a research project, and Phase I results can be found in the March 2014 publication, *Performance Evaluation and Utility Assessment of Magneto-Optical Sensor Technology for Detecting and Visualizing Obliterated Serial Numbers in Firearms* (<https://rti.connectsolutions.com/p937t0wcn2/>). Results from Phase II testing, currently under way, should be available in late 2014 or early 2015. Vendor Matesy GmbH of Jena, Germany, has provided all sensor technology needed for the research at no charge.



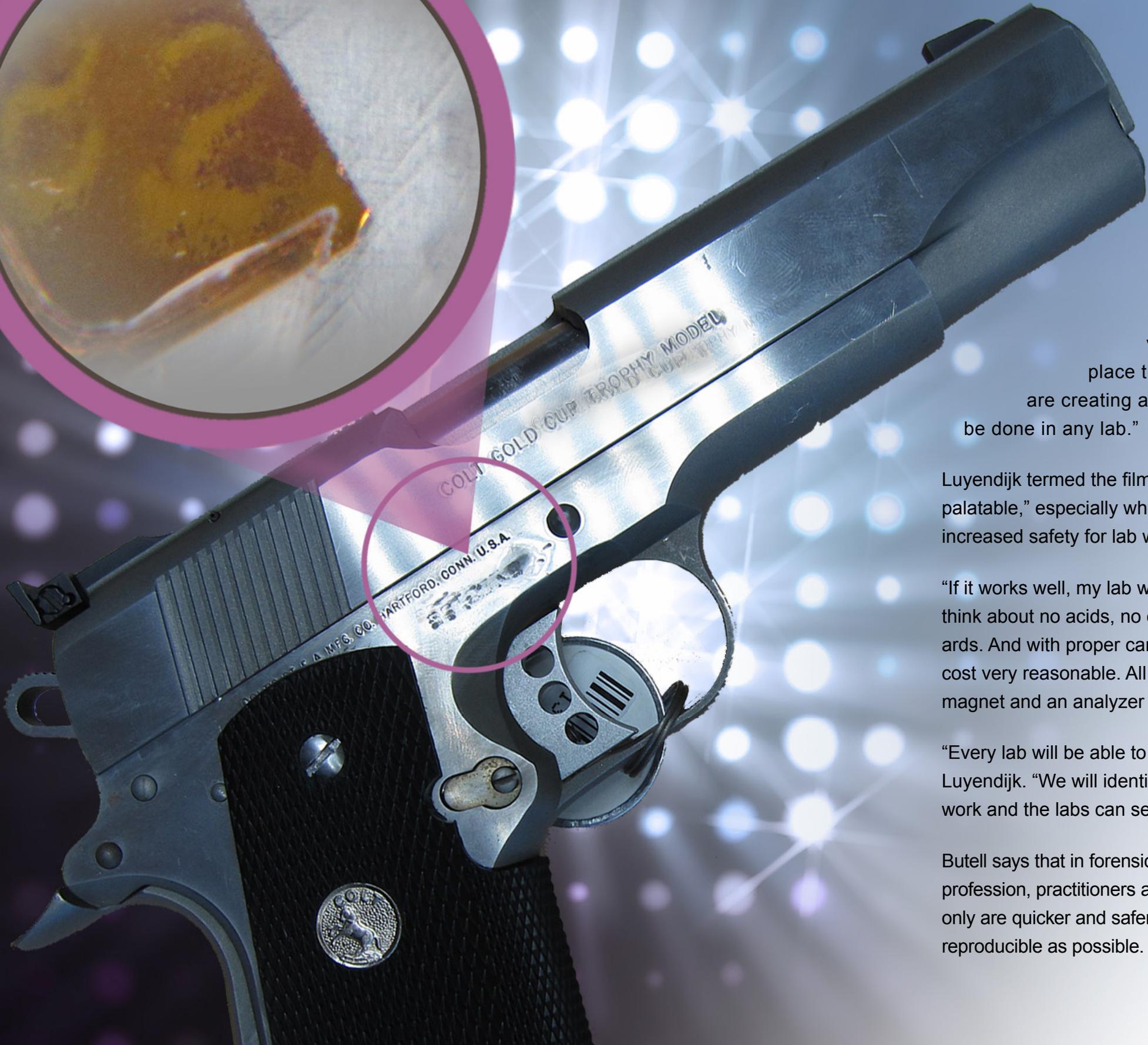
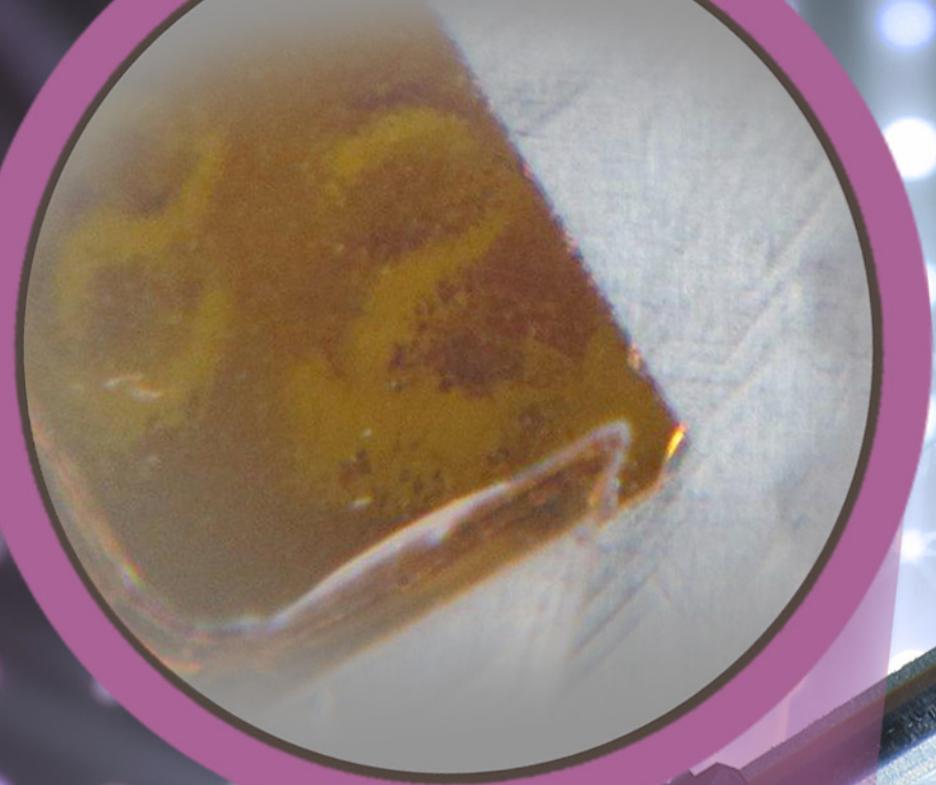
“Once we were sure the technology had potential, we got in touch with some firearms examiners and asked if they thought it could be a beneficial alternative to the methods currently in use,” says Principal Investigator Dr. Rudi Luyendijk from MFRC. “We then asked them to help with research on some prepared samples.”

Jason Butell of the Johnson County Criminalistics Laboratory in Olathe, Kan., one of the firearms examiners, says that in Phase I testing, the technology showed great promise when working with certain types of standardized samples.

“It’s very quick, it’s very simple,” Butell says. “There are no chemicals to mix and no precautionary measures to take because you’re not dealing with acids. There’s no need for a fume hood or protective equipment, and you don’t have to put a mirror-like polish on the sample first.”

Just in case that sounds too good to be true, Butell also had some drawbacks to list:

- ❖ The technology worked well on ferrous metals, but not on nonferrous metals or zinc alloys.
- ❖ The sensor needs to contact a planar surface directly; many firearm serial numbers are located on curved parts of the weapons or are obstructed.
- ❖ The cost is prohibitive (\$15,000 compared to a few hundred).



So why is the research continuing? Luyendijk explains that the researchers plan to take the promising portion of the technology and try to adapt it to real-world use.

“The vendor has provided us with the film that the sensor uses,” Luyendijk says. “This will be much more versatile. We can take actual firearms and place the film on their curved surfaces, and we are creating a method that will be reproducible and can be done in any lab.”

Luyendijk termed the film’s cost of approximately \$1,000 “much more palatable,” especially when compared to the savings in time and the increased safety for lab workers.

“If it works well, my lab will be interested,” says Butell. “When you think about no acids, no chemicals, no hood, that adds up to zero hazards. And with proper care, the film will last for years, which makes the cost very reasonable. All the lab will need is the film, polarized light, a magnet and an analyzer (polarizing filter) to view or record the image.”

“Every lab will be able to customize the setup to meet its needs,” says Luyendijk. “We will identify the components needed to make this thing work and the labs can set it up to work for them.”

Butell says that in forensics, just as in other aspects of the public safety profession, practitioners are always looking for methodologies that not only are quicker and safer, but are also as accurate as possible and as reproducible as possible.

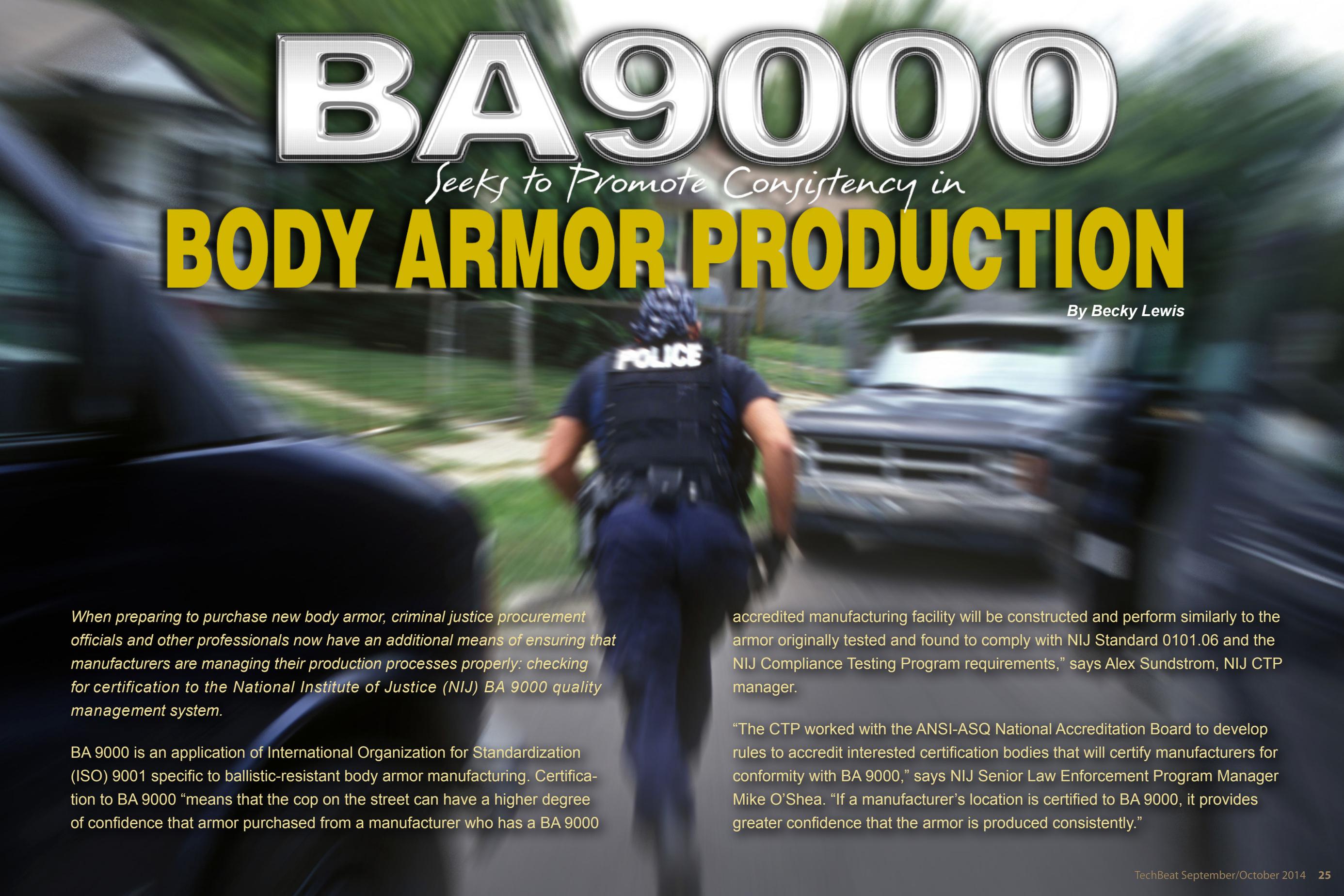


“I hope we can make this a universal method that’s obtainable by all,” Butell says. “That’s a big part of what Rudi does. In the field, we’re stuck doing casework all the time, and we need someone to come up with the ideas for additional research and ways to advance the science.”

In addition to the benefits to Butell; Kevin Westland of the Kansas City (Missouri) Police Department Crime Laboratory, who assisted with the research; and other firearms examiners, Luyendijk says the technology could also have other forensic applications, such as the restoration of obliterated vehicle VIN numbers.

“That’s the beauty of this technology, it has multiple applications that we have yet to evaluate and test. If we can make it portable so it can be taken into the field, the Border Patrol, for example, might find ways to use it,” he adds.

*For more information on this project, contact Dr. Rudi Luyendijk at [rluyendi@ameslab.gov](mailto:rluyendi@ameslab.gov). For more information on the projects and programs of NIJ’s FTCoE, contact FTCoE Director Dr. Jeri Roper-Miller at [jerimiller@rti.org](mailto:jerimiller@rti.org). For more information on NIJ’s forensic technology portfolio, contact Gerald LaPorte, acting director, Office of Investigative and Forensic Sciences, at [Gerald.LaPorte@usdoj.gov](mailto:Gerald.LaPorte@usdoj.gov).*



# BA9000

*Seeks to Promote Consistency in*

# BODY ARMOR PRODUCTION

*By Becky Lewis*

*When preparing to purchase new body armor, criminal justice procurement officials and other professionals now have an additional means of ensuring that manufacturers are managing their production processes properly: checking for certification to the National Institute of Justice (NIJ) BA 9000 quality management system.*

BA 9000 is an application of International Organization for Standardization (ISO) 9001 specific to ballistic-resistant body armor manufacturing. Certification to BA 9000 “means that the cop on the street can have a higher degree of confidence that armor purchased from a manufacturer who has a BA 9000

accredited manufacturing facility will be constructed and perform similarly to the armor originally tested and found to comply with NIJ Standard 0101.06 and the NIJ Compliance Testing Program requirements,” says Alex Sundstrom, NIJ CTP manager.

“The CTP worked with the ANSI-ASQ National Accreditation Board to develop rules to accredit interested certification bodies that will certify manufacturers for conformity with BA 9000,” says NIJ Senior Law Enforcement Program Manager Mike O’Shea. “If a manufacturer’s location is certified to BA 9000, it provides greater confidence that the armor is produced consistently.”



Perry Johnson Registrars, Inc., became the first ANAB accredited certification body for the BA 9000 standard in July 2014, and immediately began certifying manufacturers (see sidebar).

ISO 9001 deals with the fundamentals of quality management systems and the requirements that manufacturers must fulfill; BA 9000 provides additional requirements specific to the production of ballistic-resistant body armor. In order to become certified to BA 9000, a manufacturer must:

- ❖ Meet all ISO 9001 certification requirements applicable to the manufacture of ballistic body armor.
- ❖ Meet documentation requirements concerning both the preservation of raw materials and body armor construction details (also known as build sheets).
- ❖ Specify that CTP documentation, including forms, applications and standard operating procedures, as well as test reports and any other communications with the CTP, be controlled documents. These documents shall be considered as containing criteria for product acceptance.
- ❖ Ensure that staff members with approval authority have competencies defined.
- ❖ Consider impact on ballistic performance when writing purchase requirements and specifications for both ballistic materials and materials used for panel covers. Be sure to include lot testing of bulk materials.
  - ❖ Devise product traceability from raw materials to individual end products, using serial and lot numbers unique to each armor.
  - ❖ Protect ballistic materials from detrimental environmental factors (such as temperature, humidity, contamination, rough handling and ultraviolet radiation) throughout the production cycle.

This additional confidence in a manufacturer's consistency then permits a reduction in the frequency of manufacturing location surveillance inspections related to the Follow-Up Inspection and Testing portion of the CTP. This results in a reduction in surveillance inspection costs proportional to the number of models a given manufacturer is actively manufacturing. Before this reduction in inspections takes place, a manufacturer must provide evidence of certification to the CTP.

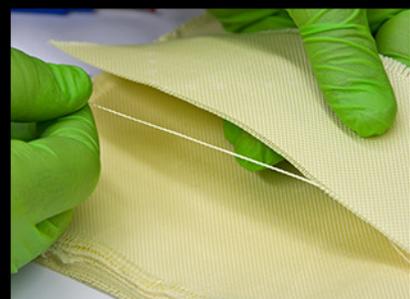
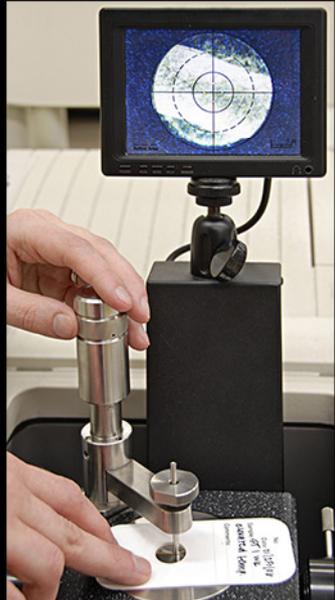
For more information on BA 9000, and for information on the NIJ Compliance Testing Program in general, visit [www.justnet.org](http://www.justnet.org), call (800) 248-2742, email [bactp@justnet.org](mailto:bactp@justnet.org), or contact NIJ Senior Law Enforcement Program Manager Mike O'Shea at [michael.oshea@usdoj.gov](mailto:michael.oshea@usdoj.gov).

# HighCom

## **First Manufacturer to Attain Certification**

On July 21, 2014, Florida-based HighCom Security, Inc. became the first company to attain certification to BA 9000, obtaining certification from Perry Johnson Registrars, Inc. (PJR). Earlier in the month, PJR became the first certification body accredited by the ANSI-ASQ National Accreditation Board (ANAB) to certify manufacturers to BA 9000.

In order for PJR to become accredited, the company had to be observed performing and completing an actual certification, thus demonstrating its capability to ANAB. ANAB issued accreditation to PJR, which then in turn issued certification to HighCom. Certification is indicated through use of the ANAB registration mark along with an indication of a specific management system (in this case, BA 9000). HighCom has provided a copy of its certificate to the National Institute of Justice Compliance Testing Program.



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](http://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/subscribe.html>, email your request to [asknlectc@justnet.org](mailto: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.*

## School Crime and Safety Report

**Bureau of Justice Statistics and National Center for Education Statistics**

A report is available that highlights the most recent data on crime and safety at schools in the United States from the perspectives of principals, students and teachers, and postsecondary

institutions. The U.S. Department of Justice's Bureau of Justice Statistics and the Department of Education's National Center for Education Statistics jointly released *Indicators of School Crime and Safety: 2013*.

The report is an annual publication that seeks to establish reliable indicators of the current state of school crime and safety and regularly update and monitor these indicators. Topics covered include victimization at school, teacher injury, bullying and cyber-bullying, school conditions, fights, weapons, availability and student use of drugs and alcohol, student perceptions of personal safety at school, and criminal incidents at postsecondary institutions.

This report contains 22 indicators of crime at schools based on information from sources such as the School-Associated Violent Deaths Study, National Crime Victimization Survey (NCVS), School Crime Supplement to the NCVS, Youth Risk Behavior Survey, Schools and Staffing Survey, School Survey on Crime and Safety, and Campus Safety and Security Survey.

**For more information and to access the report, go to <http://www.bjs.gov/index.cfm?ty=pbdetail&iid=5008>.**



## Researchers Develop New mtGenome Sequencing Method

### Forensic Technology Center of Excellence

A recent study describes a major advance in the typing of mitochondrial genomes.

The study was 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. The study describes a new method of sequencing the entire mtGenome (~16.5 kilobases) of up to 79 individuals in a single run with greater than 200x coverage at all positions in the genome. With this type of economy of scale, forensic scientists can generate better data in a less expensive manner than by using current methods.

Due to its high copy number per cell, mitochondrial DNA (mtDNA) is often used for human identification with degraded human remains because it is more likely to return a result compared to traditional short tandem repeat typing. Additionally, since mitochondria are inherited through the maternal line, this type of data can be used to associate remains with a

surviving maternal relative. Further, since no recombination occurs, mtDNA can be used in molecular anthropology studies to determine the ethno-geographic background of an individual's maternal relatives.



The current methodology for typing samples involves sequencing a small section (approximately 1,200 base pairs) of the mtGenome. Although effective, this method results in only 2x coverage of an approximately 1.2 kilobase sequence, with no information regarding the remaining approximate 15 kilobases of sequence in the mtGenome. Some of the differentiating markers used in molecular anthropology studies lie outside this region, and there can be problems with strings of nucleotides where the same base is repeated multiple times in a row as well. In addition, current Sanger-based sequencing methods are expensive to use.

*To read more about this study, see “High-quality and high-throughput massively parallel sequencing of the human mitochondrial genome using the Illumina MiSeq,” published in the September 2014 issue of FSI:Genetics at <http://www.sciencedirect.com/science/article/pii/S1872497314001197>.*

# PUBLIC SAFETY TECHNOLOGY

JUSTNET

## In The News

Following are abstracts on public safety-related articles that have appeared in newspapers, magazines and websites.

### **Estes Park Police to Encrypt 800 MHz Radio Channels**

*Trail-Gazette, (08/14/2014), John Cordsen*

The Estes Park Police Department is encrypting its broadcasts, which will prevent the public from listening in on police communications using radio frequency scanners. Officials say the purpose of radio encryption is to protect citizens' rights to privacy and officer safety. Estes Park public information officer Kate Rusch noted that procedures are currently in place to provide the public with immediate information during a crisis, such as social media, email subscriber lists, LETA911 emergency notifications and a recorded information line.

[http://www.eptail.com/estes-park-news/ci\\_26336391/estes-park-police-encrypt-800-mhz-radio-channels](http://www.eptail.com/estes-park-news/ci_26336391/estes-park-police-encrypt-800-mhz-radio-channels)

### **Mercer County Officials Unveil New Communications System for Emergency Workers**

*Times of Trenton, (08/14/2014), Keith Brown*

A New Jersey county has a new system that will ease communication among emergency responders. The countywide Mercer County Public Safety Interoperable Communications System will allow different groups of first responders, such as police and EMS workers, to communicate with each other on the same radio system. The system expands the number of conversations that can happen simultaneously on a single radio channel, with less confusion. Responders can talk to each other without having to listen to other conversations and broadcasts.

[http://www.nj.com/mercercounty/index.ssf/2014/08/county\\_officials\\_unveil\\_new\\_communications\\_system\\_for\\_emergency\\_workers.html](http://www.nj.com/mercercounty/index.ssf/2014/08/county_officials_unveil_new_communications_system_for_emergency_workers.html)

### **Oakland Gets \$2M State Grant to Reduce Recidivism, Improve Policing**

*KTVU.com, (08/11/2014)*

Oakland has received a \$2 million grant as part of statewide effort to reduce recidivism. The grant will fund policing programs and ones to help released convicts find work and housing. City officials said funding for ongoing crime reduction strategies should further reduce crime rates.

<http://www.ktvu.com/news/news/local-govt-politics/oakland-gets-2m-state-grant-reduce-recidivism-impr/ngzRH/>

### **CONTACT US**

Call the NLECTC Information Hotline at 800-248-2742 or email [asknlectc@justnet.org](mailto:asknlectc@justnet.org)

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See [www.nij.gov](http://www.nij.gov) or [www.grants.gov](http://www.grants.gov).

### **Give Us Your Tech Ideas**

We are actively seeking ideas to help us identify technology needs and requirements as part of the National Institute of Justice's Research, Development, Testing, and Evaluation process.

*Click here for recent public safety-related articles from the news media.*

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# WWW.JUSTNET.ORG

**JUSTNETNews.** Includes article abstracts on law enforcement, corrections and forensics technologies that have appeared in major newspapers, magazines and periodicals and on national and international wire services and websites.

**Testing Results.** Up-to-date listing of public safety equipment evaluated through NIJ's testing program. Includes ballistic- and stab-resistant armor, patrol vehicles and tires, protective gloves and more.

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