

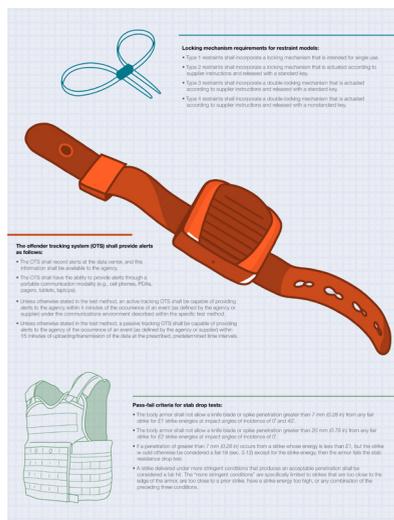
THE ROLE OF EQUIPMENT PERFORMANCE STANDARDS IN CORRECTIONAL SETTINGS

BY JACK HARNE AND MARK GREENE

To help improve criminal justice policy and practice, NIJ develops performance standards for the unique equipment used by corrections agencies.

Why are equipment performance standards important to corrections agencies? Standards and the conformity assessment programs that test products to those standards' requirements provide agencies and officers with confidence in product performance.

Take offender tracking systems (OTs), stab-resistant body armor, and restraints, for example. NIJ has published standards defining minimum performance requirements for these products and the test methods used to assess their performance. NIJ also works to establish conformity assessment programs that define the requirements and methods needed to ensure that equipment meets the standards. Together, the standards and compliance testing warrant a certain level of quality in those products and give agencies the ability to compare different types of products against a common set of benchmarks. (See sidebar, "NIJ's Standards and Testing Program.")



Developing an OTS Standard

At the end of 2013, adult correctional systems supervised nearly 7 million people; close to 70 percent — more than 4.7 million people — were on probation or parole.¹

At least 46 states and the District of Columbia have statutes that allow agencies to use electronic monitoring to supervise individuals on probation or parole.² Agencies use OTs to get time-stamped information on supervisees' whereabouts. OTs are complex: They involve technology that fixes a person's location in space and time, software that processes and analyzes that spatiotemporal data, and communications technology

that transmits the relevant information to the supervising agency.

Most OTS tracking components consist of a single element that is strapped to the ankle, commonly referred to as an “ankle monitor” or “ankle bracelet.” Most models use signals from Global Positioning System (GPS) satellites to determine location and then transmit that information to a monitoring center via cellular communications networks.³ When GPS is not available, ancillary technologies such as cellular-based location data, inertial sensors, and wireless positioning help determine a person’s location.

Some OTSs have multielement tracking components. A transmitter or receiver strapped to a person’s ankle or wrist shares data with a second element, which may be on or near the individual and which communicates location information to a monitoring center.

In 2006, the NIJ-sponsored Community Corrections Technology Working Group, made up of expert corrections officers, noted that the field lacked both national consensus performance requirements for OTSs and a conformity assessment regime to identify models that met those requirements. The group placed a high priority on the need for a performance standard for OTSs.

In 2009, NIJ convened a committee of expert practitioners from eight local, regional, state, and federal agencies across the United States, along with engineers, testing specialists, and other experts, to develop an OTS standard. Key stakeholder organizations, including the American Probation and Parole Association, the American Jail Association, and the American Correctional Association, reviewed the draft standard. In July 2016, after two public comment periods and validation testing by an independent test laboratory, the Institute published NIJ Standard 1004.00, *Criminal Justice Offender Tracking System Standard*.

Minimum Performance Requirements

Although most OTS models use GPS, the new standard does not require the use of specific

technologies. NIJ standards specify performance requirements, not design requirements, so manufacturers are free to innovate.

The OTS standard addresses mandatory performance areas, such as:

- The accuracy with which an OTS can locate individuals both indoors and outdoors.
- The speed with which an OTS can send a person’s most recent location to the supervising agency.
- The speed with which an OTS can notify an agency of tampering, a loss of GPS or cellular communication, or a violation of a defined geographic zone.

Another mandatory performance requirement — and one that was important to the practitioners involved in the standard’s development — involves the ability of the OTS data analysis software to create zones. Zones are defined geographic areas typically intended to restrict the supervised individual’s movement during specific periods; when the individual crosses the area boundaries, the agency is notified. The standard requires that OTS software be able to configure zones in the shapes of circles, rectangles, and arbitrary-shaped polygons (i.e., freeform zones, because restricted areas often need to be irregularly shaped), including zones within zones. The standard further requires that the software be able to generate zone templates and create and store at least 50 zones per template.

The standard also includes optional performance requirements for the ability to detect attempts to circumvent the tracking component by using metallic shielding, cellular interference/jamming, or GPS interference/jamming. The optional requirements represent a compromise. Not all OTSs offer these capabilities; making them optional allows more vendors to participate, driving the overall cost to agencies down. At the same time, manufacturers are incentivized to incorporate these capabilities to differentiate their product from others.

The U.S. Government Accountability Office (GAO) assessed the draft standard, comparing

10 performance areas in the standard with nine agencies' procurement requirements and policy documents. The GAO found that the standard's requirements were at least as rigorous as the agencies' requirements in 81 percent of cases (31 percent were cases in which the standard had a requirement that the agency did not have) and less rigorous in 6 percent of cases. The GAO was not able to make a determination on the comparative rigor of requirements in 13 percent of the cases.⁴

Test Methods

Creating an OTS standard was a novel undertaking and required the development of new testing methods. Figure 1 shows one new test method for determining a system's capability to detect attempts to circumvent the tracking component by using metallic shielding, cellular interference/jamming, or GPS interference/jamming.

The standard also includes ergonomic, safety, and environmental tests. For example, if the OTS devices require emergency removal, the standard provides a test method that uses emergency medical system shears, as defined by 21 CFR 880.6820 (FDA), Medical disposable scissors.

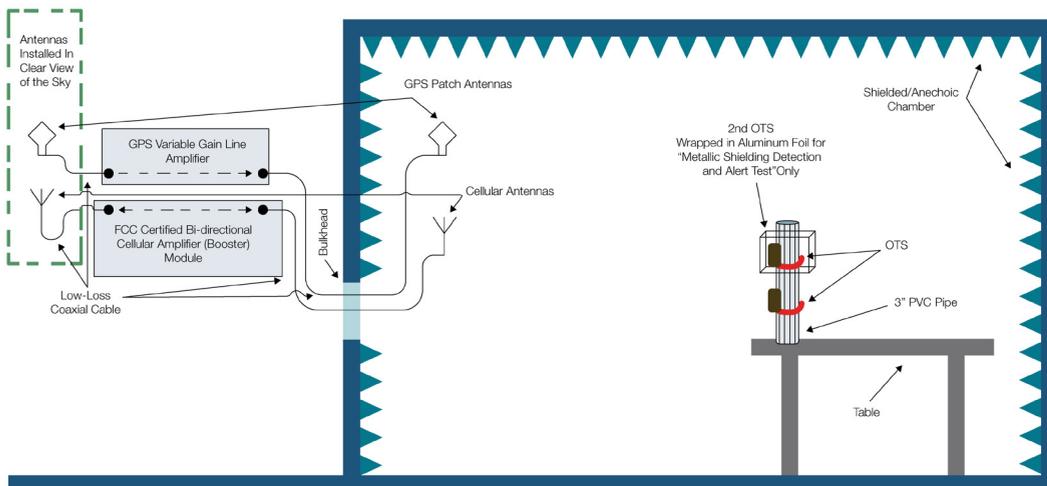
Conformity Assessment Program

NIJ is actively pursuing the implementation of a conformity assessment program to test OTS models to the standard. When it released the standard, NIJ also released a *Federal Register* notice inviting conformity assessment groups — such as laboratories, certification bodies, and inspection bodies — interested in conformity assessment activities to review the standard and provide expressions of interest.⁵

One of the challenges in implementing a conformity assessment program for OTSs, however, is the use of refurbished equipment. Agencies often receive refurbished equipment as part of their service agreements. Conformity assessment of refurbished equipment adds another layer of complexity in terms of quality control.

Until a conformity assessment program is established, agencies can still use the standard's requirements to inform purchasing. The GAO report noted, "By setting minimum requirements for a range of commonly identified offender tracking system needs, the standard could help agencies more thoroughly consider and develop contractual requirements and help ensure their needs will be met."⁶

Figure 1. Test Configuration for Loss of Location Test/Communications Loss Alert Test



Based on Section 6.21 of NIJ Standard 1004.00, Criminal Justice Offender Tracking System Standard.

NIJ's Standards and Testing Program

Through its Standards and Testing Program, NIJ fosters the development and implementation of standards and associated conformity assessment programs for the unique equipment that criminal justice agencies use.

NIJ identifies the need for new or improved standards or conformity assessment programs by systematically engaging criminal justice practitioners in discussions about their work. This process helps identify shortfalls in practitioners' capabilities that might be addressed by technology. Developing a new technology might be one way to address a shortfall. Developing a performance standard for a technology or an improved conformity assessment program might be another way.

When required, NIJ develops and implements standards and conformity assessment programs. Whenever practical, it adopts existing standards or adapts them to the needs of the criminal justice community. To the extent possible, NIJ supports public and private organizations' development of standards and conformity assessment programs to speed their introduction into practice. NIJ scientists and engineers often participate in projects with other standards development organizations. For example, an NIJ engineer is currently leading the National Fire Protection Association's (NFPA's) development of NFPA 1986, *Standard on Respiratory Protection Equipment for Technical and Tactical Operations*.¹

Standards Development

NIJ develops standards through a consensus process. Committees composed of corrections officers and other criminal justice practitioners, scientists, test laboratory personnel, and conformity assessment experts write the standards. Major relevant stakeholder organizations, such as the American Correctional Association, the American Probation and Parole Association, the American Jail Association, and the Association of State Correctional Administrators, review the standards. NIJ also seeks manufacturers' input, mainly through workshops and public comment periods.

There are two major purposes for developing standards this way. First, NIJ believes that the people who will use the equipment are best suited to understand what it should be able to do. For example, a committee that included representatives from both the Ohio Department of Rehabilitation and Correction and the Colorado Department of Corrections developed NIJ Standard 1001.00, *Criminal Justice Restraints*, which addresses new technologies and four different types of restraints. Second, this process helps ensure that there is a community consensus about the requirements.

NIJ is not a regulatory agency, so its performance standards are voluntary. Neither manufacturers nor criminal justice agencies need to adopt these standards. However, there are reasons for both to do so. Manufacturers are incentivized to meet the standards' performance requirements, because they reflect the consumers' requirements. On the purchasing side, the standards give public safety agencies the ability to compare different types of equipment against a common set of benchmarks.

Standards can also raise the bar for equipment performance by promoting market-driven competition. Each manufacturer will seek to differentiate its product from similar products by improving its performance, leading to the introduction of safer, more effective products.

Compliance Testing

NIJ's oldest compliance testing program — testing body armor to the then–National Institute of Law Enforcement and Criminal Justice Standard 0101.01, *Ballistic Resistance of Police Body Armor* — was established in 1978. Currently, NIJ directly supports compliance testing programs for two types of equipment: body armor and autoloading pistols.

NIJ actively engages with private-sector organizations to expand the number of conformity assessment programs addressing criminal justice products. For example, the Safety Equipment Institute now tests the protective ensembles used by public safety bomb squads to NIJ Standard 0117.01, *Public Safety Bomb Suit Standard*.

Note

1. “NFPA 1986: Standard on Respiratory Protection Equipment for Technical and Tactical Operations,” *National Fire Protection Association*, accessed December 5, 2016, <http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1986&tab=about>.

Sharing Data

As it developed the OTS standard, NIJ also identified a need for a specification that allows data sharing between OTSs.

OTSs generate vast amounts of data. One challenge occurs when an agency ends its contractual relationship with one OTS vendor and moves to another. Ideally, the agency would be able to automatically transfer data from the previous provider to the new provider's system. This would allow the agency to retain important historical data and would help streamline the re-enrollment process. Having a specification for data sharing would also lay the foundation for automated information sharing across jurisdictions and vendor software platforms, which would enhance public safety.

To help make data exchange between OTSs possible, NIJ funded the development of a Global Reference Architecture Service Specification Package (SSP), which details the models and technical components for transferring tracking information between systems. The Global Standards Council adopted the SSP as the “Offender Tracking Record Transfer Service

Specification, Version 1.0.” Access it at <https://www.it.ojp.gov/GIST/186/Offender-Tracking-Record-Transfer-Service-Specification--Version-1-0>.

Standards for Stab-Resistant Body Armor and Restraints

NIJ has developed additional standards relevant to the corrections community. In 2000, the Institute published NIJ Standard 0115.00, *Stab Resistance of Personal Body Armor*, which was modeled on the U.K.'s Police Scientific Development Branch (PSDB) Stab Resistant Body Armor Test Procedure (1999). The PSDB standard — and, consequently, the NIJ standard — defined protection requirements for manufactured, as opposed to improvised, threats (e.g., knives) that are used to stab rather than slash.

The result is that the stab-resistant armor worn by corrections officers working exclusively in a controlled facility may be overdesigned for the threats that those officers are most likely to encounter. Additionally, armor designed for stab protection may not be optimal for protection against a slash attack.

NIJ has convened a committee to revise the standard. Proposed revisions include defining two protection

classes — manufactured weapons and improvised weapons — and testing against both stab and slash attacks. Other proposed changes include incorporating the *Personal Protective Equipment (PPE) for Blunt Trauma Standard* (CAN/CSA-Z617-06 [R2011])⁷ and the *Standard Practice for Measurement of Body Armor Wearers* (ASTM E2902-12).⁸ Also under consideration are cleaning and decontamination requirements for fecal matter and bodily fluids and test protocols for the bust area of body armor for women.

To support the revision, NIJ funded a study to develop new test models characterizing (1) the improvised weapons that law enforcement and corrections agencies are most likely to face and (2) the dynamics of slash and stab attacks with those weapons. Researchers from Wayne State University, in collaboration with Biokinetics, collected and identified more than 1,300 weapons confiscated by law enforcement and corrections agencies in 20 states. Their report, *Characterization of Weapons Used in Stab/Slash Attacks*, is available at NIJ.gov, keyword: 249550.

NIJ also recently replaced NIJ Standard 0307.01, *NIJ Standard for Metallic Handcuffs*, which was last revised in 1982, with NIJ Standard 1001.00, *Criminal Justice Restraints*. In large part, the new standard responds to the introduction of nonmetallic restraints, such as zip tie restraints, that necessitated new performance requirements and test methods.

The new standard addresses four types of restraints. Types 1 and 2 are intended for temporary control when the person is under direct supervision. Type 1 restraints are intended to be single use, while type 2 restraints are intended to be reusable for a limited number of uses. Types 3 and 4 are intended for control when the person is not under direct observation but is supervised continuously. Type 4 restraints are more tamper resistant than type 3 restraints.

NIJ is currently working with conformity assessment bodies to develop minimum requirements for the certification of restraints described in the new standard.

About the Authors

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For More Information

Learn more about NIJ's Standards and Testing Program at NIJ.gov, keywords: standards testing.

Read the full OTS standard (NIJ Standard 1004.00, *Criminal Justice Offender Tracking System Standard*) at NIJ.gov, keyword: 249810.

Learn more about the criminal justice restraints standard at NIJ.gov, keyword: standards.

Notes

1. Lauren E. Glaze and Danielle Kaeble, *Correctional Populations in the United States, 2013*, Bureau of Justice Statistics, December 2014, NCJ 248479, <https://www.bjs.gov/content/pub/pdf/cpus13.pdf>.
2. Matthew DeMichele and Brian Payne, *Offender Supervision with Electronic Technology Community Corrections Resource*, 2nd ed. (Lexington, KY: American Probation and Parole Association, 2009), https://www.appa-net.org/eweb/docs/APPA/pubs/OSET_2.pdf.
3. *Draft National Standard for Offender Tracking Systems Addresses Common Stakeholder Needs*, GAO-16-10 (Washington, DC: Government Accountability Office, October 2015), <http://www.gao.gov/assets/680/673325.pdf>.
4. *Ibid.*, 32-33.
5. "Publication of Offender Tracking System Standard, NIJ Standard 1004.00, and Request for Expressions of Interest from Manufacturers and Conformity Assessment Bodies," *Federal Register* 81 no. 136 (July 15, 2016): 46116, <https://www.gpo.gov/fdsys/search/pagedetails.action?granuleId=2016-16760&packageId=FR-2016-07-15&acCode=FR&collectionCode=FR>.
6. *Draft National Standard for Offender Tracking Systems Addresses Common Stakeholder Needs*, 17.

7. "CAN/CSA-Z617-06 (R2011) - Personal Protective Equipment (PPE) for Blunt Trauma," *Canadian Centre for Occupational Health and Safety*, accessed December 5, 2016, <https://www.ccohs.ca/products/csa/27024462006>.
 8. "ASTM E2902 - 12: Standard Practice for Measurement of Body Armor Wearers," *ASTM International*, accessed December 5, 2016, <https://www.astm.org/Standards/E2902.htm>.
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