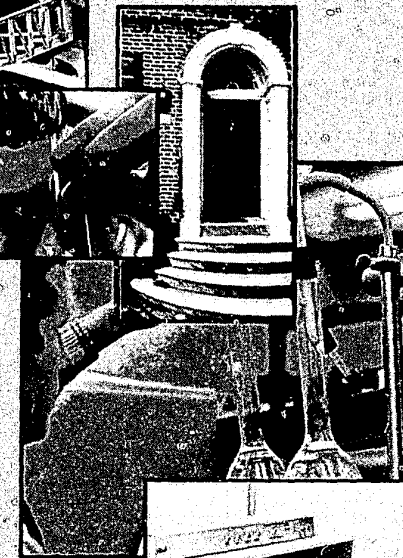




U.S. Department of Justice  
National Institute of Justice

MJ-1

# The Technology Assessment Program



*Findings from  
A Decade of  
Technological  
Research*

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## About the National Institute of Justice

The National Institute of Justice is a research, development, and evaluation center within the U.S. Department of Justice. Established in 1979 by the Justice System Improvement Act, NIJ builds upon the foundation laid by the former National Institute of Law Enforcement and Criminal Justice, the first major Federal research program on crime and justice.

Carrying out the mandate assigned by the Congress, the National Institute of Justice:

- Sponsors research and development to improve and strengthen the criminal justice system and related civil justice aspects, with a balanced program of basic and applied research.
- Evaluates the effectiveness of federally-funded justice improvement programs and identifies programs that promise to be successful if continued or repeated.
- Tests and demonstrates new and improved approaches to strengthen the justice system, and recommends actions that can be taken by Federal, State, and local governments and private organizations and individuals to achieve this goal.
- Disseminates information from research, demonstrations, evaluations, and special programs to Federal, State and local governments; and serves as an international clearinghouse of justice information.
- Trains criminal justice practitioners in research and evaluation findings, and assists the research community through fellowships and special seminars.

U.S. Department of Justice  
National Institute of Justice

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## The Technology Assessment Program

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A Decade of  
Technological  
Research*

**U. S. Department of Justice**  
National Institute of Justice  
*Office of Development, Testing,  
and Dissemination*

July 1981

**National Institute of Justice**

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## What The Technology Assessment Program Is

In the 1980's, soaring demands on justice system agencies will be met in part by complex and sophisticated technologies. Many law enforcement agencies, for example, have moved from simple two-way communications to digital transmissions and computer-aided dispatch systems. The volume of court records that must be processed and stored virtually dictates computers and archival storage. Collection and analysis of evidence--often crucial to successful prosecution of criminal cases--make well-equipped laboratories and highly trained technicians essential.

To help justice system agencies meet their diverse technological needs effectively and economically, the National Institute of Justice (NIJ) sponsors the Technology Assessment Program. This applied research program--

- Sets minimum performance standards for specific technological devices.
- Tests commercially available equipment against the standards.
- Disseminates the standards and test results to police, courts, and corrections agencies throughout the country.

"...there will be a need for centralized establishment of technical standards and for provision of technical assistance and guidance." This recommendation by the National Crime Commission in the late 1960's became the blueprint for the Technology Assessment Program.

From its beginnings in 1971 as a small effort to answer equipment-related questions from individual agencies, the Technology Assessment Program has evolved into a major NIJ program of support for technological research at the National Bureau of Standards (NBS). Today, engineers and scientists from NBS and from other parts of the public and private sector examine technology for the entire justice system and develop reliable guides to performance, economy, and safety through scientifically sound standards and technical assistance.

### reliable guides to performance, economy, and safety. . .

Criminal justice agencies spend millions of dollars on equipment each month. The International Association of Chiefs of Police (IACP) estimates that law enforcement agencies alone spent \$13 billion on equipment in 1979. The Bureau of Justice Statistics estimates that courts and corrections spent over 100 million tax dollars in the last 5



years to improve their technology, equipment, and facilities. Like all buyers in these days of high prices and tight budgets, public agencies need to know how to make cost-effective, reliable purchasing decisions that fit long-term goals. Although cost is important, it cannot be the overriding consideration: safety and performance also are paramount concerns. An inferior product is never a bargain, but for criminal justice agencies the cost may be measured in lives, not just dollars and cents.

through standards and technical assistance. . .

Over the past decade, the program has supported technological research that surveys the entire market and puts vital purchasing information in the hands of agency officials responsible for purchasing decisions.

The complexity and diversity of modern technology make it difficult for local agencies to compare products, to establish performance criteria and test products against these standards, or to develop a bid process that guarantees the equipment ordered will meet requirements. Technical performance standards help local agencies resolve these difficulties. By using the standards, they can eliminate from competition equipment that does not comply with the scientifically established criteria.



## How The Technology Assessment Program Works

The National Institute of Justice operates the Technology Assessment Program through three organizations--the Advisory Council, the Law Enforcement Standards Laboratory, and the Information Center.

### The Advisory Council

This nationally recognized group of prominent criminal justice and public safety experts reviews performance requirements and evaluates newly developed standards and ongoing equipment testing. Specifically, the Council--

- Assesses technological needs among criminal justice agencies and sets priorities for items to be evaluated and tested.
- Provides technical consultation to assist planning and implementation of the program.

### The Standards Laboratory

The Standards Lab of the National Bureau of Standards, U.S. Department of Commerce is part of the National Engineering Laboratory at NBS, a center of engineering technology with expertise in equipment safety and utility. Projects in the standards program take advantage of the scientific and technological resources at NBS, the Nation's oldest and best known standards laboratory.

The Standards Lab--

- Subjects representative equipment to laboratory testing and evaluation.
- Develops voluntary national performance standards,\* the rule of thumb for measuring the performance of equipment used by criminal justice agencies. Final standards are the result of an intensive development and review process --typically 3 years.
- Produces user guides that complement the technical standards by explaining equipment capabilities in non-technical terms.

\*Performance Standards describe minimum performance levels for essential functions. They differ from design standards which define such things as size, color, or weight.

## The Information Center

The Information Center of the International Association of Chiefs of Police (IACP) is in direct contact with working professionals in the field. Its large Federal, State, and local membership has benefited from the Association's technical assistance and consumer information programs for over half a century. Suggestions for technological research often spring from these inquiries from the field.

### The Information Center--

- Supervises a national compliance testing program conducted by independent laboratories.
- Disseminates the results to State and local agencies.
- Distributes standards and user guides, and relates the decisions of the Advisory Council to the field.
- Offers technical assistance to agencies--
  - . Immediate help is available through a toll-free line at the Center: (800) 638-4080 (except in Maryland and the Washington, D.C. area (301) 948-0922).
  - . Planners needing assistance in the bid process can call the toll-free number for information about new technology or names of equipment vendors.

The Advisory Council begins the technology assessment process by determining the needs of justice system agencies. In consultation with NIJ, the Council sets research priorities. The Standards Laboratory then supervises the research and testing that eventually lead to performance standards. With assistance from the NBS Office of Testing Laboratory Evaluation Technology, the Council helps the Information Center select commercial testing laboratories, and manufacturers are invited to submit samples for testing. The actual tests that assess whether commercially available equipment meets the minimum performance levels established by the standard are supervised by the Information Center. Finally, after the tests are completed, the Center gets the word to the justice community through the *Consumer Product Report*. This report presents the detailed results of the test; it does not, however, recommend individual commercial products.

## What The Technology Assessment Program Does

### Serves the Entire Justice Community

Help for planning the proper use of technology is needed everywhere in the justice system. The Technology Assessment Program has a full agenda of justice system research projects including standardization techniques for measuring fire accelerants used in jails and prisons, a standard for hydrocarbon gas detectors in the battle against arson, guidelines for energy conservation in correctional facilities, a standard for fixed antennas at police headquarters sites, and standards for video as well as audio recording equipment for courtrooms.

### Reaches a Broad Audience

More than 200,000 copies of standards have been distributed in response to requests. Many city, county, and State governments use the program's standards. Equally important, more than 6,000 justice system practitioners have attended workshops on implementing standards. Foreign nations also use the standards. When Canada established its own technology assessment program, for example, it adopted the NIJ-Law Enforcement Standards. In the private sector, the American Bankers Association has distributed 12,000 copies of the NIJ publication on intrusion alarm terms and definitions.

### Supports Arson Investigations

One current study--a calibration system for arson detectors--illustrates how closely scientists, engineers, and technicians from diverse fields work together to solve criminal justice problems.

The growing incidence of arson in the past decade has alarmed both the public and the criminal justice community. Deaths and property damage from arson have skyrocketed, with losses in the billions. When arson investigators arrive at the scene of a suspicious fire, the "sniffer"--a portable vapor detector--can help determine the fire's cause. It samples the air for flammable vapors, and a sensing device signals the presence of hydrocarbon vapors that might come from such substances as gasoline, kerosene, or paint thinner--commonly used by arsonists. If the sniffer detects suspicious vapors, samples of nearby debris likely to contain accelerants are collected and sent to a laboratory to determine evidence of arson--expediting investigations and aiding in prosecutions.

Until recently there was no reliable, readily available method to determine the sensitivity of the detectors. Physicists at the NBS Center for Fire Research developed a device to calibrate detectors that might have become contaminated or insensitive to accelerant vapors. Bureau engineers and chemists are also studying standard levels of hydrocarbon vapor that detectors might find in different types of material. This research will help fire investigators and laboratories understand performance and limitations of commercial sniffers, providing more reliable results for them and aiding the Standards Lab in developing a performance standard for sniffers.

### Protects the Protectors

**Soft body armor.** The first commercial item to undergo testing under the Technology Assessment Program was perhaps the most well known--soft body armor.

Body armor has been a persistent problem for police management over the years. The early garments were so heavy and awkward that officers avoided wearing them--the lifesaving vest was more often in the locker than on the officer. The garments frequently were uncomfortable and lacked built-in stretch, inhibiting the quick movements essential for self-defense. Heat buildup was another problem causing discomfort for the wearer.

KEVLAR® *aramid*, the trademark for a new, Dupont synthetic fiber, solved many of these problems. It was first developed as a replacement for steel cords in automobile tires. While testing it for the U.S. Army, officials brought the new material to the attention of the National Institute of Justice. An Institute representative asked, "Will it stop a bullet?" The fiber promised a high degree of protection and light weight. Flexible as well, vests of Kevlar could be worn unobtrusively under normal street clothes and uniforms. NIJ pioneered the development of a prototype vest made from Kevlar, and, after extensive laboratory work, new garment designs were tested in 15 cities. The results exceeded expectations.

By 1975, dozens of manufacturers had entered the market. Police had a choice of vests but little information on which to base purchases. What departments needed were objective guidelines for making sound purchases--performance standards. The Advisory Council recommended that armor made of Kevlar be tested so that departments could order vests according to the level of protection required. After exhaustive tests and internal review, the Standards Laboratory created a new standard that defines the types of armor necessary to protect officers from a .22 caliber bullet on up through an armor-piercing 30.06 weapon.

Since few local or State agencies had resources to test armor against the new criteria, the Information Center and the Advisory Council took the next important step. They selected several independent laboratories, which were evaluated by the National Bureau of Standards, and invited manufacturers to submit bullet-resistant vests for testing.

The Information Center monitored tests of 54 vests; 25 did not meet the standard. These results, published in the Center's December 1978 *Consumer Product Report*, prevented several departments from buying inferior equipment. Many manufacturers modified their vests to meet the standard and resubmitted their products for testing. Product improvement thus became another benefit of the Technology Assessment Program.

But the greatest benefit of this research development and testing effort is enhanced police safety. Officers wearing the soft body armor have escaped serious injury and even death. According to statistics compiled from *FBI Uniform Crime Reports*, 129 officers died in 1975 from unexpected assaults. In 1980, the same number of unanticipated assaults caused 103 fatalities--20 percent fewer--due in part to the increased use of the soft body armor.



**High-speed patrol car tires.** Any of the organizations involved in the program can suggest what needs to be studied. Sometimes recommendations come from Institute personnel, sometimes from practitioners in the field. In the case of patrol car tires, police chiefs reported to NIJ that blowouts were occurring during high-speed chases, causing death and disability. NIJ, after preliminary investigation, recommended that the Standards Laboratory investigate the problem associated with steel-belted radial tires.

After extensive study of typical tires in police use nationwide, results showed that most tires were not certified beyond 85 miles per hour. The Center published the test results. The impact was dramatic. Manufacturers stopped bidding on patrol car tires unless their company's tires were certified up to 125 miles per hour. The Information Center alerted police departments to the data and--most important--no more accidents occurred because of high-speed blowouts.

### **Saves Tax Dollars**

Shortly after the test data on soft body armor became available, the New York City Police Department was prepared to order over \$1 million worth of vests. The NYPD reviewed the armor tentatively selected and found that it failed to comply with the NIJ standard. Soliciting new bids on armor that met the performance standard, the Department saved \$35 per garment.

In 1978, the U.S. Marshals Service cited NIJ performance standards in a bid proposal rather than buying equipment listed on the GSA discount schedule. The Marshals Service was able to purchase special radios that met their needs, while saving taxpayers over half a million dollars.

### **Assesses Fire Hazards in Correctional Institutions**

Alarmed by tragic fires in nursing homes, NIJ directed the program to study the frightening prospects of fire in another confined setting--correctional facilities. The responsibility for institutionalized persons during emergencies such as a fire is extraordinary, with serious implications for community and correctional administrators. Liability for prisoners, just one of the consequences, has become a major litigation issue in the last 10 years. The Standards Lab is working on a manual for use by correctional personnel that shows how to assess fire hazards in long-term confinement institutions. The new manual includes methods for preventing fires in prisons and limiting the risks of injury and damage if a fire does occur.

### **Aids the Collection and Maintenance of Evidence**

The Technology Assessment Program has published four guidelines to aid police in collecting and maintaining evidence. In contrast to standards, which are highly technical and intended for laboratory use, guidelines are simple and easy to follow. The Center's August 1979 *Bulletin* included "Guidelines on Collection and Handling of Physical Evidence," and described procedures and kits for Blood Alcohol, Post-Mortem Blood Alcohol, Rape Evidence Collection, and Controlled Substances Evidence Handling and Securing, which were developed by the council's forensic science committee.

In 1978, the Standards Laboratory and the Analytical Chemistry Division at NBS completed work that will help in forensic investigations of drugs. They developed a standard that establishes minimum requirements for chemical spot test kits and several methods for testing the kits. Specifying test methods for checking final color, sensitivity, and detection limits, the standard should be especially useful in the bid process. The process of developing the standard has already improved the quality of test kits now on the market. Testing of the kits was recently completed, and a report is now available.

### **Guides Courts in Better Recordkeeping**

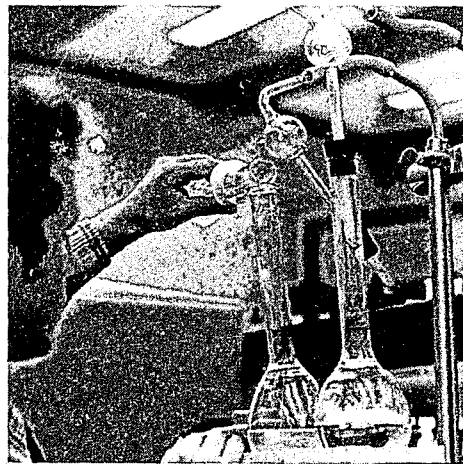
The range of technology available for courtroom use is rapidly expanding. Among the technology under study is the use of tape recorders for court reporting. Currently, their potential far exceeds their use. How can court administrators determine the best conditions for using recorders and the proper position of the recorder to obtain a clear tape suitable for error-free transcription? The market offers dozens of makes of recorders and accessories at various prices, but little guidance for applications in the courtroom. Through the efforts of the Technology Assessment Program, performance standards and user guidelines for courtroom tape recorders are now available. Quality purchases can help improve accuracy in court reporting and yield budget savings for agencies.

Another guide, "Transfer of Monochrome Video Information From Magnetic Tape to Motion Picture Film for Archival Storage," warns court administrators that magnetic tape is not archival material. In time, physical deterioration causes loss of cohesion and magnetism. The report shows how magnetic tape can be transferred to motion picture film and suggests ways to process and store film.



## Helps Citizens Protect Their Homes

Several years ago, the program found that most homes offered little protection against one of the most common crimes--burglaries. Household doors shattered readily, door assemblies gave way easily, and strike plates could be quickly pried loose with a small screwdriver. After careful testing, performance standards were developed including requirements for doors and hardware that ensure resistance to forcible entry by unskilled burglars in typical crimes of opportunity. The standards were adopted by the American Society for Testing and Materials and were incorporated into the Uniform Building Code and in several State building security codes as well.



## Protects Business From Intrusion

Security is essential to businesses today. The increasing rate of burglaries has produced demands for increased protection--reliable, effective alarm systems. But selection of suitable alarm systems is no simple matter. The array of equipment and services on the market makes satisfactory purchasing decisions complicated.

To help businesses cope with the problem, the Standards Lab prepared a special publication, *Selection and Application Guide to Commercial Intrusion Alarm Systems*. It is directed toward business consumers who need a general understanding of intrusion alarm systems, information on the type

of protection each system offers, how they operate, and the various components available for different applications.

Economics is a big factor in selecting systems. Installation costs range from hundreds to thousands of dollars; service fees can be as high as several hundred dollars a month. Does the risk of property loss justify the expense? The guide helps businesses weigh the decision about whether to invest and outlines several ways to get the best system for the least money.

Effective alarm systems can help police operations as well. By purchasing systems that meet performance standards, businesses can help prevent false alarms, lifting an unnecessary burden from police. Ultimately the standards can be applied to local alarm ordinances and become part of community crime prevention programs.



### **PUBLIC PARTICIPATION IS VITAL**

Public participation is vital to the Program. With active involvement everyone benefits--the Technology Assessment Program and local communities. A good illustration of the value of this participation to the public is recent inquiries to the Standards Lab from local planners and sheriffs building new jails. Concerned with energy conservation and fire prevention, they asked the Laboratory about current technological or scientific studies useful in planning their facilities. Two publications in particular were suggested for reference: *Saving Energy Dollars in Prisons and Jails*, a new NIJ publication that outlines ways to incorporate energy-saving designs into old and new structures, and a manual that shows how to assess fire hazards in confinement institutions, *Fire Safety Evaluation System for Prison Housing Facilities*.

## **How to Participate**

The Technology Assessment Program welcomes public participation. To suggest revision of existing standards, reports, or guides, or the need for new standards, write your recommendations to:

Program Manager for Standards  
Technology Assessment Program  
National Institute of Justice  
U.S. Department of Justice  
Washington, DC 20531

## **How To Get Materials and Information**

The National Bureau of Standards' Law Enforcement Standards Laboratory publishes standards, reports, and guidelines, and develops collections of forensic reference materials. Single copies of standards, reports, and guidelines are free. Costs of collections vary. For information, write:

Law Enforcement Standards Laboratory  
National Bureau of Standards  
U.S. Department of Commerce  
Washington, DC 20234

The Information Center at the International Association of Chiefs of Police offers technical assistance on equipment sources. Call the Information Center at IACP toll-free: (800) 636-4084 (except in Maryland and the Washington D.C. area (301) 948-0922). For the Center's *Consumer Product Report* write:

Technology Assessment Program  
Information Center  
International Association of Chiefs of Police  
11 Firstfield Road  
Gaithersburg, MD 20760

A 19-minute, 16-mm DuPont film, *Protecting Society's Protectors*, is available on loan from NCJRS. It encourages the use of body armor and suggests helpful ways to ensure comfort and fit. Write:

NCJRS Audio Visual Dept.                      DuPont Company  
Box 6000    or                      Communications Dept.  
Rockville, MD 20850    Wilmington, DE 19898

## **To Stay Informed About the Technology Assessment Program**

Register with NCJRS to receive the abstract bulletin *Selective Notification of Information (SNI)*, with announcements of new standards.

NCJRS  
Box 6000  
Rockville, MD 20850

## Products of The Technology Assessment Program

Information Center , International Association of Chiefs of Police

- **Consumer Product Reports:**

*Police Body Armor 1978 (seven supplements)*

*Patrol Vehicle Testing (1981 models) 1980*

In Press: *Police Personal FM Transceivers (2 volumes)*

*Drug Test Kits*

*Handcuffs*

*Crash Helmets, Riot Helmets and Face Shields*

Standards Laboratory , National Bureau of Standards

- **Standards**, technical performance requirements and descriptions of test methods that agencies can use to purchase superior quality equipment.

- **Reports**, highly readable presentations, less technical than standards, to inform a more general audience.

- **Guidelines**, instructive material for selecting and using equipment that describes factors to consider before purchasing equipment.

- **Reference Collections**, actual physical samples of materials; for example, the automobile paint collections include samples of each type of paint and each color used by domestic manufacturers for each model year since 1974. Available at cost from the Standards Lab.

- **Reference Materials**, samples of homogeneous material with well-defined properties against which similar material can be compared; for example, glass with a specified refractive index. Reference Collections and Materials are designed for forensic investigations. Available at cost from the Standards Lab.

The following Standards, Reports, and Guidelines are grouped by function: Communications Equipment, Investigative Aids and Forensic Science, Protective Equipment and Weapons, Security, Vehicles and Vehicle Accessories, and Miscellaneous.

#### COMMUNICATIONS EQUIPMENT

Automatic Vehicle Location Techniques for Law Enforcement Use. LESP-RPT-0205.00, September 1974. GPO Stock No. 027-000-00282-0. 75 cents. NCJ 14189.

Batteries for Personal/Portable Transceivers. NIJ-STD-0211.00, June 1975. GPO Stock No. 027-000-00342-7. 65 cents. NCJ 25994.

Batteries Used with Law Enforcement Communications Equipment: Chargers and Charging Techniques. LESP-RPT-0202.00, June 1973. GPO Stock No. 027-000-00216-1. 80 cents. NCJ 10692.

Batteries Used with Law Enforcement Communications Equipment: Comparison and Performance Characteristics. LESP-RPT-0201.00, May 1972. GPO Stock No. 027-000-00156-4. 50 cents. NCJ 07031.

Body-Worn FM Transmitters. NIJ-STD-0214.00, December 1978. GPO Stock No. 027-000-00711-2. \$1.20. NCJ 47378.

Communication Systems Guide. NBS Special Publication 480-12, January 1979. GPO Stock No. 003-003-02012-5. \$1.60. NCJ 55335

Continuous Signal-Controlled Selective Signaling. NIJ-STD-0219.00, August 1980. GPO Stock No. 027-000-01041-5. \$1.75.

Digital Data Transmission Tests on Voice Channels. NBS Special Publication 480-19, July 1977. GPO Stock No. 003-003-01773-6. \$2.10. NCJ 42845

Electronic Eavesdropping Techniques and Equipment. LESP-RPT-0207.00, September 1975. GPO Stock No. 027-000-00362-1. \$1.15. NCJ 30008.

Fixed and Base Station Antennas. NIJ-STD-0204.00, November 1977. GPO Stock No. 027-000-00567-5. \$1.00. NCJ 41996.

Fixed and Base Station FM Receivers. NIJ-STD-0206.00, September 1975. GPO Stock No. 027-000-00358-3. 55 cents. NCJ 29643.

Fixed and Base Station FM Transmitters. NIJ-STD-0201.00, September 1974. GPO Stock No. 027-000-00283-8. 65 cents. NCJ 15243.

FM Repeater Systems. NIJ-STD-0213.00, November 1977. GPO Stock No. 027-000-00568-3. \$1.00. NCJ 41975.

A Guide to Voice Scramblers for Law Enforcement Agencies. NBS Special Publication 480-8, December 1976. GPO Stock No. 003-003-01735-3. \$1.05. NCJ 40134.

Microphone Cable Assemblies for Mobile FM Transceivers. NIJ-STD-0217.00, August 1980. GPO Stock No. 027-000-01031-8. \$1.25.

Mobile Antennas. NIJ-STD-0205.00, May 1974. GPO Stock No. 027-000-00250-1. 55 cents. NCJ 13319.

Mobile FM Receivers. NIJ-STD-0207.00, June 1975. GPO Stock No. 027-000-00344-3. 65 cents. NCJ 25996.

Mobile FM Transmitters. NIJ-STD-0202.00, October 1974. GPO Stock No. 027-000-00287-1. 70 cents. NCJ 15244.

Personal FM Transceivers. NIJ-STD-0209.00, December 1978. GPO Stock No. 027-000-00728-0. \$1.50. NCJ 47380

Police Communications Equipment Survey of 1976. NBS Special Publication 480-13, August 1977. GPO Stock No. 003-003-01818-0. \$2.00. NCJ 42844.

Repeaters for Law Enforcement Communication Systems. LESP-RPT-0206.00, October 1974. GPO Stock No. 027-000-00288-9. 65 cents. NCJ 14521.

RF Coaxial Cable Assemblies for Mobile Transceivers. NIJ-STD-0212.00, September 1975. GPO Stock No. 027-000-00357-5. 35 cents. NCJ 28496.

Technical Terms and Definitions Used with Law Enforcement Communications Equipment (Radio Antennas, Transmitters, and Receivers). LESP-RPT-0203.00, June 1973. GPO Stock No. 027-000-00214-5. \$1.55. NCJ 10591.

Voice Privacy Equipment for Law Enforcement Communication Systems. LESP-RPT-0204.00, May 1974. GPO Stock No. 027-000-00260-9. 65 cents. NCJ 13386.

#### INVESTIGATIVE AIDS AND FORENSIC SCIENCE

Auto Headlight Glass: Visible Features of Forensic Utility. NBS Special Publication 480-17, February 1978. GPO Stock No. 003-003-01857-1. \$3.00. NCJ 46176.

Calibrating Units for Breath Alcohol Testers. 40FR36167, August 1975. Federal Register, Vol. 40, No. 161, pp. 36167-36171, August 19, 1975.

Chemical Spot Test Kits for Preliminary Identification of Drugs of Abuse. NIJ-STD-0604.00, December 1978. GPO Stock No. 027-000-00730-9. \$1.10.

Evidential Breath Testers for Alcohol Content. 38FR30459, November 1973. Federal Register, Vol. 38, No. 212, pp. 30459-30463, November 5, 1973.

The Hazard of Benzidine to Criminal Justice Personnel. NBS Special Publication 480-21, May 1977. GPO Stock No. 003-003-01777-9. \$1.00. NCJ 35070.

Photographic Terms and Definitions. LESP-RPT-0307.00, October 1975. GPO Stock No. 027-000-00373-7. \$1.10. NCJ 31566.

Reference Collection of (1977) Automotive Paints; \$100 per set.

Reference Collection of (1978) Automotive Paints; \$190 per set.

Refractive Index Glass; A Standard Reference Material of the National Bureau of Standards; \$58 per unit. SRM 1820, September 1974.

Refractive Index Silicone Liquids; A Standard Reference Material of the National Bureau of Standards; \$53 per unit. SRM 1823, February 1976.

Selection and Application Guide to Police Photographic Equipment. NBS Special Publication 480-23, August 1980. GPO Stock No. 003-003-02224-1. \$3.75.

Standard Reference Collections of Forensic Science Materials: Status and Needs. LESP-RPT-0601.00, February 1977. GPO Stock No. 027-000-00444-0. \$1.55. NCJ 35833.

A Trace Vapor Generator for Testing Explosives Vapor Detectors. LESP-RPT-0604.00, March 1977. GPO Stock No. 027-000-00453-9. 65 cents. NCJ 36142.

#### PROTECTIVE EQUIPMENT AND WEAPONS

Ballistic Helmets. NIJ-STD-0106.00, September 1975. GPO Stock No. 027-000-00370-2. 35 cents. NCJ 31328.

Ballistic Resistance of Police Body Armor. NIJ-STD-0101.01, December 1978. GPO Stock No. 027-000-00729-5. \$1.00.

Crash Helmets. NIJ-STD-0105.00, June 1975. GPO Stock No. 027-000-00347-8. 35 cents. NCJ 27242.

An Evaluation of Police Handgun Ammunition: Summary Report. LESP-RPT-0101.01, October 1975. GPO Stock No. 027-000-00374-5. 45 cents. NCJ 34301.

Hearing Protectors for Use on Firing Ranges. NIJ-STD-0102.00, March 1973. GPO Stock No. 027-000-00182-3. 40 cents. NCJ 09959.

Metallic Handcuffs. NIJ-STD-0307.00, October 1974. GPO Stock No. 027-000-00292. 65 cents. NCJ 15436.

Portable Ballistic Shields. NIJ-STD-0103.00, May 1974. GPO Stock No. 027-000-00253-6. 55 cents. NCJ 13316.

The Reduction of Airborne Lead in Indoor Firing Ranges by Using Modified Ammunition. NBS Special Publication 480-26, November 1977. GPO Stock No. 003-003-01821-0. \$1.20. NCJ 44509.

Riot Helmets and Face Shields. NIJ-STD 0104.01, August 1980. GPO Stock No. 027-000-01018-1. \$1.50.

Selection Guide to Hearing Protectors for Use on Firing Ranges. NIJ-GUIDE-0101.00, April 1976. GPO Stock No. 027-000-00427-0. 75 cents. NCJ 35069.

A Study of Handcuff Improvements. NBSIR 80-1989, April 1980.

#### SECURITY

Active Night Vision Devices. NIJ-STD-0305.00, June 1975. GPO Stock No. 027-000-00346-0. 95 cents. NCJ 27241.

Catalog of Security Equipment. NBS Special Publication 480-35, November 1978. GPO Stock No. 003-003-01970-4. \$2.30. NCJ 56874.

Directory of Security Consultants. LESP-RPT-0309.00, October 1975. GPO Stock No. 027-000-00372-9. \$1.25. NCJ 31327.

Hand-Held Metal Detectors for Use in Weapons Detection. NIJ-STD-0602.00, October 1974. GPO Stock No. 027-000-00285-4. 65 cents. NCJ 15246.

Image Quality Criterion for Identification of Faces. LESP-RPT-0303.00, May 1974. GPO Stock No. 027-000-00261-7. 65 cents. NCJ 13389.

Image Quality of Monochrome Television Cameras. NBS Special Publication 480-25, October 1977. GPO Stock No. 003-003-01855-4. 90 cents. NCJ 43677.

Magnetic Switches for Burglar Alarm Systems. NIJ-STD-0301.00, March 1974. GPO Stock No. 027-000-00238-2. 65 cents. NCJ 12060.

Mechanically Actuated Switches for Burglar Alarm Systems. NIJ-STD-0302.00, May 1974. GPO Stock No. 027-000-00258-7. 55 cents. NCJ 13384.

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