

# TECH

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# b · e · a · t



National Institute of Justice  
National Law Enforcement and Corrections Technology Center



JEREMY TRAVIS, DIRECTOR, NATIONAL INSTITUTE OF JUSTICE

## Image Analysis Convicts Killer

**C**harles Rathbun was one of the best in the business. As an automotive photographer, he had a special talent for making fast cars look faster and sleek cars even more glamorous. He also had a particular talent for posing beautiful women next to these shiny four-wheeled subjects. Dubbed "cheesecake-and-car" shots, Rathbun's work frequently appeared in automotive magazines. It was ironic, then, that the very thing that brought him a measure of fame and fortune was also the thing that sent him to prison for the rest of his life.

Rathbun was convicted of murdering Linda Sobek, a model and former Los Angeles Raiders cheerleader, during an assignment in which he was to photograph her driving a sport utility vehicle. Initially, he claimed he accidentally ran over Sobek while trying to demonstrate a high-speed turn. He said he panicked and buried the body. But the investigation revealed that Sobek was raped and died from asphyxiation. The defense tried to prove there was no

rape, that the sex was consensual. The defense offered the court a set of photographs it claimed Rathbun took in the back seat of the vehicle during the alleged sex act. However, using sophisticated computer technologies, detectives with the Los Angeles County Sheriff's Office compared the pictures with photos taken of Sobek after her death. It was unmistakable. The woman in the pictures was not Linda Sobek. In fact, it wasn't even the same vehicle.

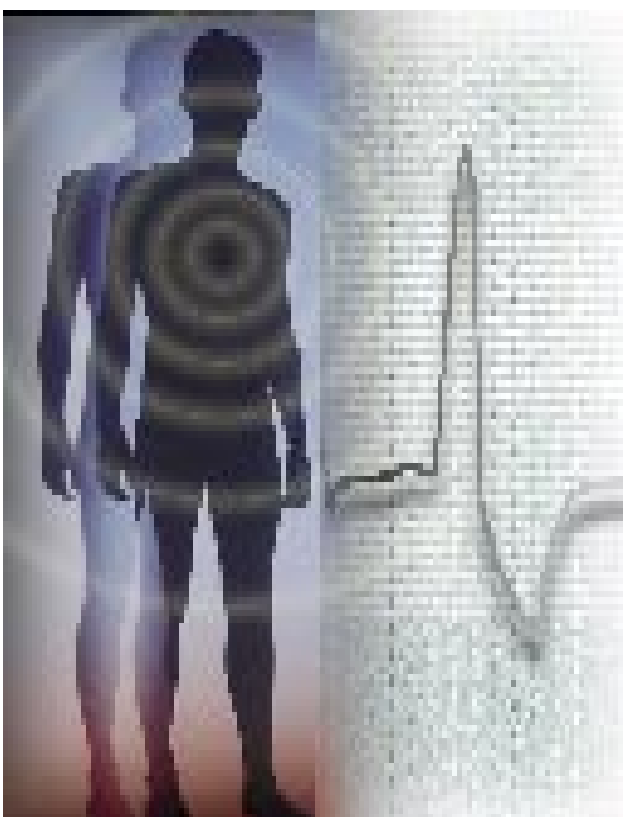
That analysis came from the National Law Enforcement and Corrections Technology Center (NLECTC)-West facility, which has done image analysis and enhancement for police departments in more than 200 criminal cases. Located on the grounds of The Aerospace Corporation in El Segundo, California, NLECTC-West, under the auspices of the National Institute of Justice, actually draws on Aerospace's expertise in space technology and security systems to provide this kind of service to departments throughout the country.

"We probably have the best equipped troubleshooting laboratories in the world," states Bob Pentz, director of the center. "The reason is that when a satellite is launched, it costs hundreds of millions of dollars. Every minute it remains on the launching pad costs a million dollars. So we have to make sure we can troubleshoot any launch problems in a very timely way. We have all kinds of cameras and can watch everything that happens on the pad from every angle. We know how to analyze what we're seeing. It is through this kind of technology transfer and expertise that we can also help police departments."

Pentz says that by using sophisticated computer software, experts help detectives extract vital information from video evidence, whether that evidence comes from an automated teller machine (ATM); a bank, store, or shopping mall camera; by way of the news media; or through the unexpected act of a citizen bystander roaming around with a video recorder. Although NLECTC-West also works in analyzing audio tapes, the center has become especially well known for its work in imagery. It has analyzed photos and videotapes in cases ranging from serial rapes and kidnappings to homicides and robberies. Working side by side with detectives, NLECTC-West has helped investigators identify suspects, create pictures to show witnesses, reconstruct crime scenes, and obtain clearer images of license plates and vehicles.

The center's experts helped police apprehend the killer of a Manhattan Beach, California, officer by establishing a link between the suspect and a car that was shown in surveillance photographs taken at the scene of the crime. In another case, the center produced high-quality photographs of the suspects in a convenience store robbery/homicide. The photos were widely broadcast by print and electronic media, and the suspects identified and arrested. Its enhancement of a

(See Image, page 2)



"We have rolled people in bubble wrap, in mattresses, in comforters . . . and the technology still works."

Leo Labaj  
Oak Ridge  
National  
Laboratory

## Just a Heartbeat Away

**I**nmates trying to escape from prisons and jails may find themselves just a heartbeat away from freedom when they are apprehended by a device so sensitive it can pick up the soft beat of a human heart.

Developed by the U.S. Department of Energy's Oak Ridge National Laboratory (ORNL) and marketed by GeoVox, the Advanced Vehicle Interrogation and Notification (AVIAN) system is the newest technology in correctional security. It consists of a computer loaded with specially developed software, a touch-screen monitor, and special sensors that detect the shock wave created by the heartbeat of someone hiding in a vehicle or any other type of enclosed space.

AVIAN already has been successfully demonstrated by the National Institute of Justice's (NIJ's) Border Research and Technology Center and the U.S. Border Patrol at the San Clemente border checkpoint and at the San Ysidro and Otay Mesa ports of entry in California in tests designed to detect illegal aliens. The system's immediate focus, however, is in the correctional arena, where it has thus far been 100 percent effective at detecting prison escapees. "Prisons may have 100 or more

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(Image . . . cont. from page 1)



shopping mall videotape helped identify a man who kidnapped and molested an 8-year-old girl.

Its work has also led to a teaching stint by NLECTC–West staff at the California

Commission on Peace Officer Standards and Training (POST)-certified Criminal Investigators Course, as well as a “Recommended Practices” list for officers who encounter video evidence. “We look at it as a kind of triage,” Pentz says. “We tell them the first-responder kind of things to do with video evidence. We also can suggest equipment they can purchase for a modest amount of money so they can do some image analysis on their own. If they need more sophisticated expertise or technology, we have it here.”

At NLECTC–Northeast, similar work in the area of audio enhancement is under way at the Law Enforcement Analysis Facility (LEAF). “We’re doing signal noise reduction,” notes Roy Ratley, program manager for the Analytical Systems Engineering Corporation. “If you have a noisy tape, we take the noise out so the detectives can better hear and understand what is being said and get the information they’re looking for.”

NLECTC–Northeast is colocated with the U.S. Air Force’s Rome Laboratory, which has demonstrated expertise in gathering and analyzing intelligence. “Anything that has to do with surveillance and sound, we can do,” Ratley states. “For the Air Force, we have done background identification, where we tell them what kind of aircraft we hear on the background of a tape. We can tell you what language or dialect a person is speaking. We do signal reduction where we reduce background noise from phone taps or body wires, and we have a computer system that can understand what people are saying. During a phone tap, it can pick up on a word, like ‘cocaine’ for

instance, and signal the investigators to start listening to the conversation. Or, it will start recording from there. It’s a way to keep the detectives from having to listen to every single word, which can waste a lot of time and money.”

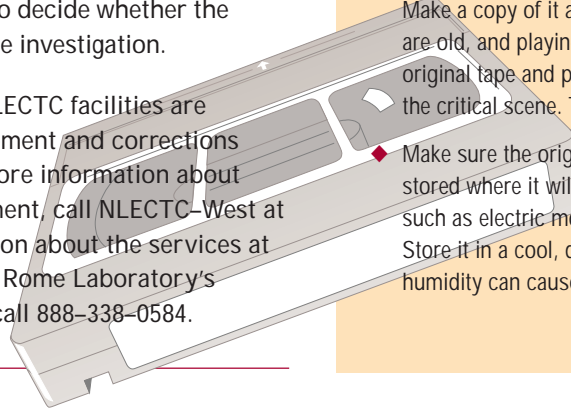
According to Ratley, LEAF has worked about 100 cases for different law enforcement agencies. In one case, a department wanted to hear what was happening inside one of its patrol vehicles during a multicar pursuit. LEAF experts were able to facilitate this by eliminating the noise from inside the car that made the officer’s transmission inaudible. In the case of a triple homicide, they digitally amplified the audio portion of an 8mm videotape. This became the evidence that led to the capture and subsequent confession of the murderer. The facility also does videotape freeze-frame capture. This is especially helpful in robbery cases. “A lot of suspects know to keep their head and face away from the camera. If they look up, it may only be for a millisecond. We digitize the video and take it frame by frame. When he looks up, we snap his picture,” Ratley says.

Like NLECTC–West, NLECTC–Northeast has certain criteria with which law enforcement departments must comply. It does not accept original evidence tapes; it analyzes only duplicates. Its experts will not alter anything, nor will they make case-related decisions about what is on the tape. Instead, they leave it up to the detective to decide whether the information is valuable to the investigation.

The services of these NLECTC facilities are available to any law enforcement and corrections agency in the Nation. For more information about image analysis or enhancement, call NLECTC–West at 310–336–2222. For information about the services at NLECTC–Northeast and the Rome Laboratory’s speech processing facility, call 888–338–0584.

### “Recommended Practices” for Videotape Evidence

- ◆ Determine if there is a videotape. Always look for a recorder at any crime scene.
- ◆ Stop the recorder to avoid accidentally recording over information you may need, but do not eject the tape yet. Note the recorder time to the second and simultaneously note the time on your watch to the second (they probably will not be the same, but noting the discrepancy will help you make time comparisons later). Note times on other clocks in the vicinity and write down the numbers on the “position counter” on the recorder. Rewind the tape and note the position counter again. Eject the tape and break the “write-protect” tab. Follow your department’s chain-of-custody protocol and seize the tapes as evidence.
- ◆ Document the video system’s physical relation to the crime scene. Note camera views and surrounding physical objects (height, width, depth) that can provide a visual reference and help determine facts such as the suspect’s height. Write down information about the recorder, such as manufacturer, model, time lapse, mode setting.
- ◆ Check for additional recorders, especially those that may provide a different view of the crime. These might be found at a business down the street from the crime scene, at a nearby bank or ATM, or at another entrance or exit in relation to the area. Suspects also may have visited the crime scene prior to the incident, so check for tapes that may have been recorded before the crime took place.
- ◆ When you return to your department, do not play the tape. Make a copy of it and play only the copy. Most videotapes are old, and playing can degrade them. Also, do not play the original tape and pause it or run it in slow motion through the critical scene. This also could ruin a videotape.
- ◆ Make sure the original tape is secured as evidence and stored where it will not be damaged by magnetic fields, such as electric motors, solenoids, or magnetic detectors. Store it in a cool, dry location. Excessive heat and/or humidity can cause deterioration.



(Just . . . cont. from page 1)

vehicles entering and exiting per day, and portals represent the main weakness because they’re a break in the perimeter,” said Leo Labaj, of ORNL’s Y–12 Special Projects Office, where the device was developed.

The National Law Enforcement and Corrections Technology Center (NLECTC)–Southeast arranged the first testbed site for the system at the Riverbend Maximum Security Institution in Tennessee. AVIAN is also being tested at the Continela State Prison in California and has been installed at the Federal prison in Atlanta, Georgia; the Wabash Correctional Facility in Carlisle, Indiana; and a State prison in Maine.

The underlying technology is actually the mechanical equivalent of the medical industry’s electrocardiogram, which measures the intensity of the heart’s electrical signals. Using sophisticated software, the AVIAN system registers the shock wave the heart creates when it beats. The measurement of this wave is known as the ballistocardiac effect.

Prison guards place a motion detector, called a geophone, on any flat surface of a vehicle. The detector contains a weight suspended in an electromagnetic field. When the weight is moved, it generates an electrical signal that is sent to a computer. The computer then runs an algorithm that can distinguish a beating heart’s vibrational characteristics from other types of vibration or movement.

In tests at various correctional institutions, prison guards have tried to smuggle themselves out, but none have been successful. “We have rolled people in bubble wrap, in mattresses, in comforters, put them in tractor-trailers and in garbage trucks three-quarters full of garbage, and the technology still works,” Labaj said in an interview with the Massachusetts Institute of Technology’s (MIT’s) *Technology Review* magazine.

AVIAN also has been able to detect the heartbeat of dogs and cats, which has led officials to believe it can be used to detect endangered animals being illegally smuggled into the United States. In future tests, ORNL scientists will try to upgrade the technology to the point where it is so sensitive it can pick up the heartbeat of a bird.

One of the difficulties in developing the system, originally dubbed the Enclosed Space Detection System (ESDS), was its sensitivity to wind and the vibration of doors opening and closing. But ORNL scientists analyzed the ballistocardiac signal and discovered a pattern of distinctive harmonic peaks that were specific to a human heartbeat. It can now distinguish between ambient noise and other vibrations, although it needs a degree of protection from moderate to high winds to eliminate false positives. The system also cannot be used on any type of vehicle that sits flat on the ground. The vehicle must have some kind of cushion, such as shock absorbers or tires, to prevent the vehicle and the ground becoming one solid body.

AVIAN/ESDS is another example of NIJ’s mission to find technologies developed for other disciplines and use them in ways that will benefit corrections and law enforcement. For example, the underlying principle of the AVIAN system is based on the medical technology of electrocardiograms. Additionally, the system’s geophone is actually a highly sensitive motion detector that is typically used by geologists looking for seismic signatures that reveal underground pockets of minerals. The computer is a simple personal computer (PC) with a touch-screen monitor. “What we brought to the table were the algorithms, the number crunching that went into the software to find the heartbeat,” Labaj says. “The device was built with off-the-shelf equipment.”

The heartbeat detector also has won the prestigious R&D 100 Award from *R&D Magazine*. “It signifies that this is one of the top 100 inventions of 1996,” Labaj says with a smile. “We essentially won the Nobel Prize of inventions.”

Oak Ridge National Laboratory scientists plan to use microwave-based technology in the next incarnation of the heartbeat-detector system. Such a system would work much like a police radar gun, firing a beam at the wall of a vehicle and calculating the vibrations according to the distance and the time it takes to travel back. The plan is to have a microwave testing facility in place this year.

For more information about the AVIAN/ESDS system, contact the Border Research and Technology Center at 619–685–1491 or NLECTC–Southeast, which focuses on corrections technologies, at 800–292–4385.

# Innovations in Concealed Weapons Detection Technology

Illegally concealed weapons are a serious and growing threat—to law enforcement, to corrections, to the courts, to everyone. In response, the National Institute of Justice (NIJ) is making a concerted effort toward finding ways to detect concealed weapons on people.

The problem with existing detection systems, usually metal detectors, is that they have a limited range and high false-alarm rates. They are also obtrusive, hard to move, and easy to circumvent. And nonmetallic knives and stabbing implements, as well as handguns having a low metal content, are very difficult to detect.

Several promising detection technologies currently under evaluation by NIJ's National Law Enforcement and Corrections Technology Center (NLECTC)-Northeast located at the U.S. Air Force Rome Laboratory in Rome, New York, include x-ray, low-power radar, and acoustic and infrared imaging that can electronically "tag" a person carrying a weapon, even in a crowd. Engineers are also studying ways to set up a stationary device that will allow police and security personnel to scan a crowd rather than screen one person at a time. One of the project goals is to develop a safe, affordable system to detect metallic or nonmetallic weapons at a distance of up to 30 feet. This effort could result in a device that permits police officers during traffic stops to scan for weapons without leaving their patrol vehicles.

Specific technologies currently under study and/or testing include:

**Passive Millimeter Wave (MMW) Technology.** This technology allows for rapid and remote detection of metallic and nonmetallic weapons, plastic explosives, drugs, and other contraband concealed under multiple layers of clothing at a distance of up to 12 feet without a direct physical search. Not requiring manmade (active) irradiation of an individual but rather relying on existing natural (passive) emissions from objects, it literally sees through clothing but does not reveal anatomical detail. The project will include the development of a fixed-site camera that can be mounted on a cruiser, a monitoring console, and a proof-of-concept hand-held camera with a video screen connected by cable to a signal analyzer box. Designs are also to be developed for a totally portable, battery-powered camera and a standoff camera system suitable for use from a patrol car.

**Electromagnetic (EM) Technology.** This active technology allows an EM pulse to be directed toward a person standing in a portal. The resulting difference in the EM radiation that is reflected back from different materials permits the identification of metallic objects. This technology has been successfully, and safely, demonstrated and is now under commercial development.

**Fluxgate Magnetometers Technology.** In this passive approach, anomalies in the Earth's magnetic field caused by metallic objects on individuals standing in a portal are measured by magnetometers and compared to the

measurements of actual weapons maintained in a computerized database. It is believed this technology will significantly reduce the false alarm rate common to the currently available detection technologies. NIJ and the Idaho State Court system are planning to test the new technology in an Idaho courthouse before the end of the year.

**Modified, Off-the-Shelf, Compton Scattered X-ray Imaging System.** In this active-approach technology an individual is exposed to an extremely low level of radiation (about the same level as 5 minutes of exposure to the sun at sea level). These x-rays do not penetrate the body to any significant degree but are reflected back. A picture is then developed electronically, in less than 1 second, from that reflected radiation. Since different materials have different reflection properties, the operator is able to detect weapons or other contraband from images in the picture. A prototype has been successfully demonstrated in a North Carolina prison and a California Federal court. NLECTC-Northeast is also looking at enhancing the technology with real-time images of subjects, without requiring them to stop in a portal. In addition, it is working with the Federal Aviation Administration to integrate other sensors to enhance the technology's ability to detect explosives and other kinds of contraband.

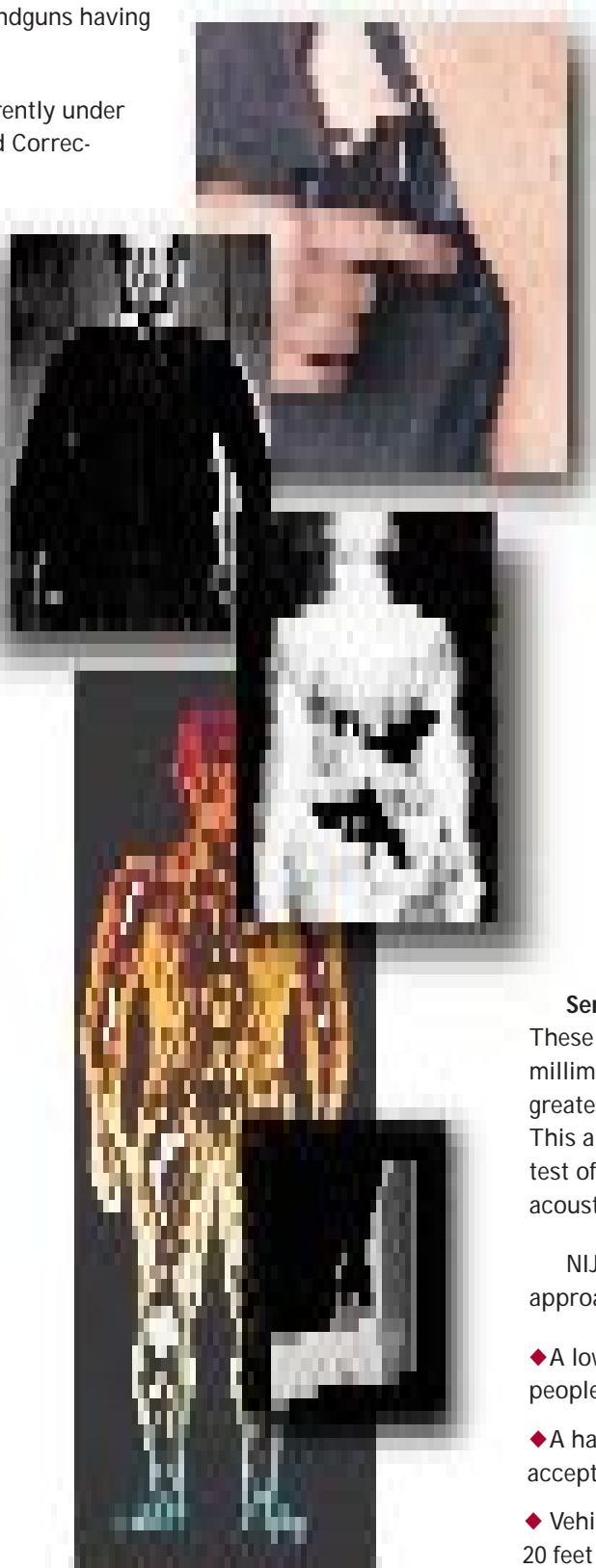
**Millimeter Wave and Infrared Cameras in a Stand-Alone and Sensor Suite Combination.** In this hybrid-passive technology approach the difference in the thermal energy retained and emitted by different materials causes them to appear in the pictures as distinct images. These technologies are complementary since the infrared camera has greater performance range than the millimeter wave camera; the millimeter wave camera has better resolution. The components of such a system have been successfully demonstrated. NIJ is continuing to study this technology with the goal of building a prototype.

**Sensor Suite Combining Radar and Ultrasound Imaging.** These technologies work together in much the same manner as millimeter wave and infrared. The radar can detect weapons at a greater range, but does not have the resolution of ultrasound. This approach can also spot nonmetallic weapons. A successful test of the components has been conducted, and the basic acoustic technology has been successfully demonstrated.

NIJ, through NLECTC-Northeast, is also exploring additional approaches that would further advance these technologies.

- ◆ A low-cost, hand-held acoustic device to detect weapons on people up to distances of 20 to 30 feet.
- ◆ A hand-held millimeter wave device to detect weapons at an acceptable range using a unique antenna.
- ◆ Vehicle-mounted devices to detect weapons on people up to 20 feet away. Technologies would involve radar, infrared radiation, and magnetic field disturbances.
- ◆ A body-cavity search system using magnetic resonance imaging (MRI) technology, which has been successfully used in medical diagnosis for years. This technology would be especially useful for weapons and contraband detection in corrections as well as other applications.

For more information about these projects, contact NLECTC-Northeast at 888-338-0584.



# Taking Back the Border



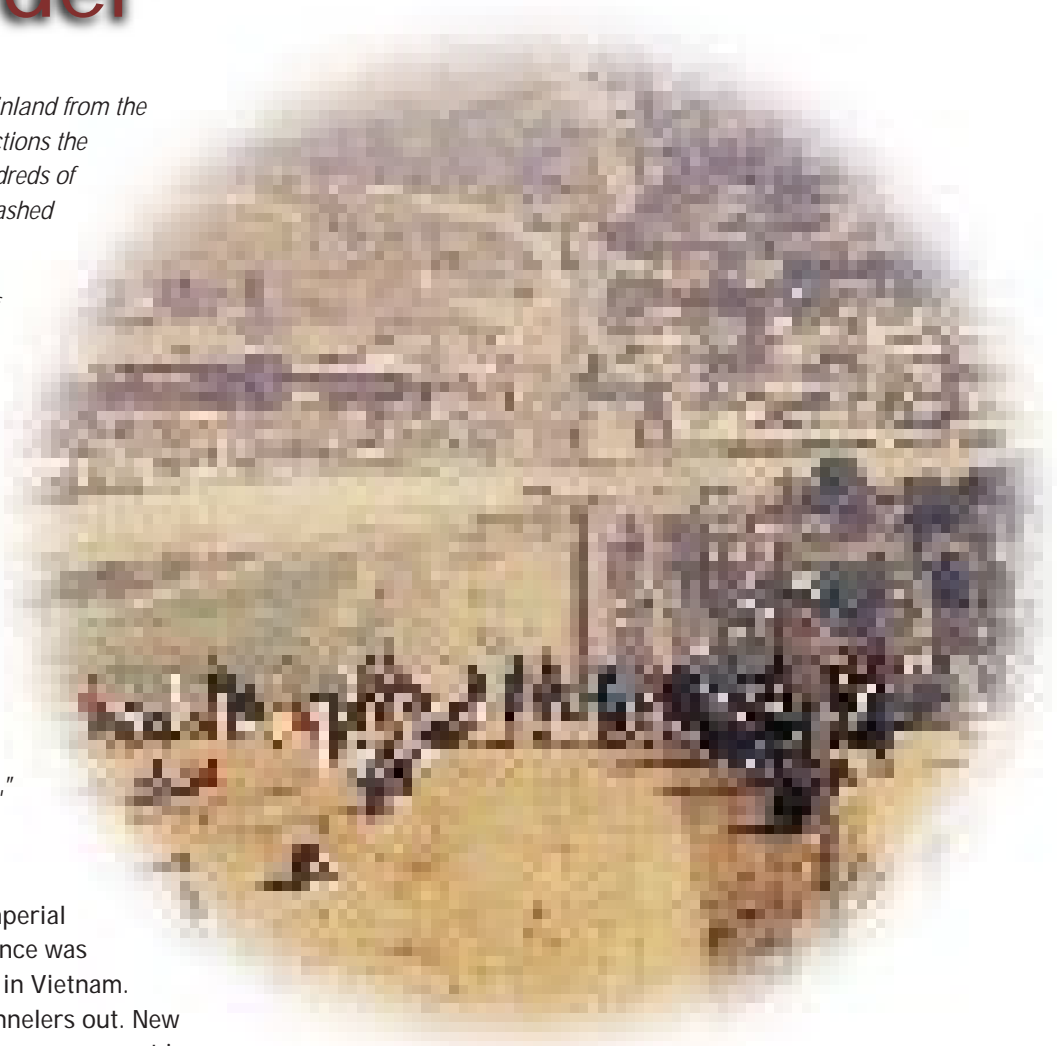
*The old chain-link fence hung in tatters across this 5-mile strip that runs inland from the Pacific Ocean and separates the United States from Mexico. In some sections the fence had been cut to pieces. In others it had been trampled by the hundreds of illegal immigrants who crossed the border nightly. Other parts were smashed flat by smugglers in cars and trucks.*

*A small hillside rising gently above the border on the American side was the site of an enormous nightly gathering, with hundreds of Mexicans talking, laughing, playing games, and buying food and drink from the vendors who set up shop nearby. It was here that plans were made for the continuing journey into the interior of the United States. The area became known as the "soccer field" because of the regular soccer games staged there. On any given night, authorities could count as many as 800 immigrants waiting to sneak into the States.*

Known as Imperial Beach, this area was one of the easiest places to cross and one of the most difficult to patrol, primarily because of its proximity to the city of San Diego. "The window of time we had to make an apprehension was 1 minute or less. Within seconds of crossing the border they had access to public transportation in the form of a taxi, bus, or the trolley that picks up people 200 yards from the border. If we missed them, they were on the freeway, in somebody's backyard, a nearby apartment, or in a car going somewhere else," said Jim Pilkington, a senior U.S. Border Patrol agent and one of the San Diego Sector's public information officers.

The U.S. Border Patrol initially implemented Operation Gatekeeper in the Imperial Beach area, expecting the project to take 3 years to control the traffic. A new fence was built of ridged metal sheets that were once used to create aircraft landing mats in Vietnam. In some areas, the fence runs an additional 8 feet deep underground to keep tunnelers out. New roads were cut, and lights were installed and focused on the fence. Infrared cameras were put in patrol vehicles that were stationed throughout the area. Ground sensors alerted dispatchers, and the international line was reinforced with agents sitting guard duty. The effort paid off, and in much less time than the agency anticipated.

"It took 3 months. It was amazing," said longtime Border Patrol agent Marco Ramirez. Today, Imperial Beach is deserted, populated only by agents on patrol. The traffic has moved into East County, a hilly area that takes hours, instead of minutes, to cross. "Now we have an 18-hour window to catch them because the terrain is rougher and they have to cross farther away from the city," Ramirez said.



U.S.-Mexican border, south of San Diego (above). High-powered lighting is used to illuminate areas identified as border crossings. The photo at bottom left is of the U.S. Border Patrol, Imperial Beach Sector.

As a result of Operation Gatekeeper, the first 14 miles of the border, from the Pacific Ocean to the base of Otay Mountain, is under control. "That doesn't mean we're taking the pressure off," Pilkington said. "This is not an overnight, quick fix. It is a slow, deliberate, methodical process. We're doing high-probability, high-visibility, proactive enforcement, and we have no intention of stopping. We figure if we can take back that 5 miles of Imperial Beach border, we can just about do anything."

To that end, the government increased the Immigration and Naturalization Service (INS) budget to \$3.1 billion this year, part of which paid for more helicopters, planes, bicycles, boats, horses, and all-terrain vehicles, as well as infrared and motion sensors, cameras, floodlights, and night vision equipment. The agency also expects to add 1,000 more agents per year for the next 5 years, for an eventual total of 10,000 agents.

The Border Patrol has also joined forces with the National Institute of Justice's (NIJ's) Border Research and Technology Center (BRTC), located in San Diego, California; the U.S. Customs Service; the White House Office of Drug Control Policy; and the U.S. Attorney for the Southern District of California to develop other strategies and technologies that will facilitate control of the Southwest border. One of its most recent accomplishments has been the implementation of the Secured Electronic Network for Travelers' Rapid Inspection (SENTRI), a special commuter lane for people who frequently cross the border between the United States and Mexico at the Port of San Ysidro in California. These daily travelers zip through the port by entering a precleared lane of traffic where their license plate is read electronically and matched to preapproved information in a database. This system has been recognized for its innovation and effectiveness, winning the Vice President's Hammer Award by the National Performance Review Board.

The U.S. Customs Service has put another aspect of technology to work with a giant x-ray machine that scans tractor-trailers coming across the border. This sophisticated machine can detect people, narcotics, or other types of contraband hidden in any part of the vehicle or trailer. It is another example of using a common technology that has been around for many years, albeit in a new and different way.



(See Taking, page 7)

# WANTED

## *Safety Gloves for Police and Correctional Officers*

The Law Enforcement and Corrections Technology Advisory Council, the committee of criminal justice practitioners that guides much of the National Institute of Justice's (NIJ's) technology research and development efforts, has expressed a need for standards for protective gloves for law enforcement and corrections officers. The committee has specified three levels of protective gloves: a basic health protective glove, a cut-resistant glove, and a puncture-resistant glove.

Gloves that are resistant to hidden hypodermic needles are not always as effective against a knife; conversely, cut-resistant gloves do not always protect from punctures. Currently, there is no independent evaluation or substantiation of manufacturer claims for protective gloves. Through a joint effort of the Office of Law Enforcement Standards (OLES), the Office of Law Enforcement Technology Commercialization (OLETC), and the National Law Enforcement and Corrections Technology Center (NLECTC)-National, information has already been collected from police and corrections officers on what they require in protective gloves, and efforts are under way to develop a testing standard and program to evaluate the performance of gloves now on the market. NLECTC would like your input into this effort. Contact: Lance Miller of NLECTC-National at 800-248-2742 or e-mail to [lmiller@aspensys.com](mailto:lmiller@aspensys.com).

## *Pick-Proof Handcuffs*

Due to the problem of some prisoners being able to pick the lock on their restraints, the need for reliable and efficient restraints for prisoner transport has been an issue with law enforcement and corrections agencies large and small. According to law enforcement and corrections personnel in the field, the current pick-proof cuff on the market is complicated and expensive (\$60 per pair), and requires two keys to unlock. Law enforcement and corrections agencies, especially those that process large numbers of prisoners and require speedy processing, are looking for more reliable, secure handcuffs that can be produced at an acceptable price. OLETC, OLES, and NLECTC-National are working jointly to address this problem. Efforts also are under way to revise the existing handcuff standard (NIJ Standard 0307.01, Metallic Handcuffs). NLECTC-National conducts a testing program for metallic handcuffs. Models that comply with the standard can be found in the *Metallic Handcuffs Consumer Product List*, which can be obtained through NLECTC-National or downloaded from JUSTNET at <http://www.nlectc.org>.

## *From the Director*

*The National Institute of Justice (NIJ) supports research on diverse issues of importance to law enforcement and corrections executives, as well as to officers in the field. Under NIJ's charter, the Institute is authorized to:*

- *Sponsor research and development (R&D) to improve and strengthen the Nation's system of justice with a balanced program of basic and applied research.*
- *Evaluate the effectiveness of criminal justice and law enforcement programs and identify those that merit application elsewhere.*
- *Support technological advances applicable to criminal justice.*
- *Test and demonstrate new and improved approaches to strengthen the justice system.*
- *Disseminate information from research, development, demonstrations, and evaluations.*

*Improving fingerprint and trace-evidence identification and the development of DNA standards are some of the notable areas of research. In the late 1980's and early 1990's, a renewed interest in less-than-lethal (LTL) weapons by the criminal justice system led Congress to allocate special funding to NIJ to begin an R&D program in this area.*

*In late 1992 and early 1993, NIJ initiated an expanded program to investigate all aspects of this issue and to develop a broad-based research program that would lead to new tools and use-of-force options for law enforcement and corrections officers. The program has evolved into one that looks not only at weapons but also at the sociological aspects of the use of LTL weapons, such as liability and community acceptance issues.*

*Other current areas of R&D include enhancements to concealed weapons detection technology and to technology to stop fleeing vehicles. NIJ also has supported development of a prototype "smart gun" that will fire only when held by its owner. NIJ, through its grants program, will continue to support development of new technologies to fight crime and improve criminal justice.*

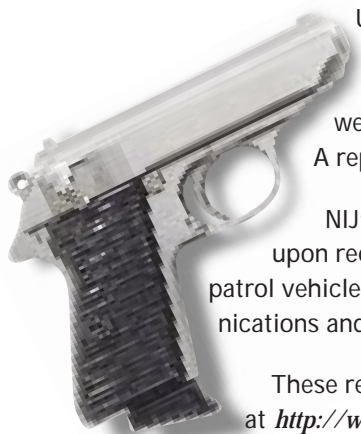
Jeremy Travis  
Director  
National Institute of Justice

# Testing of Semiautomatic Pistols To Resume

Under the direction of the National Institute of Justice (NIJ), the National Law Enforcement and Corrections Technology Center (NLECTC)-National, located in Rockville, Maryland, will soon begin testing semiautomatic pistols. These evaluations, which were last done in 1987, will include such new weapons as 10mm and .40-caliber pistols. A report on the findings will be published following completion of the testing.

NIJ's voluntary performance standards, test results, and other information are available upon request and cover such items as protective apparel, weapons, chemical incapacitants, patrol vehicles, tires, replacement brake pads, metallic handcuffs, night vision devices, and communications and surveillance equipment.

These reports are free and can be obtained by calling 800-248-2742 or by accessing JUSTNET at <http://www.nlectc.org>.



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The National Institute of Justice is a component of the Office of Justice Programs, which also includes the Bureau of Justice Assistance, Bureau of Justice Statistics, Office of Juvenile Justice and Delinquency Prevention, and Office for Victims of Crime.

# National Law Enforcement and Corrections Technology Center System

The National Institute of Justice (NIJ), responding to recommendations by the law enforcement and corrections community, converted its Technology Assessment Program Information Center (TAPIC) into the National Law Enforcement and Corrections Technology Center (NLECTC) system. Created in 1994 as a component of NIJ's Office of Science and Technology, NLECTC's goal, like that of NIJ, is to offer support, research findings, and technological expertise to help State and local law enforcement and corrections personnel safely and more efficiently do their jobs.

NIJ's NLECTC system consists of facilities located around the country that are colocated with an organization or agency that specializes in one or more specific areas of research and development. Although each of the NLECTC facilities has a different technology focus, they work together to form a seamless web of support and technology development and information to help the law enforcement and corrections community do their jobs more safely and efficiently.

## NLECTC-National

2277 Research Boulevard • Rockville, MD 20850  
Phone: 800-248-2742 • Fax: 301-519-5149 • E-mail: [nlectc@aspensys.com](mailto:nlectc@aspensys.com)

The National Center, located just 30 minutes north of Washington, D.C., is the hub of the NLECTC system. It provides information and referral services to anyone with a question about law enforcement and corrections equipment or technology. Its staff manages the voluntary equipment standards and testing program that tests and verifies the performance of body armor, metallic handcuffs, shotguns, and police vehicles and tires. This office produces consumer product lists of equipment meeting a specific set of performance standards, and also operates JUSTNET (Justice Technology Information Network), an Internet World Wide Web site that provides links to the entire NLECTC system and other appropriate sites, as well as assistance to those seeking information about equipment, technology, or research findings.

## NLECTC-Northeast

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Phone: 888-338-0584 • Fax: 315-330-4315 • E-mail: [nlectc\\_ne@rl.af.mil](mailto:nlectc_ne@rl.af.mil)

NLECTC-Northeast is located at the Rome Laboratories on the grounds of the Griffiss Business and Technology Park (formerly Griffiss Air Force Base). The center sponsors research and development efforts into technologies that address command, control, communications, computers, and intelligence. This center draws on the expertise of Air Force scientists and engineers in its development of technologies that can be used to detect concealed weapons on people, an effort that is expected to yield a stationary device for use in buildings, and hand-held devices for patrol officers. Other areas of research and development include the creation of an automatic booking system, automated firearms identification, multiband multifunction radios, transportable communication systems, and a computerized automatic language translation system.

## NLECTC-Southeast

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Two of the focus areas of NLECTC-Southeast are corrections technologies and surplus property acquisition and distribution for law enforcement and corrections. The center facilitates the acquisition and redistribution of Federal surplus/excess property to State and local law enforcement and corrections agencies. The equipment must be used for law enforcement purposes only. Utilizing the JUSTNET Web site, the center educates law enforcement and corrections professionals about the Federal surplus and purchasing programs. The efforts of NLECTC-Southeast have resulted in agencies receiving equipment they would not ordinarily have access to or might not have been able to afford due to budgetary restraints. This facility also studies the needs of corrections agencies. It is guided in this mission by a committee of criminal justice, law enforcement, and corrections practitioners who identify requirements and set priorities for research and development. NLECTC-Southeast is allied with the South Carolina Research Authority (SCRA) and the Naval Command, Control and Ocean Surveillance Center In-Service Engineering, East Coast Division (NISE East). NLECTC-Southeast's other areas of focus include information management and technologies, simulation training, and designated special projects.

## NLECTC-Rocky Mountain

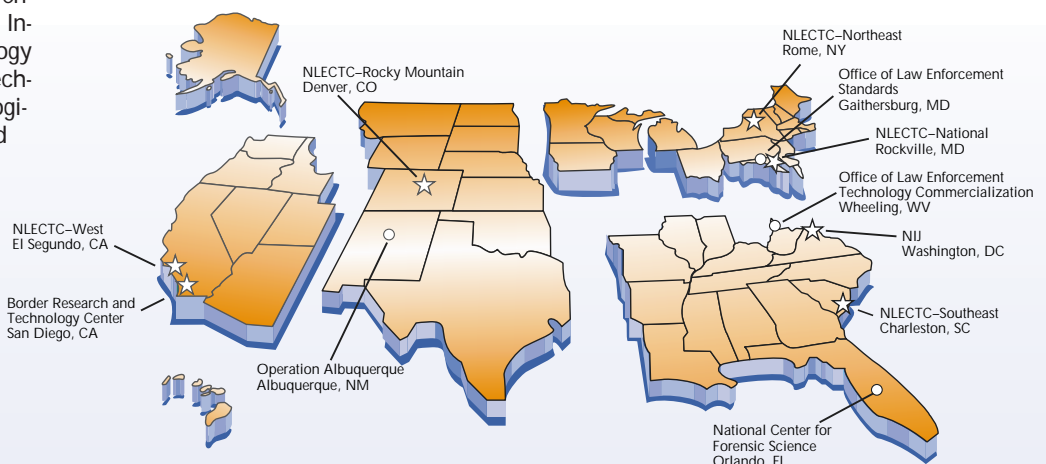
2050 East Iliff Avenue • Denver, CO 80208 • Phone: 800-416-8086, or  
303-871-2522 in the Denver area • Fax: 303-871-2500 • E-mail: [nlectc@du.edu](mailto:nlectc@du.edu)

Located at the University of Denver, NLECTC-Rocky Mountain focuses on communications interoperability and the difficulties that often occur when different agencies and jurisdictions try to communicate with each other. This facility works with law enforcement agencies, private industry, and national organizations to implement projects that will identify and field test new technologies to help solve the problem of interoperability. NLECTC-Rocky Mountain also houses the newly created Crime Mapping Technology Center, the training and practical application arm of NIJ's Crime Mapping Research Center, which is staffed by NIJ social scientists and scholars who utilize crime analysis research to improve police field operations and develop crime-mapping software for small, medium, and large departments. The Rocky Mountain facility also conducts research into ballistics and weapons technology, as well as information systems. Sandia National Laboratory has been designated as a satellite of NLECTC-Rocky Mountain. The laboratory works in partnership with NLECTC-Rocky Mountain and focuses on technology for detecting and neutralizing explosive devices.

## NLECTC-West

c/o The Aerospace Corporation • 2350 East El Segundo Boulevard • El Segundo, CA 90245-4691  
Phone: 310-336-2222 • Fax: 310-336-2227 • E-mail: [nlectc@law-west.org](mailto:nlectc@law-west.org)

NLECTC-West is housed on the grounds of The Aerospace Corporation, a nonprofit corporation that provides technical oversight and engineering expertise to the Air Force and the U.S. Government on space technology and space security systems. NLECTC-West draws on The Aerospace Corporation's depth of knowledge and scientific expertise to offer law



enforcement and corrections the ability to analyze and enhance audio, video, and photographic evidence. In cooperation with The Aerospace Corporation, this NLECTC facility also has available an extensive array of analytic instrumentation to aid in criminal investigations, such as a scanning electron microscope, an x-ray microscope, and a mass spectrometer, all of which are used to process trace evidence. Its other areas of expertise include computer architecture, data processing, communications systems, and a recent effort to identify technologies to stop fleeing vehicles.

## Border Research and Technology Center (BRTC)

1250 Sixth Avenue, Suite 130 • San Diego, CA 92101  
Phone: 619-685-1491 • Fax: 619-685-1484 • E-mail: [brtchrissa@aol.com](mailto:brtchrissa@aol.com)

The Border Research and Technology Center works with the Immigration and Naturalization Service, the U.S. Border Patrol, the U.S. Customs Service, the White House Office of Drug Control Policy, and the U.S. Attorney for the Southern District of California to develop strategies and technologies that will facilitate control of the Southwest border. One of its most recognized accomplishments has been the implementation of SENTRI (Secured Electronic Network for Travelers' Rapid Inspection). BRTC also works on joint ventures to identify technologies that will stop fleeing vehicles, and is currently participating in a project to detect the heartbeats of people concealed in vehicles or other containers.

## Office of Law Enforcement Standards (OLES)

National Institute of Standards and Technology, Building 225 • Gaithersburg, MD 20899  
Phone: 301-975-2757 • Fax: 301-948-0978 • E-mail: [oles@nist.gov](mailto:oles@nist.gov)

Supported by NIJ, the Office of Law Enforcement Standards applies science and technology to the needs of the criminal justice community. While its major objective is to develop minimum performance standards for equipment and technology, which NIJ promulgates as voluntary national standards, OLES also undertakes studies leading to the publication of technical reports and user guides. Its areas of research include clothing, communications systems, emergency equipment, investigative aids, protective equipment, security systems, vehicles, and weapons. It also develops measurement methods for analytical techniques and standard reference materials for forensic scientists and crime labs. Since the program began in 1971, OLES has coordinated the development of nearly 200 standards, user guides, and advisory reports. Housed at the National Institute of Standards and Technology, OLES works closely with NLECTC-National to conduct tests and to guarantee the performance and quality of equipment used by police and corrections.

## Office of Law Enforcement Technology Commercialization (OLETC)

Wheeling Jesuit University • 316 Washington Avenue • Wheeling, West Virginia 26003  
Phone: 800-678-6882 • Fax: 304-243-2131 • E-mail: [oletc@nttc.edu](mailto:oletc@nttc.edu)

Housed at Wheeling Jesuit University, the Office of Law Enforcement Technology Commercialization provides one of the NLECTC system's most important services, that of bringing research and private industry together to put new technologies into the hands of law enforcement and corrections. OLETC actively solicits manufacturers to commercialize technologies based on requirements identified by law enforcement and corrections practitioners. For example, it is currently seeking companies interested in commercializing technologies already developed by the U.S. Department of Energy's Los Alamos National Laboratory, such as a device that lets police officers detect crack houses from a distance, microwave and acoustic sensors that detect the motion of people behind walls or doors, and a nondetectable, non-scannable transmitter for use in undercover situations. OLETC works with private industry to support its efforts and help companies streamline the commercialization process.

## National Center for Forensic Science

University of Central Florida • P.O. Box 162367 • Orlando, FL 32816-2367  
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The newest addition to the NLECTC system, this facility is housed in the University of Central Florida and initially will focus on arson and explosives research. Its mission is to conduct fundamental research into the basic nature of fire and explosion reactions, provide the support for developing standard protocols for analyzing arson and explosion debris, promote the use of electronic media to access and exchange information about the forensic sciences, and provide education opportunities to practicing professionals and full-time students. This new facility will draw on the experience and expertise of the university, which houses a forensic science program with an active research program, as well as the Institute of Simulation and Training, which is currently exploring ways to simulate explosive reactions to study various chemical processes.

(Taking . . . cont. from page 4)



To better enforce smuggling laws, the U.S. Customs Service uses a machine that x-rays tractor-trailers. It can spot drugs, people, or agricultural contraband stashed in hidden compartments.



The U.S. Customs Service's Secured Electronic Network for Travelers' Rapid Inspection (SENTRI) matches photo, identification, and vehicle before the driver can enter the United States.

Drug runners and trafficking rings, possibly in response to stepped-up enforcement efforts, are becoming increasingly canny and technologically sophisticated. One ruse used by drug traffickers is to send several cars across the bridge and assume that one of them will be seized. In this way they can discern the pattern of detection. They also employ the use of spotters. At one border checkpoint there were at least four—two leaning against a pay telephone 20 yards from the checkpoint, another hunched in the shade near an employee parking lot, and a fourth positioned near the center of the bridge, about 50 yards from Customs officers. One of the spotters was an elderly man in a straw hat and rumpled clothes, carrying a cellular phone in his hand. The job of these spotters was to send a coded message to drivers waiting in line, telling them to head for a particular booth because Customs agents with drug-sniffing dogs were checking the drivers' lane, or signaling them that crossing was too dangerous and to make a hasty return to Mexico.

Then there are also those who don't need new technology—just a lead foot. They are directed by their superiors that if they believe a Customs agent is planning to search their vehicle, to step on the gas and run through the border checkpoint. Customs' low-tech, but highly effective, response has been to use concrete barriers to create a serpentine lane that prevents border runners from gaining enough speed to escape. Another method being used is a retractable barrier strip (see story "RoadSpike™ Stops Fleeing Vehicles").

As impressive as the results of this concerted enforcement effort have been, officials still say they are overwhelmed in certain areas of the border. To support their efforts, NIJ is continuing its work in developing applicable technologies. For example, BRTC arranged for a demonstration of a new device that can detect the heartbeat of people or endangered animals being smuggled inside trucks, trailers, or other types of enclosed space. This technology was developed by Oak Ridge National Laboratory (see story "Just a Heartbeat Away") and is currently being tested in the Nation's prison systems. NIJ expects the device, which has had a 100 percent success rate at detecting prison escapees, to be equally effective at the border's ports of entry and checkpoints.

For more information about BRTC or any of the new border technologies, contact the Border Research and Technology Center. Telephone: 619-685-1491.

## NLECTC Is Online

<http://www.nlectc.org>

Have Internet access? Try our Web site, JUSTNET, for:

- ◆ Information on new technologies, equipment, and other products and services available to law enforcement, corrections, and the criminal justice communities, including access to a database of over 4,000 available products and technologies.
- ◆ Breaking News from the printed media, the Internet, individual facilities of the NLECTC system, and the Nation's Capital.
- ◆ Publications from NIJ and NLECTC that you can view or download onto your system.
- ◆ Interactive Topic Boards that allow you to post questions and exchange information with hundreds of professionals in their areas of specialty.
- ◆ Frequently Asked Questions that offer detailed information based on thousands of calls to our information specialists.
- ◆ Calendar of Events that lists the latest on upcoming meetings, seminars, and training.
- ◆ Links to other important law enforcement and corrections Web sites.

For help in establishing an Internet connection, linking to JUSTNET, or finding needed technology and product information, call the NLECTC Information Hotline at 800-248-2742.

To receive future issues of the TechBeat newsletter at no charge, call 800-248-2742 or e-mail [nlectc@aspensys.com](mailto:nlectc@aspensys.com).



# RoadSpike™ Stops Fleeing Vehicles



Law enforcement agencies now have another weapon in their arsenal to stop fleeing vehicles without endangering the lives of officers or citizens. It's called the RoadSpike,™ a remotely activated barrier strip that lets officers selectively choose which vehicle to stop.

Barrier strips are not a new technology. For many years private industry has offered several versions that, when positioned in front of a fleeing vehicle, pierce the tires and force it to a slow stop. The problem has been that pursuing police vehicles and citizens' vehicles also could run over the strip. Furthermore, the officer who has to roll the device into the street could be in harm's way.

Developed at the Idaho National Engineering Laboratory in conjunction with the National Institute of Justice (NIJ) and commercialized by NIJ's Office of Law Enforcement Technology Commercialization, the RoadSpike™ takes care of those problems. The device is easily deployed, and its remote activation keeps officers out of the way of speeding cars. Because the spikes in the strip are retractable, traffic can pass over unimpeded until the suspect's vehicle approaches. The officer then activates the strip from a remote position. The spikes are elevated and the suspect's tires are punctured by several hollow spikes.

The RoadSpike™ is being sold commercially by PMG, Inc., in Wheeling, West Virginia. It is designed to be carried in the trunk of a patrol car, and can be field serviced with replacement spikes by any law enforcement officer. It weighs 23 pounds and comes with an 18-foot control cable for remote activation; a heavy-duty storage bag; and an accessory pouch with spare spikes, an installation tool, and extra grommets. Also available is a radio remote control activator, an electronic remote control, and additional strips for multiple lane coverage.

For more information about this and other technologies for stopping fleeing vehicles, contact the Office of Law Enforcement Technology Commercialization. Telephone: 800-678-6882.

## New Publications

The following publications are available from the National Law Enforcement and Corrections Technology Center-National:

*Equipment Performance Report: 1997 Patrol Vehicle Tires.* This report provides results of comprehensive testing of 1997 patrol vehicle tires. The report contains a large amount of data generated throughout the evaluation, which was conducted under a variety of test conditions.

*1997 Evaluation of Replacement Brake Pads for Police Patrol Vehicles.* This bulletin summarizes the results of the May 1997 comprehensive evaluation of replacement brake pads for police patrol vehicles. The evaluation can help police departments evaluate these vital auto parts before they stake their officers' lives on them.

*Police Body Armor Consumer Product List Update Fall 1997.* This consumer product list (CPL) identifies models of armor that were tested and found to comply with the NIJ standard. CPLs are updated to include new models that have passed the test. This edition is an update to the Spring 1994 edition of the CPL; both documents are required to have a complete listing of NIJ approved models.

*Michigan State Police Tests 1998 Patrol Vehicles.* Every year, the Michigan State Police test new patrol vehicles as part of its procurement policy. This bulletin summarizes test results of the 1998 patrol vehicles.

## The following publications will be available soon:

*Selection and Application Guide to Police Body Armor.* While body armor is a household word in the law enforcement community, questions about its selection and use are frequently asked. This guide responds to commonly expressed concerns. It provides information to assist in determining the level of protection required for individual officers consistent with the threats to which they are exposed.

*Equipment Performance Report: Replacement Brake Pads for Police Patrol Vehicles.* This report provides complete results of the May 1997 comprehensive evaluation of replacement brake pads for police patrol vehicles. The report contains a large amount of data generated throughout the evaluation, which was conducted under a variety of test conditions.

*Equipment Performance Report: 1998 Model Year Patrol Vehicle Testing.* This report provides complete data on the 1998 Michigan State Police patrol vehicle testing.

To obtain any of the above publications or to receive additional copies of the TechBeat newsletter, write NLECTC, P.O. Box 1160, Rockville, MD 20849-1160; telephone 800-248-2742; or download from JUSTNET at <http://www.nlectc.org>.



*TechBeat is the flagship publication of the National Law Enforcement and Corrections Technology Centers. Our goal is to keep you up to date on technologies that are currently being developed by the NLECTC system, as well as other research and development efforts within the Federal Government and private industry. Your questions, comments, and story ideas are always welcome. Contact: Rick Neimiller through NLECTC-National, 800-248-2742 or e-mail to [rneimiller@aspensys.com](mailto:rneimiller@aspensys.com). Contributing writer/editor, Lois Pilant.*

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