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Keeping Contraband on the Outside

Time for the early afternoon shift change. Day shift is leaving the correctional facility and the afternoon shift is coming in. In this security-minded era, as employees enter the facility, everything possible must be done to verify identity and to ensure employees are not bringing contraband into the institution. Depending on the sensitivity of the institution's portal technology, uniformed staff may need to remove duty belts, restraint sets, uniform insignia and shoes with metal toes before they can successfully pass through. Those that trigger an alarm must stand aside for a more detailed search with a handheld device, often waiting in another line.

Time given up to this process can be time lost in getting the outgoing shift off duty. For that reason, staff feel obligated to move as quickly as possible, but are also held responsible for any prohibited material that passes through undetected. Staff new to the system typically resent the delay and feel offended at the implication of not being trusted to follow the rules.

Checking for contraband typically occurs at either the perimeter gate house, in a lobby or at control points within the institution. Staff, inmates, contractors and visitors are processed through the perimeter of the facility, as are, similarly, large numbers of inmates moving to work assignments within the facility on a scheduled basis. Successful security operations, including those at correctional institution portals, are seldom the result of one security system in operation. This article presents a quick look at some of the types of technology available.

- **RF Metal Detectors.** Project low frequency radio waves. As a person passes through the portal, a radio signal is received and interpreted by software to determine whether the person is carrying a metallic object. If the alarm sounds, it means there is a metallic object on the person that falls within the system's detection limits. When alarms occur, operators usually take the individual aside for an additional search. It does not detect nonmetallic items such as explosives, paper money, drugs, tobacco and prohibited literature.
- **Millimeter Wave Detection Devices.** Consist of very high frequency radio waves interpreted by software to determine whether a potentially prohibited object exists on a person's body next to the skin. This technology, which can be active or passive, detects all foreign substances on the human body with reliable results within a reasonable timeframe. However, it does not detect objects within the body such as in the digestive system, the anal canal or oral cavities. The Office of Justice Programs' National Institute of Justice (NIJ) Information and Sensor Technologies Division sponsored an operational evaluation of millimeter wave detection portal technology and other efforts are ongoing (see sidebar, "Scanning for Contraband.")
- **Passive Magnetic Field Metal Detection.** Senses and reports the earth's natural magnetic field within the space of an opening, then measures the same space when a human is standing in the portal. Interpretative software shows on a monitor the location of any foreign objects on the body of the person. There are no fields of energy radiated at or through the body; this device simply measures what is there naturally. This mobile sensing equipment is not limited to a fixed portal or archway and may be installed in door jambs, walls or other less conspicuous structures. It does not detect contraband located in body cavities.
- **Electric Field Tomography.** Projects weak electrical energy into the body of the person being examined. An interpretation by software provides a graphical view, as if the operator were looking through a person's body. This technology has the capability of detecting all objects on and within a human body. An NIJ grantee is expected to produce a working model of this developing technology in fourth quarter 2009.
- **Ion Scan Technology.** Typically used to detect drugs and explosives. It detects the ion profile within an air sample associated with a person's body, vehicle or living space. This portable handheld device must

be in close proximity to the person being examined. Time required to complete the scan can be slow.

- **Heartbeat Detection.** Uses geophone sensors combined with interpretive software to listen to vehicles parked in perimeter sally port enclosures for indications of a human heartbeat. Under proper conditions, the information produced is highly accurate and reliable. Compared to the time normally needed to inspect a vehicle and its contents, this technology requires very little staff time.
- **Backscatter X-Ray Contraband Detection.** Available in walkthrough portal design and as a device that searches for contraband on vehicles in sally ports. Backscatter machines use high-energy, low-dose x-ray beams that pass over a human body. High-energy x-rays tend to scatter, or "bounce" off of a surface, as opposed to penetrating it like lower energy x-rays used for medical purposes. Backscatter technology, along with millimeter wave detection, is being offered to passengers entering airports as an alternative to manual pat searches if they trigger a metal detection alarm. However, it does not penetrate the skin or detect objects inside the body such as in the mouth, anal opening or digestive system.

All of these systems depend on electronics to support or focus their search efforts.

NIJ's Sensors, Surveillance and Biometric Technologies Center of Excellence (CoE) has many ongoing projects related to portal detection. To learn more about this CoE's activities, visit http://www.justnet.org/coe_surveillance/Pages/home.aspx or call (888) 424-8424. The Weapons and Protective Systems Technologies CoE, in partnership with the National Law Enforcement and Corrections Technology Center (NLECTC)-Rocky Mountain, coordinates research and activities in the correctional environment. Visit http://www.justnet.org/coe_ppe/Pages/home.aspx or call (814) 865-7098.

NIJ is currently in the process of revising its standards on both walk-through and hand-held metal detectors. New versions of these standards should be published in the near future. The Rocky Mountain Center provided background research for this article.

Scanning for Contraband

A baggie containing aspirin, tucked in a pocket. A vinyl cell phone, dropped down inside a tucked-in shirt. Extra cash folded and put away outside of a wallet. All contraband items inside a correctional facility, none of them detectable by a standard walk-through metal detector, able to slip through the system.

That is, until now. The Pennsylvania Department of Corrections (DOC) State Correctional Institution at Graterford has had so much success using a new active millimeter wave scanner that during its testing phase, visitors who had been caught by it on prior trips began calling to ask if the day of their next planned visit was a day the scanner would be in operation.

Graterford, the largest maximum security facility in Pennsylvania with an inmate population of approximately 4,000, handles around 32,500 visitors annually, all of whom must be checked to ensure that they are not bringing contraband into the facility. Contraband, in the eyes of correctional facility staff and administrators, is not limited to weapons; it also includes money, controlled and uncontrolled pharmaceutical or chemical substances, pornographic materials, cell phones and pagers and digital storage devices. None of these items can be detected by standard walk-through metal detectors.

With that in mind, the Pennsylvania DOC, an active member of the National Law Enforcement and Corrections Technology Center (NLECTC)-Northeast Regional Advisory Council, decided to evaluate active millimeter wave scanning technology as a possible solution and called on NLECTC-Northeast for assistance in evaluating its effectiveness. NLECTC is a program of the Office of Justice Programs' National Institute of Justice.

Millimeter wave detection technology consists of very high frequency radio waves at extremely low power levels that are interpreted by software to determine whether a foreign object exists on a person's body next to the skin. Some devices actively project the energy at the person's body and others passively compare the level of illumination emitted by the body compared with a spot blocked by an item. The limitations of this type of system are that it is expensive (more than $150,000 per unit) and does not detect objects within the body such as in the digestive system, anal canal or oral cavities.

This same technology is presently in use by the U.S. Department of Defense in support of the global war on terrorism and the Transportation Security Administration. Its scanning capability penetrates clothing to reveal hidden weapons, explosives, drugs and other contraband.

A vendor installed the equipment and trained correctional personnel in October 2007, and NLECTC staff members made a site visit to perform the evaluation in January 2008. A preliminary report, *Millimeter Wave Body Scanning Technology in a Corrections Environment,* is undergoing review for publication in the future.

"We did an exercise to gather information, including observing visitors entering the facility," says Fred Sestito of NLECTC-Northeast. "Graterford has a very detailed and successful operation, and we were able to collect some lessons learned that made the technology even more valuable."

The evaluation showed a major deterrent effect and a positive ability to detect a wide variety of nonmetallic contraband, thus stopping far more items from entering than using standard walkthrough detection equipment alone. Some of this deterrent effect could be attributed to their concept of operations (ConOps), because as noted previously, perception of the capabilities of this system caused visitors to not attempt to bring in as much contraband.

"It's an incredible technology, much more effective than standard metal detectors," Sestito says. "In the correctional environment, there are all types of contraband that aren't weapons, but can cause some very big problems if they're smuggled inside. This can look right through the clothing all the way to the skin, although it can't see through the skin. If someone is trying to bring in something hidden in a pocket, they're going to find it."

The system in use at Graterford, the ProVision 100 Body Scanner, has potential peak throughput levels of 300 to 600 people an hour, far faster than most other screening methods. It can be configured for single scanner or multilane use, and requires only a brief multidimensional scan to identify contraband hidden anywhere on an individual's person.

The system can easily be configured to meet specific throughput and facility requirements. With the system in operation, an individual walks into the portal and raises both arms. One bank of transmitter/receivers is located in front of the individual, and the other to the rear. The device rotates around the individual, emitting millimeter waves and recording the results in a three-dimensional holographic image of the individual, who then steps out of the portal. A trained operator analyzes the scan, and if nothing is detected, the person continues on through the checkpoint. However, if a suspicious object is detected, the individual may then be subjected to a search directed at the general area where the suspected contraband was indicated.

In addition to the previously mentioned phone calls during the training period (when the technology was not in daily use), Graterford is finding less and less contraband as repeat visitors learn they are going to be caught, so it is pointless to try to smuggle items in. Visitors caught with legal items, such as cell phones or extra cash, can continue with their planned visits after the property is confiscated and placed in a locker. However, if correctional staff find individuals carrying illegal substances, the officers hold them as suspects for local law enforcement.

NIJ's Sensors, Surveillance and Biometric Technologies Center of Excellence (CoE) has many ongoing projects related to body scanning devices. To learn more about this CoE's activities, visit http://www.justnet.org/coe_surveillance/Pages/home.aspx or call (888) 424-8424.

The Weapons and Protective Systems Technologies CoE coordinates research and activities in the correctional environment. Visit http://www.justnet.org/coe_ppe/Pages/home.aspx or call (814) 865-7098.

For more information on this project, contact Fred Sestito of NLECTC-Northeast at (888) 338-0584, e-mail Fred.Sestito@L-3COM.COM.

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