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# On the Cutting Edge

## Law Enforcement Technology

By DAVID G. BOYD, M.B.A.

In 1972, a researcher from the U.S. Department of Justice's National Institute of Justice (NIJ) stumbled upon heavy-duty military tires made from a fiber that could stop bullets. This material, perhaps best known by its trademark Kevlar, weaved its way into the soft body armor worn by law enforcement personnel. Since 1975, when NIJ first conducted field tests in 15 cities across the country, bulletproof vests have saved the lives of thousands of police officers.

Today, discoveries like this do not happen by accident. Rather, an agreement between the Department of Justice (DOJ) and the Department of Defense (DOD) ensures that the high-tech wizardry once employed solely by the military will be used to enhance the capabilities of law enforcement. As a sign of their commitment, the departments have formed an office whose mission is to move law enforcement into the 21st century.

### THE NATIONAL LAW ENFORCEMENT TECHNOLOGY CENTER

DOJ made a commitment to develop new technologies for law enforcement long before its April 1994 Memorandum of Understanding with DOD. Under the auspices of the NIJ, the Technology

Assessment Program Information Center (TAPIC) had been setting performance standards for equipment, testing new products, and disseminating test results to criminal justice agencies since 1968.

TAPIC eventually changed its name, but not its basic mission. The new National Law Enforcement Technology Center (NLETC) will

continue to help develop the technology that law enforcement officers need to stay several steps ahead of criminals.

### A COOPERATIVE EFFORT

NLETC works with several other government agencies to accomplish its objectives. First, DOD's Advanced Research Projects



Agency (ARPA) identifies "dual-use" technologies—those that could have both military and law enforcement applications.

Next, NLETC's Advisory Council, a group of more than 80 senior Federal, State, and local law enforcement officials from the United States and Canada, meets twice-yearly to prioritize the projects identified by ARPA. Products that protect human lives, save agency resources, or decrease the potential for liability claims against an agency usually receive top priority.

The advisory council recommends such projects for NIJ funding. It also serves as a "reality check," noting which applications would fail to meet the requirements of law enforcement officers in real-world situations.

In conjunction with the National Institute of Standards and Technology's Office of Law Enforcement Standards, the advisory council sets the standards to which the

equipment must adhere. Standardization involves establishing criteria and testing procedures to evaluate whether the product or procedure meets the performance requirements of the law enforcement officers who will use it. Council members establish criteria with an administrator's eye—one that often sees dollar signs. Accordingly, the cost of new technology should not exceed its benefits to law enforcement.

#### PRODUCT DEVELOPMENT AND TESTING

With projects identified, prioritized, and standardized, NLETC disseminates the council's reports to research and development concerns in NIJ, DOD, and private industry. In turn, these entities create solicitations, which outline the projects for which NIJ will provide funding. NIJ then accepts proposals from manufacturers and laboratories interested in developing and testing the equipment and awards grants to

the firm whose proposal best meets the previously established standards.

By this time, several years likely have passed. Developing and testing a prototype in the laboratory and then in the field take considerably more time. However, the time spent is well worth the effort if it means safer, more effective products. Furthermore, once NIJ sets standards for a product or technique, other agencies—both public and private—can use the criteria to develop new or improved products.

Finally, with testing complete, NLETC analyzes the data and disseminates the results. It continues to publicize the information gathered just as TAPIC did in the past: Through articles in criminal justice publications, in technology bulletins, at criminal justice conferences, and in its newsletter, newly christened *Technology Beat*.

The new center also is a place where researchers, manufacturers, and practitioners can meet to exchange information. Indeed, NLETC will make available "state-of-the-science" technologies to benefit law enforcement officers across the country. Many new products and procedures—some of which are described here—already await the law enforcement seal of approval.

#### LESS-THAN-LETHAL TECHNOLOGIES

Developing less-than-lethal technologies represents a top priority for law enforcement. In a 1985 landmark decision, the Supreme Court ruled that deadly force is unjustified against an escaping, non-violent felon<sup>1</sup> and called for the law enforcement community to develop



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appropriate equipment to apprehend suspects safely.

In 1986, the Attorney General's Conference on Less-Than-Lethal Weapons characterized the law enforcement officer's most common tools—the nightstick and the gun—as inappropriate in many instances, especially in hostage and barricade situations, which require equipment that can stop a dangerous subject without endangering innocent hostages or bystanders. Clearly, criminal justice professionals need new approaches to capturing, subduing, and detaining subjects.

### Sticky Foam

One product under development is restraining or "sticky" foam, a taffy-colored, gel-like substance that, when dispersed from a pressurized shoulder-slung "gun," expands and turns into a glue that sticks on contact. The Department of Energy developed it to help secure nuclear weapon facilities by tripping up and entangling trespassers. It originally was believed that police officers could shoot the foam from a safe distance to stop fleeing suspects or to disable violent individuals armed with weapons other than guns.

Unfortunately, laboratory tests on volunteer subjects showed that the fairly large quantities required to achieve disabling effects made cleanup difficult. Despite this drawback, the U.S. Marines expressed an interest in sticky foam and have used it successfully during recent peace-keeping operations in Somalia.

In addition, the foam may prove effective in quelling prison disturbances by denying inmates access to certain areas, as may aqueous foam, a kind of thick, artificial fog. Tests

and evaluations continue on these products, as NLETC explores their safety and effectiveness.

### Strobe-and-Goggle Technology

Already in the prototype stages, strobe-and-goggle technology employs a bright flashing light to blind and disorient subjects during drug raids or assaults on barricaded structures, allowing officers to enter the premises. In the past, these pyrotechnic flash-light generators, or "flash-bang" devices, had limitations. They sometimes generated extreme amounts of heat and light. Most often, they disoriented subjects for too brief a time.

Worse, the officers who used them experienced the same effects as the criminals.

The new prototype includes goggles that protect law enforcement officers from the light's effects. In this case, the technology needed to make the goggles already existed. Both military pilots and commercial welders wear goggles designed to darken when exposed to bright light.

### Backseat Airbag

New patrol cars have driver-side and passenger-side airbags, but soon they may have backseat airbags as well. With the ability to activate and control the bag from the front seat, an officer could subdue an unruly subject



*A backseat airbag inflates to restrict a subject's mobility.*

without harm to the individual. These bags also could be used in prisons to control and, if necessary, immobilize unruly prisoners. A similar technology might expel unwilling detainees from their cells.

### Remote-Control Barrier Strips

Law enforcement agencies face a myriad of potential liability situations. Many such lawsuits spring not from the use of firearms but from high-speed vehicular chases. In California last year, more than 7,000 high-speed pursuits occurred. One out of five ended in accidents, resulting in more than 1,200 injuries.<sup>2</sup> About 1 percent of all high-speed chases end with a fatality.<sup>3</sup>

In response to the need for safe ways to stop fleeing suspects, a national laboratory is developing technology to allow police to activate, by remote control, strips of needles that pop out of the road and puncture the tires of fleeing vehicles. Then, the police will retract the needles to chase the subject. The ability to activate the system remotely will prevent injury to law enforcement and to innocent civilians. NLETC anticipates evaluating a prototype strip some time in 1995.

### Fleeing Vehicle Tagging System

Ultimately, if law enforcement cannot find a harmless way to stop a pursued vehicle, it happily will settle for a way of definitively marking the

vehicle to locate it at a later time. The same laboratory developing retractable spiked strips is at work on a projectile launcher system, which would allow officers to fire a "tagging" projectile at a fleeing vehicle. Equipped with a tiny radio transmitter, the object would stick to the car and allow police to track the vehicle from a safe distance without endangering lives or allowing the suspect to escape.

### OFFICER SAFETY

Less-than-lethal technologies that save the lives of innocent people and protect agencies from liability lawsuits represent an important area of research. However, officer safety remains a top priority, and NLETC continues to sponsor projects designed to save officers' lives.

### Smart Gun

One-sixth of all law enforcement officers killed each year are shot with their own weapons.<sup>4</sup> A national laboratory is testing a variety of sensors, which, when placed in the handgrip of a weapon, would "recognize" the authorized user and refuse to fire for anyone else. The resulting "smart gun" never could be used against its owner.

In addition to saving the lives of law enforcement officers, smart guns might save the lives of children

who kill themselves, either accidentally or intentionally, with their parents' weapons. Finally, criminals who obtain weapons illegally could not fire them.

### Personnel Monitoring System

Technology soon may make the standard police walkie-talkie obsolete. Originally developed for Army medics, a personnel monitoring system will enable law enforcement and other public service personnel to remain in direct contact with their departments at all times.

A miniature camera transmits full-color video of the scene; wireless networks allow audio communication and data transmissions; a Global Positioning System provides the officer's exact street location; and a personal status monitor tracks the officer's vital signs. As a result, an agency could locate and monitor an officer in distress, quickly assess the situation, and respond accordingly.

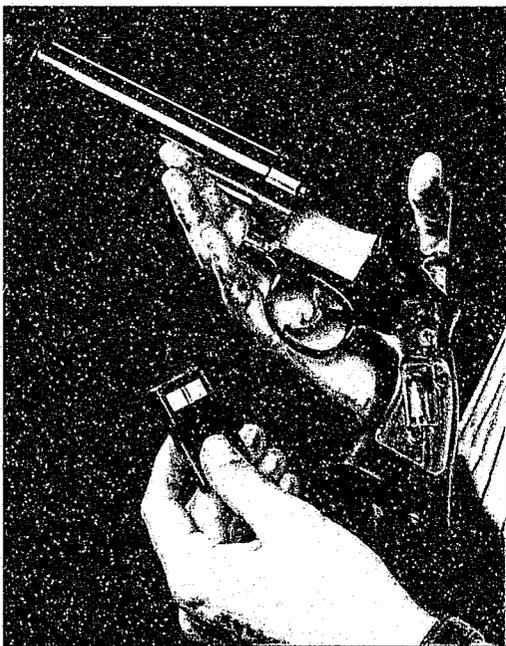
### INVESTIGATIVE TOOLS

The "perfect crime" becomes harder to commit every day. Emerging technology allows law enforcement officers to piece together crime scene clues where little evidence appears to exist.

### The Magic Wand

In only 18 months and with a research grant of under \$100,000, the Alaska Crime Laboratory, together with a nationally known private firm, developed and distributed the Fingerprint Visualization System, named the "Magic Wand." It allows investigators to lift prints from nonporous surfaces at the scene of the crime, not in the lab.

*This prototype of the "smart gun" has a sensor built into the handgrip that prevents unauthorized users from firing the weapon.*



It helps police identify and apprehend suspects quickly.

The Fingerprint Visualization System allows prints to be developed onsite in a matter of seconds using a portable, handheld device that combines a superglue with a dye and reduces the procedure to one simple step. With prints in hand, the investigator need only link them to a suspect, a process that one day will be accomplished from the officer's patrol vehicle.

### Smart Car

Firefighters and mail carriers use specially designed trucks on the job; yet, no vehicles have been designed specifically for police work. Even cars with "police packages" usually come equipped only with different paint, special lighting packages, and other accessories. With limited buying power, law enforcement could not even persuade Detroit automobile manufacturers to produce cars without passenger-side airbags, which, if deployed, could turn equipment mounted on the passenger side into dangerous projectiles.

Still, some private firms that once held DOD contracts now have focused their creative energies on law enforcement. Police vehicles have become fertile ground for the seeds of science and technology. The "smart car," already being used by the Anne Arundel County, Maryland, Police Department and the Maryland State Police, is ready to merge onto the information superhighway with computer hardware and software designed to link officers on the street with databases all over the country.

These systems allow officers to do more than write reports on computers. They provide immediate access to wants and warrants information, letting officers know what dangers they might face before they even step from their patrol cars.

The computers also permit on-the-spot transmission and retrieval of arrest records, fingerprints, and mugshots. Some day, they will hold

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**...NLETC will make available 'state-of-the-science' technologies to benefit law enforcement officers across the country.**

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voice samples, giving law enforcement officers a complete offender profile from the street. As departments acquire more smart cars and network them so that they communicate with one another, a trip to the station may be a rare occurrence for police officers in the future.

### CONCLUSION

Small police departments usually do not have the resources to implement new techniques and technologies for fighting crime. Even larger departments with the funds may not have access to the information they need to make the right purchases. In fact, law enforcement agencies as a group do not possess the buying power to encourage manufacturers to research and develop products their officers need at prices they can afford.

Adapting technology to serve in a field different from the one for which it was intended frequently costs almost as much as developing it from scratch. Multiple-use technologies save money by targeting several fields, including the military, public service, and law enforcement. With the National Law Enforcement Technology Center, the Federal Government has reaffirmed its commitment to identifying, developing, and manufacturing new products and applications specifically designed with law enforcement in mind.

Technology cannot fix every shortcoming. It cannot make up for poor judgment or compensate for inadequate or nonexistent training. It cannot fix the problems that result from poor officer screening or selection, and it can never replace competent leadership.

Technology can provide the tools to make law enforcement more efficient and effective, limit the consequences of poor judgment, and improve the safety of the police and the public. It can save lives. ♦

### Endnotes

<sup>1</sup> *Tennessee v. Garner*, 471 U.S. 1, 105 S.Ct. 1694.

<sup>2</sup> Unpublished report by the California Highway Patrol.

<sup>3</sup> Studies have produced fatality estimates ranging from about .38 percent to 3 percent. See Geoffrey P. Alpert, "Police Pursuit and the Use of Excessive Force," unpublished paper; and Tim Grimmond, "Police Pursuits," *Police Chief*, July 1992, 43-47.

<sup>4</sup> Author-calculated average of Uniform Crime Reports data for the past 12 years.

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For information on products or services offered by the NLETC, call 1-800-248-2742 or write NLETC, Box 1160, Rockville, MD 20849.

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