Using Science and Technology to Improve Criminal Justice

NIJ continued its leadership role in developing, testing, and evaluating technology tools to assist criminal justice. Ongoing projects highlight the value of technology in investigating crime, protecting officers and citizens, and detecting illegal and dangerous materials.

Reducing the DNA testing backlog

Forensic DNA evidence can be a powerful tool to convict the guilty and to exonerate the innocent. But as legislation increases the list of crimes for which offender DNA samples must be collected and law enforcement becomes better trained and equipped to collect DNA samples at crime scenes, the backlog of samples awaiting testing throughout the criminal justice system will continue to increase. NIJ explored ways to reduce the backlog and equip laboratories to manage the influx of convicted offender samples and other casework.

Through the DNA Backlog Reduction Program, NIJ has funded the analysis of almost 500,000 DNA samples taken from convicted offenders in 45 States through fiscal year 2002. Since the program's inception in 2000, the analysis of these samples has generated nearly 2,000 "hits," or matches, with crime scene samples in the State and national DNA databases. Each hit can assist investigators by linking related crimes, proving the innocence of a subject under investigation or even convicted of the crime, or helping to bring a violent criminal to justice.

To take advantage of economies of scale available from the private sector, NIJ has worked with the States to pool samples for analysis by high-capacity private DNA laboratories and by State and local laboratories in order to help make analytic services available at a lower cost. NIJ also screens vendor laboratories to ensure technical capability and quality control, taking this burden off State and local laboratories. As a result, NIJ has reduced the average cost of analysis per sample by more than 30 percent.

During 2002, NIJ restructured the Convicted Offender Backlog Reduction Program to allow States to use private labs selected by the General Services Administration and take advantage of their high capacities. The goal was to make analytic services available more quickly and cost-effectively to State and local laboratories.

For more information:

- Visit NIJ's program page on investigative and forensic sciences at http://www.ojp.usdoj.gov/nij/sciencetech/ifs.htm.

Detecting crack and other smokable forms of cocaine

Federal legislators have set more severe punishments for crack use and trafficking than for powder cocaine use and trafficking. But a lab technician testing an arrestee's urine sample for cocaine use would be unable to tell whether or not the drug was smoked. That may soon change. In 2002, NIJ

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Crack is the primary form of smokable cocaine and is considered by many law enforcement officials to be more dangerous than powder cocaine. In addition to being highly addictive, crack is associated with a multitude of social, economic, and health problems.

Although the methodology needs further refining before large-scale testing can be implemented, the ability to distinguish how cocaine is used will enable researchers to verify the accuracy of self-reports in specific populations (e.g., juveniles) and to better analyze drug use trends in the effort to better understand why treatment fails and arrestees recidivate. In addition, improved data could help local officials track the spread of crack in areas where the drug is not well established.

Technology to search, protect, and communicate

In 2002, NIJ continued to assess and test innovative technologies of practical use to the criminal justice field and to assist in commercializing those technologies that can improve criminal justice.

Seeing through walls. Soon law enforcement officers may have the ability to see through solid walls. In 2002, NIJ oversaw the completion of a second-generation prototype of through-the-wall personnel detection and tracking radar. A number of similar devices are in the development and testing stages. The devices use technology similar to that found in CAT scans or ultrasound equipment to locate and track people through the walls of buildings. If commercialized, such a device could greatly enhance the ability of police to successfully resolve hostage situations.

Detecting weapons and drugs. A number of workable technologies are in use to detect weapons at security checkpoints in airports, courts, prisons, and schools. The current generation of devices is limited by a high number of false positives. NIJ continued an assessment of a weapons detection portal in a New York City high school. The portal shows the potential for developing a more reliable system for distinguishing between dangerous weapons and innocuous items such as coins or keys.

Another NIJ-sponsored experiment in 2002 tested drug detection technologies for prison mail rooms. The equipment can help reduce the amount of illicit drugs reaching prisoners in the Nation's prisons and jails.

Improving communications. NIJ continued initiatives to improve communications within and among local and regional law enforcement agencies. In 2002, a regional information sharing system for law enforcement was launched in the Hampton Roads, Virginia, area. Another project led to the development of a statewide secure counterterrorism Web site for the Florida Department of Law Enforcement.

Search and rescue needs. NIJ began a project with the U.S. Department of Energy's Savannah River Technology Center in 2002 to identify what technology tools urban search-and-rescue teams can use to perform their job more effectively. The Center collaborated with the Federal Emergency Management Agency and practitioners to determine the needs of the field as a first step in making those

NATIONAL LAW ENFORCEMENT AND CORRECTIONS TECHNOLOGY CENTER

NIJ's National Law Enforcement and Corrections Technology Center (NLECTC) provides technology assistance along with scientific and engineering advice and support to State and local law enforcement and corrections agencies. NLECTC activities during FY 2002 included:

Assistance to the Integrated Border Enforcement Teams. NLECTC helped the Integrated Border Enforcement Teams identify current and emerging technologies for border security applications in such areas as sensors and surveillance, intrusion and human presence detection, geographic information systems (GIS) and related crime mapping technologies, criminal information sharing systems, and less-than-lethal technologies designed to stop boats and other vehicles.

Assistance to the Metro Area Sniper Task Force. During the serial sniper incident in the Washington, D.C., metropolitan area, NIJ—through the NLECTC system—offered assistance to the Joint Operations Center, organized by the Montgomery County, Maryland, Police Department to handle the investigation. NLECTC provided hardware, software, and system installation support for the analysis of investigative information; communications interoperability support; and audio/video and timeline analysis.

Security at the Winter Olympic Games. To assist with security at the Winter Olympic Games, NLECTC provided the U.S. Forest Service with five thermal imagers to help ensure public safety through wide-area surveillance capability.

Technology evaluation. The NLECTC system continued to help State and local agencies avoid costly and potentially harmful mistakes by evaluating manufacturers' technology claims. Of note, the explosive detection capability of the "MOLE" Programmable Detection System was tested, and the device was found to "perform no better than a random selection process."

Mock Disaster. NLECTC sponsored the first annual Mock Disaster, which provides comprehensive educational and operational training for emergency first responders to help them plan for, evaluate, respond to, and mitigate large-scale disasters.

For more information:

Visit the NLECTC Web page at http://www.justnet.org.

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technologies available. Areas of interest include robotics, communications, and technologies to locate individuals in rubble.

ID checks for inmates. Biometrics uses physical traits (such as fingerprints, voice analysis, facial features, or eye patterns) to identify an individual. Can biometrics be used effectively in a prison setting? NIJ teamed with the Space and Naval Warfare Systems Center to conduct a biometrics field test at the Naval Correctional Facility in Charleston, South Carolina. The project sought to determine which biometric techniques work best in a prison or jail environment and whether existing technologies need to be modified to meet the special needs of prisons and jails.

Five different biometric technologies have been evaluated, with mixed results. Preliminary results concluded that iris recognition is the most accurate method, while facial recognition produces the most mismatches. But the project underscored that biometrics is an emerging technology with limits. A corrections administrator must weigh that fact and a number of other factors before considering the viability of biometrics in a prison setting. What are the lighting conditions? How many users will there be? Will the device be used overtly or covertly? These and other factors will influence the effectiveness of any technology implemented.

In 2002, NIJ continued a similar project to test biometrics in the Prince Georges County, Maryland, jail.

For more information:

- To learn more about biometrics, visit the *Biometrics Catalog* at http://www.biometricscatalog.org, developed with support from NIJ.

AGILE for interoperability

During natural disasters, high-speed pursuits, terrorist attacks, or other critical incidents that span jurisdictional boundaries, the ability to communicate can be a matter of life and death. NIJ's AGILE Program was developed to improve the ability of State and local law enforcement agencies to communicate with one another across agency and jurisdictional boundaries. In 2002, the AGILE Program supported the National Task Force on Interoperability, a group formed by 18 national associations representing State and local elected and appointed officials and public safety personnel, with a stated goal of improving interoperability among Federal, State, regional, and local government and public safety agencies. Other AGILE activities in 2002 included:

- Funding the development of the Computer-Assisted Precoordination Resource and Database System, which helps agencies in the same geographic region coordinate the allotment of communications airwave frequencies and is used in developing State or regional communication plans.
- Providing standards development and support for projects to improve broadband communications, to use wireless technology, and to staff the Nation's communications centers.

- Providing continued support to the National Public Safety Telecommunications Council, the national voice for State and local public safety communications issues.
- Managing a grant to the Capital Wireless Integrated Network, which is creating the first multi-State, interjurisdictional integrated wireless network in the United States.

For more information:

- Visit the AGILE Web site at http://www.agileprogram.org.

Protecting Communities

NIJ continued to explore strategies for keeping communities safe in 2002 by giving communities evidence-based knowledge, innovative methods, and other tools to help reduce crime and protect citizens.

Reducing firearms violence

Projects in Atlanta, Boston, Detroit, Indianapolis, Los Angeles, and St. Louis have shown some success in targeting and reducing youth gun violence. These six cities operated local projects designed to reduce firearm-related violence and were funded by NIJ, the Office of Community Oriented Policing Services, and the Centers for Disease Control and Prevention.

Lessons learned from these projects are chronicled in a series of publications on reducing gun violence. The first one described Boston's Operation Ceasefire. The second described the Indianapolis Police Department's Directed Patrol Project, which showed that targeted patrol efforts can significantly reduce violent crime. One area of the city, the East District, increased officer contact with citizens, primarily through increased traffic enforcement. The North District increased officer contact only with targeted individuals who police suspected of being involved in illegal activities. The North District issued far fewer citations, but made twice as many arrests per vehicle stopped and discovered three times as many guns per stop compared to the East District.

Each subsequent report in the series will describe in detail the problem targeted; the program designed to address it; the problems confronted in designing, implementing, and evaluating the effort; and the strategies adopted in responding to any obstacles encountered.

For more information:

- Edmund F. McGarrell, Steven Chermak, and Alexander Weiss, *Reducing Gun Violence: Evaluation of the Indianapolis Police Department's Directed Patrol Project*, Washington, DC: U.S. Department of Justice, National Institute of Justice, November 2002 (NCJ 188740), http://www.ojp.usdoj.gov/nij/pubs-sum/188740.htm.