



System Assessment and Validation for Emergency Responders (SAVER)

Walk-Through Metal Detectors Market Survey Report

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Security**

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System Assessment and Validation for Emergency Responders

Prepared by the National Urban Security Technology Laboratory

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FOREWORD

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions. Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations on commercial equipment and systems and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL). The SAVER Program mission includes:

- Conducting impartial, practitioner-relevant, operationally oriented assessments and validations of emergency responder equipment; and
- Providing information, in the form of knowledge products, that enables decision-makers and responders to better select, procure, use, and maintain emergency responder equipment.

Information provided by the SAVER Program will be shared nationally with the responder community, providing a life- and cost-saving asset to DHS, as well as to Federal, state, and local responders.

The SAVER Program is supported by a network of Technical Agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: “What equipment is available?” and “How does it perform?”

As a SAVER Program Technical Agent, the National Urban Security Technology Laboratory (NUSTL) has been tasked to provide expertise and analysis on key subject areas, including chemical, biological, radiological, nuclear, and explosive weapons detection; emergency response and recovery; and related equipment, instrumentation, and technologies. In support of this tasking, NUSTL conducted a market survey of commercially available walk-through metal detectors (WTMDs). WTMDs fall under AEL reference number 15SC-00-PPSS, Systems, Personnel/Package Screening.

Visit the SAVER website at FirstResponder.gov (www.firstresponder.gov/SAVER) for more information on the SAVER Program or to view additional reports on WTMDs or other technologies.

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1. INTRODUCTION

Walk-through metal detectors (WTMDs), also called portal or personnel screening metal detectors, are devices used to screen individuals for weapons or other concealed contraband. They are used for security at checkpoints in airports, government facilities, entertainment and transportation venues, and other buildings. To provide security personnel with information about this detection technology, the System Assessment and Validation for Emergency Responders (SAVER) Program conducted a market survey of commercially available WTMDs.

This market survey report is based on information gathered between May and July 2013 from Internet searches, industry publications, and a government-issued Request for Information (RFI) accessible from the Federal Business Opportunities website.¹ WTMDs included in this report consist of:

- Commercial off-the-shelf (COTS) products for indoor and/or outdoor use;
- Active or passive metal detection technologies; and
- Fixed or transportable devices (not handheld).

This report focuses on WTMDs for law enforcement and/or homeland security and is not intended for detectors designed for specialized applications, such as screening patients prior to magnetic resonance imaging (MRI), or devices designed to prevent theft of small amounts of precious metals in the jewelry industry. However, some detectors that are used for industrial loss prevention are appropriate for correctional facility use and are included here. Due diligence was performed to develop a report that is representative of products in the marketplace.

2. WALK-THROUGH METAL DETECTORS OVERVIEW

WTMDs are used at airports, transportation venues, government facilities, and other buildings to screen individuals for concealed weapons or other contraband. They are often one component of a layered security system that may include operational procedures, security personnel, physical barriers, and/or surveillance equipment. WTMDs typically consist of a rectangular archway, wide enough for one person to pass through, and visible and audible alarm indicators. They may be designed to be installed at a specific location or to be easily transportable to different locations.

2.1 Current Technologies

WTMDs identify metal objects by sensing the metal's interaction with a magnetic field. The magnetic field may come from the device (active detection devices) or from the ever-present magnetic field of the Earth (passive detection devices). In active detection, the magnetic field is generated by a transmitter coil in the device. Two categories of active detection technologies are distinguished by the types of magnetic fields that they transmit:

- Pulse induction (PI) detectors transmit a pulsed or time-varying field that induces an electric current, or eddy current, in a target metal object passing through the portal. This

¹ Federal Business Opportunities, RFI-13-0008, *Walk-Through Metal Detectors*, www.fbo.gov/spg/DHS/OCPO/DHS-OCPO/RFI-13-0008/listing.html (May 31, 2013)

current generates an opposite magnetic field in the metal object. Electronic circuitry analyzes the pulse decay at the receiver and identifies the presence of a metal object by sensing the slight difference in decay time caused by this additional magnetic field.

- Continuous wave (CW) detectors transmit a continuously oscillating magnetic field that also induces eddy currents and magnetic fields in metal objects passing through the portal. In these detectors, electronics analyze small changes in the phase and amplitude at the receiver to identify the presence of metal objects.

Passive detectors sense an object's interaction with the Earth's magnetic field. WTMDs that use passive metal detection measure the disruption of the magnetic field in the detection space caused by a moving ferromagnetic object. Ferromagnetic objects are iron-containing metals, such as steel alloys, that are capable of being magnetized. Non-magnetic metals, such as aluminum, are not magnetized by the Earth's field and therefore cannot be detected by a passive WTMD. Since almost all firearms use ferrous steel alloys as components, these detectors can be used in many security applications.

For both active and passive WTMDs, detection of a target object depends on the object's composition, size, shape, surface area, orientation in the magnetic field, and other factors such as interference from the surrounding environment. Ferrous (iron-containing) metals, such as steel, are most easily detected because they are readily magnetized in an applied field, resulting in a large signal at the receiver. Non-ferrous metals, such as aluminum, brass, bronze, and copper, are more weakly magnetized but can still be detected by an active detector. Since most weapons are made of metal, WTMDs are used as a primary means of checkpoint security.

In addition to identifying the presence of a metal object, some WTMDs provide information about its location. Multiple-zone detectors use a system of transmitters and receivers to divide the detection space of the portal into a grid of detection areas (Figure 2-1). The horizontal zones of the grid indicate the height of the metal target, while the vertical zones pinpoint its location on the left, right, or center. In some WTMDs, the sensitivity of each zone can be individually set. Information on where the target is located on the person helps security personnel to resolve alarms more quickly and allows greater throughput of people compared with single-zone detectors.



Figure 2-1. A Multiple-Zone Detector

Courtesy of Garrett Electronics, Inc.

2.2 Applications

WTMDs play a specific role in security for detecting concealed weapons. Indoor, fixed systems are typically installed as checkpoints at:

- Transportation venues (e.g., airports, train, bus, ship boarding areas);
- Government buildings, including courthouses and military installations;
- Schools;
- Private buildings; and
- Prisons.

Temporary, indoor systems may also be set up for special events.

Outdoor WTMDs installations may be either fixed or temporary, and may be used at:

- Sporting events;
- Concerts; and
- Special events.

All people entering a venue are directed toward the WTMD and typically place their bags, coats, and metal objects in a basket for screening by an X-ray machine. One person at a time passes through the WTMD, and if an alarm sounds, the individual will generally be screened with a metal-detecting security wand.² Thus, the WTMD is only one part of a larger security system that includes additional screening equipment, security personnel to operate the equipment, operational procedures, and a secure facility perimeter.

Those purchasing a WTMD for the first time should be aware of additional considerations:

- **Placement:** WTMD installation requires careful planning of layout to allow sufficient space for people waiting to be scanned and for secondary inspections after an alarm. Nearby metal structures, such as plumbing and air ducts, or nearby sources of electromagnetic energy, such as an elevator motor, can cause interference. These environmental interferences can be mitigated by properly siting the detector and adjusting the instrument sensitivity. Simultaneous operation of multiple WTMDs also requires frequency adjustments and adequate physical separation.
- **Testing:** New WTMDs require initial acceptance tests to verify that they detect the threats required by the facility and routine performance tests to confirm that they continue to work as expected. Both types of tests are used to optimize the sensitivity settings of the detector to minimize false positives (alarms for nonthreat items) and false negatives (failure to alarm for threat items).
- **Throughput:** Although manufacturers of WTMDs may specify a device throughput (i.e., number of people that can be scanned per unit time), overall throughput is affected by the experience of the operator, the arrival rate of people, the compliance and preparation of people to be scanned (e.g., removing metal items as they approach the detector), and the availability of personnel and equipment to adjudicate alarms.

² SAVER reports on X-ray machines and security wands can be found under AEL number 15SC-00-PPSS, Systems, Personnel/Package Screening, at www.firstresponder.gov/SAVER.

WTMDs may be considered a deterrent to bringing weapons such as knives and handguns into an area. They will not detect explosives, chemicals, narcotics, or nonconductive weapons, such as ceramic or plastic knives. Therefore, their use must be considered in the context of the threat scenario and available security resources.

2.3 Standards/Regulations

Several standards and guides relate to the use of WTMDs:

- *Walk-Through Metal Detectors for Use in Concealed Weapon and Contraband Detection*. National Institute of Justice (NIJ) Standard 0601.02 (2003)
This standard supersedes the National Institute of Law Enforcement and Criminal Justice (NILECJ) standard 0601.00 of June 1974. It describes performance requirements and testing methods for active WTMDs, and provides field testing procedures and mechanical drawings for several potentially dangerous test objects.
- *Users' Guide for Handheld and Walk-Through Metal Detectors*. NIJ Guide 600-00 (2001)
This users' guide is intended as a supplement to NIJ standards for hand-held and walk-through metal detectors. It includes information about the theory and limits of operation of these detectors and general training instructions for their use.
- *Standard Guide for Installation of Walk-Through Metal Detectors*. ASTM C1238-97 (2012)
This standard provides guidance on the installation and selection of locations for WTMDs.
- *Standard Practice for Evaluation of Metallic Weapons Detectors for Controlled Access Search and Screening*. ASTM F1468-04a (2010)
This standard describes methods for the evaluation of WMTDs for weapons and criteria for testing metal detection performance. It requires the use of nonstandardized (user-supplied) test objects and test equipment.
- *Standard Practice for Security Checkpoint Metal Detector Screening of Persons with Medical Devices*. ASTM F2401-04 (2010)
This standard provides guidance on design, configuration, and operation of security checkpoints to address the needs of people with implanted active or passive medical devices while maintaining the integrity of the security checkpoint.

Like many other electronic devices, WTMDs are also subject to environmental standards, Federal Communications Commission (FCC) compatibility regulations, and electrical safety requirements. Detectors used at airports may be further required to meet Transportation Security Administration (TSA), Federal Aviation Administration (FAA), or international standards, regulations, or test certifications.

2.4 Emerging Technologies

WTMDs are a mature technology; however, manufacturers continue to provide enhancements in multiple-zone detection, improved detection algorithms, and more sophisticated user interfaces. Devices are now available that detect a wider range of objects, such as explosives or narcotics, and that provide a visual image of the target and the location where it is concealed on or in the body. These technologies, including millimeter wave, backscatter X-ray, ion scan, and others,

are described in two guides published by the NIJ.³ Cost, ease of use, health and privacy concerns, and (in some cases) technology immaturity are currently barriers to more widespread use of these emerging technologies.

2.5 Health Concerns

A number of studies⁴ have looked at the interaction of electromagnetic fields generated by WTMDs with implanted medical devices, such as pacemakers, cardioverter-defibrillators, and artificial joints. Metal detectors may sense some medical devices or joint implants and alarm. Also, there is concern that the electromagnetic field of a WTMD may disrupt the functioning of some medical devices. Although WTMDs are typically considered safe, operators should have the necessary training and procedures to deal with people with implanted medical devices.

3. PRODUCT DATA

The market survey identified 20 WTMDs from 7 companies. Some vendors offer alternative models with different features and options. The products ranged in price from under \$2,500 to over \$10,000.

The majority of products (13) use continuous wave technology, followed by those using pulse induction (5) and passive technology (2). All but two use multiple-zone detectors. Most are designed to be versatile for use at different venues, although four have been specifically designed as high-sensitivity detectors to discover small concealed items at correctional facilities. All of the detectors can be operated indoors, and most have either standard or elective weatherization options for outdoor use. Four units can be disassembled to permit transport in a car. Others have optional dollies or wheel kits for improved portability.

All of the products in this survey automatically self-calibrate on power-up to compensate for background electromagnetic fields. Detector sensitivity is adjustable on all units. All have tamperproof or password-protected controls for adjusting parameters.

Table 3-1 compares different features for these WTMDs. Sections 3.1 through 3.20 give descriptions of individual products. Product data presented in this report was obtained directly from manufacturers and from vendor literature and websites between May and July 2013. The information has not been independently verified by the SAVER program.

Features in Table 3-1 are defined as follows:

Company: the manufacturer or vendor of the WTMD.

Product: the model name of the WTMD.

³ *Guide to the Technologies of Concealed Weapon and Contraband Imaging and Detection* (NIJ Guide 602-00), NIJ, March 2001. www.nij.gov/pubs-sum/184432.htm. Also, *Non-Metallic Contraband Screening Technology Market Survey*, NIJ Sensors, Surveillance, and Biometric Technologies Center of Excellence, TBD 2014.

⁴ For example, see *Electromagnetic Interference in Patients with Implanted Pacemakers or Cardioverter-Defibrillators*, Niehaus M, Tebbenhohanns, J. Heart 86: 246-248, 2001.

Price: refers to the manufacturer suggested retail price in dollars of the basic unit. Volume discounts and U.S. General Services Administration (GSA) pricing are available for many products.

Technology: the detector technology used (see section 2.1), where PID = Pulse Induction Detector, CWD = Continuous Wave Detector, and Pass = Passive.

Outdoor: whether the unit may operate outdoors either as is, or with a weatherproof option.

Portable: whether the device can be easily transported from place to place. Some manufacturers offer an optional wheel kit to facilitate transport.

Stowable: whether the device can fold or break down into small enough components to fit into a car trunk. Suitable for applications that require very portable devices.

Assembly: the time in minutes to set up the detector.

Continuously active: whether the unit is continuously ready for detection. This is in contrast to a sensor-activated detector, which may contain an infrared or optoelectronic device that deactivates detection circuitry until a person passes through the infrared beam.

Detection zones: the number of individual detection areas in the detection space.

Traffic counter: whether the WTMD has a device or means of counting the number of people passing through the portal.

Throughput: the rate, in people per minute, at which a WTMD can process people. It includes the screening time for an individual and the readiness to screen the next person.

Detection programs: the number of built-in programs that come with the detector. These programs are customized for different applications such as airports, courthouses, sporting events, schools, or other uses.

Sensitivity levels: the number of sensitivity levels that can be set on the detector with the goal of optimizing detection while minimizing false alarms.

Target location: the capability to visually indicate the approximate location of the metal target(s) or weapon(s) on the person passing through the portal. For example, a unit may have a light bar along the portal side that would illuminate toward the bottom if sensing metal at the person's ankle level.

Random alarm: the capability to randomly alarm on a percentage of people passing through the detector. This feature may be standard or optional.

Remote programming: the ability to set or change parameters on the WTMD using a computer or device not physically located on the unit. In many cases, this requires purchase of a command module or other additional equipment.

Remote monitoring: the ability to monitor alarms, operation, or results from a location physically separated from the unit. In many cases, this option requires purchase of additional equipment.

Table 3-1. Product Comparison Matrix

Company	Product	Price (\$)	Technology	Outdoor	Portable	Stowable	Assembly (minutes)	Continuously active	Detection zones	Traffic counter	Throughput	Detection programs	Sensitivity levels	Target location	Random alarm	Remote programming	Remote monitoring
AutoClear, LLC	CheckGate 8000	2,415†	PID	•‡	•‡		10	•	1	•‡	na	70	100		na	na	•
	CheckGate 9000	3,624†	PID	•‡	•‡		10	•	na	•‡	na	100	100		na	na	•
	MZ8	3,929†	PID	•‡	•‡		10	na	8	•	na	100	100	•	na	na	•
CEIA USA§	Classic	Contact vendor	CWD	•‡	•	•	5	•	1		40	1	100		na		
	HI-PE Multiple-zone	4,400†	CWD	•‡			7	•	20	•	40	20	200	•	•‡	•	•
	PMD2 Plus	5,350/ 6,000†	CWD	•‡	•		7	•	60	•	40	40+	200	•	•	•	•
	SMD600#	6,500†	CWD	•‡			7	•	20	•	40	40+	200	•	•	•	•
	SMD601#	8,000†	CWD	•‡			7	•	20	•	40	40+	200	•	•	•	•
	SMD601 PLUS#	Contact vendor	CWD	•‡			7	•	20	•	40	40+	200	na	na	•	•
	02PN20	10,930†	CWD	•‡	•		7	na	na	•	40	40+	200	•	na	•	•
	MSD**	Contact vendor	Pass	•	•	•	0	•	na		40	1	100		na	•	
Fisher Research Labs§	M-Scope	4,999	PID	•‡	•	•	5		3	•	12	4	100	•			

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Company	Product	Price (\$)	Technology	Outdoor	Portable	Stowable	Assembly (minutes)	Continuously active	Detection zones	Traffic counter	Throughput	Detection programs	Sensitivity levels	Target location	Random alarm	Remote programming	Remote monitoring
Garrett Electronics, Inc. §	PD 6500i	5,495	PID	• ‡	•		15	•	33	•	60	23	200	•	•	•	•
Ranger Security Detectors	Intelliscan 33	3,990*	CWD	• ‡	• ‡		na	•	33	na	50+	20	na	•	na	na	•
	Intelliscan 18	3,192*	CWD	• ‡	• ‡		15	•	18	•	50	20	na	•	na	na	•
	Intelliscan 6	2,645*	CWD	• ‡	• ‡		15	•	6	•	50	20	na	•	na	na	•
Rapiscan Systems, Inc. §	Metor 6WP	5,138†	CWD	•	•		10	•	2	•	50	12	100	•		•	•
	Metor 6M	3,526†	CWD				na	•	9	•	50	14	100	•	•	•	•
	Metor 6S#	3,325†	CWD				na	•	8	•	50	10	100	•	•	•	•
View Systems, Inc. §	ViewScan	9,500	Pass	•	•	•	20		32	•	16	1	multiple	•			•

PID – Pulse Induction Detector, CWD – Continuous Wave Detector, Pass – Passive

• the product has this feature.

na information on this feature is not available.

* Price information from distributor website.

† GSA price

‡ Available as an option or with optional equipment.

§ Product information was provided by the manufacturer in response to a Request for Information.

|| Elliptical unit is portable, panel version is not.

These products are high-sensitivity detectors designed for detection of small amounts of metals for correctional facility use.

** The CEIA MSD is configured as an omnidirectional post with a base, not as a walk-through portal.

3.1 AutoClear, LLC: CheckGate® 8000



CheckGate 8000

Photo: Walk-Through Metal Detectors Market Survey Report (July 2006)

- Dimensions: 87 in. high (H) x 35 in. wide (W) x 24 in. deep (D); Weight: 119 lbs
- Operating temperature range: 14 to 131°F
- Relative humidity range: 0 to 98 percent
- Weatherization option: available
- Power: 90-265 volts alternating current (VAC)
- Battery: optional battery backup
- Standards: meets and exceeds NILECJ Standard 0601.00 security levels 1-5, FCC, and FAA airport security regulations
- Warranty: 1-year parts and labor; extended warranty available
- Maintenance contract: information not available

The CheckGate 8000 uses PID with noise-reduction circuitry, system diagnostics, and automatic electronic synchronization among units. An optional remote command center with remote alarms is available. Additional models: 8000C is a compact, columnar version; model 8001 is an entry-level, extra-sensitive version for correctional and antitheft applications; model 8091 is a rugged and ultra-sensitive portal for correctional and antitheft use.

3.2 AutoClear, LLC: CheckGate 9000



CheckGate 9000

Photo: Walk-Through Metal Detectors Market Survey Report (July 2006)

- Dimensions: 87 in. H x 35 in. W x 24 in. D; Weight: 99 lbs
- Operating temperature range: 14 to 131°F
- Relative humidity range: 0 to 98 percent
- Weatherization option: available
- Power: 90-265 VAC
- Battery: optional battery backup
- Standards: Meets and exceeds NILECJ Standard 0601.00 security levels 1-5, FCC, and FAA airport security regulations
- Warranty: 1-year parts and labor; extended warranty available
- Maintenance contract: information not available

The CheckGate 9000 uses a dual-coil system with transmitter and receiver pairs on both portal sides to double screen each person to increase throughput and minimize false alarms. Additional models: 9000C is a compact columnar version; model 9001 is a higher sensitivity version.

3.3 AutoClear, LLC: CheckGate MZ8 (CheckGate 9800)



CheckGate MZ8

*Photo: Walk-Through
Metal Detectors Market
Survey Report (July 2006)*

- Dimensions: 87 in. H x 35 in. W x 24 in. D; Weight: 140 lbs
- Operating temperature range: 14 to 131°F
- Relative humidity range: 0 to 98 percent
- Weatherization option: available
- Power: 90-265 VAC
- Battery: optional battery backup
- Standards: Performs to the TSA enhanced metal detection target standards. Meets and exceeds NILECJ Standard 0601.00 security levels 1-5, FCC, and FAA airport security regulations. Independently certified safe for pacemakers and defibrillators.
- Warranty: 1 year; extended warranty available
- Maintenance contract: information not available

The CheckGate MZ8 (also known as Model 9800) has eight horizontal zones with individually adjustable sensitivity. Additional models: MZ4 value model with four horizontal zones.

3.4 CEIA USA: Classic



Classic

*Photo courtesy of
CEIA USA*

- Dimensions: 84.75 in. H x 28.25 in. W x 8.25 in. D; Weight: 66 lbs
- Operating temperature range: -4 to 158°F
- Relative humidity range: 0 to 95 percent
- Weatherization option: available
- Power: 110/115/230 VAC
- Battery: Available as option, 16-hour typical battery life
- Standards: Complies with regulations relating to pacemakers, defibrillators, or other vital support systems; pregnant women; and magnetic storage media. Conforms to the current international security standards for WTMDs. Complies with European Commission (EC) regulations and international standards relating to electrical safety and electromagnetic compatibility (EMC)
- Warranty: 2-year parts and in-house labor
- Maintenance contract: available

The Classic is a lightweight, compact metal detector that may be used for portable and fast deployment applications. It is an entry-level system that is characterized by low power consumption.

3.5 CEIA USA: HI-PE Multiple-zone



HI-PE Multiple-zone

*Photo courtesy of
CEIA USA*

- Dimensions: 88.8 in. H x 28.5 in. W x 28 in. D; Weight: 117 lbs
- Operating temperature range: -4 to 158°F
- Relative humidity range: 0 to 95 percent
- Waterproof (IP65)⁵ option: available
- Power: 100-240 VAC
- Battery: three available options—integrated battery with network card, 64-minute battery life; crossbar battery pack, 17-hour battery backup; external mains and battery supply unit, 32-hour battery life
- Standards: Compliant with the applicable standards for WTMDs, electromagnetic standards on human exposure and pacemaker safety, and international standards for electrical safety and EMC. Claimed by the vendor not to interfere with magnetic media.
- Warranty: 2-year parts and in-house labor
- Maintenance contract: available

The HI-PE is suggested for general purpose and public entrance applications. The detection level can be programmed to one of 16 embedded security standards or to any custom level by the use of a range of possible sensitivity settings. The unit is designed for immunity to environmental interferences including electrical noise.

3.6 CEIA USA: PMD2 Plus/PMD2 Plus Elliptic



PMD2 Plus



PMD2 Plus Elliptic

*Photos courtesy of
CEIA USA*

- Dimensions: Panel: 88.8 in. H x 32.8 in. W x 28 in. D; Weight: 125 lbs; Elliptic: 88.8 in. H x 42.4 in. W x 15.8 in. D; Weight: 89 lbs
- Operating temperature range: -4 to 158°F
- Relative humidity range: 0 to 95 percent
- Waterproof (IP65) option: available
- Power: 100-240 VAC
- Battery: Panel version (not the elliptic) has two options for small battery packs: integrated with network card, 38-minute life; and crossbar battery, 8-hour life. Both panel and elliptic versions have an external battery option with 14-hour battery life.
- Standards: Compliant with applicable standards for enhanced metal detectors, electromagnetic standards on human exposure and pacemaker safety, airport security standards worldwide, and international standards for electrical safety and EMC. Claimed by the vendor not to interfere with magnetic media.
- Warranty: 2-year parts and in-house labor
- Maintenance contract: available

⁵ See Appendix A for a description of ingress protection ratings.

The PMD2 Plus enhanced multiple-zone WTMD is capable of detecting threat metal objects composed of magnetic, nonmagnetic, and mixed alloys. The PMD2 Plus is available both in panel and in elliptic column versions; the latter is suggested for high-profile checkpoints and architecturally demanding environments. Discrimination technology for personal metal items, 22 embedded security standards, rapid transit flow, and visual and acoustic signaling capability are some of the main features offered by this model.

3.7 CEIA USA: SMD600



SMD600

*Photo courtesy of
CEIA USA*

- Dimensions: 88.8 in. H x 32.9 in. W x 28 in. D; Weight: 125 lbs
- Operating temperature range: -4 to 158°F
- Relative humidity range: 0 to 95 percent
- Waterproof (IP65) option: available
- Power: 100-240 VAC
- Battery: three available options: integrated battery with network card, 57-minute battery life; crossbar battery pack, 14-hour battery backup; and external mains and battery supply unit, 25-hour battery life
- Standards: Complies with and exceeds the applicable standards for law enforcement and correctional facilities, electromagnetic standards on human exposure and pacemaker safety, and international standards for electrical safety and EMC. Claimed by the vendor not to interfere with magnetic media.
- Warranty: 2-year parts and in-house labor
- Maintenance contract: available

The SMD600 is a multiple-zone WTMD specifically designed for very high sensitivity applications, such as correctional institutions and industrial loss prevention. The SMD600 provides pinpointing of individual and multiple metal targets from the shoe level to the crossbar. This detector features one-touch self installation, a function that aids in setting up the detector through an automated step-by-step procedure.

3.8 CEIA USA: SMD601



SMD601

*Photo courtesy of
CEIA USA*

- Dimensions: 88.8 in. H x 34.5 in. W x 28 in. D; Weight: 128 lbs
- Operating temperature range: -4 to 158°F; -34.6 to 158°F available
- Relative humidity range: 0 to 95 percent
- Waterproof (IP65) option: available
- Power: 100-240 VAC
- Battery: three available options: 9-minute battery life; 3-hour battery life; and 5.5-hour battery life
- Standards: Complies with and exceeds the applicable standards for law enforcement and correctional facilities. Meets and exceeds the NIJ 0601.02 Standard. Compliant with applicable electromagnetic standards on human exposure and pacemaker safety, and international standards for electrical safety and EMC. Claimed by the vendor not to interfere with magnetic media.

- Warranty: 2-year parts and in-house labor
- Maintenance contract: available

The SMD601 is a multiple-zone WTMD specifically designed to comply with the NIJ 0601.02 Standard that establishes the requirements for law enforcement and correctional facilities. It is a high-sensitivity detector capable of detecting small metal masses on the body or in body cavities. It is also appropriate for high-end loss prevention applications, where the theft of high value or strategic items must be prevented.

3.9 CEIA USA: SMD601 Plus

- Dimensions: 88.8 in. H x 32.9 in. W x 28 in. D; Weight: 163 lbs
- Operating temperature range: -4 to 158°F; -34.6 to 158°F available
- Relative humidity range: 0 to 95 percent
- Waterproof (IP65) option: available
- Power: 100-240 VAC
- Battery: three available options: 9-minute battery life; 3-hour battery life; and 5.5-hour battery life
- Standards: Complies with and exceeds the applicable standards for law enforcement and correctional facilities. Meets and exceeds the NIJ 0601.02 Standard. Compliant with the applicable electromagnetic standards on human exposure and pacemaker safety, and international standards for electrical safety and EMC. Claimed by the vendor not to interfere with magnetic media.
- Warranty: 2-year parts and in-house labor
- Maintenance contract: available

The SMD601 Plus multiple-zone WTMD extends the detection sensitivity of the SMD601 for difficult-to-detect threats, such as a single gun bullet, a single detonator, special stainless steel parts, and electronic parts with minimum metal content.

3.10 CEIA USA: 02PN20



02PN20

*Photo courtesy of
CEIA USA*

- Dimensions: Elliptic: 88.8 in. H x 42 in. W x 14.37 in. D; Weight: 94 lb; Panel: 88.8 in. H x 32.9 in. W x 26 in. D; Weight: 125 lbs
- Operating temperature range: -4 to 158°F
- Relative humidity range: 0 to 95 percent
- Waterproof (IP65) option: available
- Power: 115/230 VAC
- Battery: Panel version (not the elliptic) has two options for small battery packs: 9-minute life; and 3-hour life. Both panel and elliptic versions have an external battery option with 5.5-hour battery life.
- Standards: Conforms to airport security standards worldwide and applicable international standards for electrical safety and EMC.

Claimed by the vendor not to interfere with magnetic media.

- Warranty: 2-year parts and in-house labor
- Maintenance contract: available

The 02PN20 enhanced WTMD is used worldwide in airports, Federal institutions, and other checkpoints. The 02PN20 is approved both by the TSA and European Civil Aviation Conference according to the latest standards. It is a multiple-zone detector that is capable of detecting threat metal objects composed of magnetic, non-magnetic, and mixed alloys. The 02PN20 is available both in panel and in elliptic column versions; the latter is suggested for high-profile checkpoints or architecturally demanding environments. Discrimination technology for personal metal items, 22 embedded security standards, and visual and acoustic signaling capability are some of the main features offered by this model.

3.11 CEIA USA: MSD



MSD

*Photo courtesy of
CEIA USA*

- Dimensions: 74.8 in. H x 12.2 in. W x 12.2 in. D; Weight: 21 lbs
- Operating temperature range: 14 to 149°F
- Relative humidity range: 0 to 95 percent
- Waterproof (IP65)
- Power: 100-240 VAC
- Battery: up to 18-hour operation with embedded rechargeable battery
- Standards: Compliant with applicable electromagnetic standards on human exposure and pacemaker safety. Compliant with and certified to applicable international standards for electrical safety and EMC.
- Warranty: 2-year parts and in-house labor
- Maintenance contract: available

The MSD (Magneto Static Detector) is a portable ferromagnetic detector. It is not configured as a walk-through portal; its post and base configuration provides omnidirectional detection. The MSD finds metals such as iron, nickel, cobalt, and some alloys. These materials are used for magnetized parts in cell phones, radio transceivers, smartphones, and other electronics. The MSD can be used in prisons for detecting illegal use of cell phones or communications devices. It has six separate zone indications and a wireless Bluetooth earpiece.

3.12 Fisher Research Labs: M-Scope



M-Scope

*Photo courtesy of
Fisher Research Labs*

- Dimensions: 88 in. H x 46 in. W x 34 in. D; Weight: 85 lbs
- Operating temperature range: -4 to 140°F
- Relative humidity range: up to 95 percent
- Optional tent available for waterproof (IP65) protection
- Power: 100-220 VAC; runs on two internal 12-volt batteries that recharge when unit is plugged into AC power.
- Battery: 40-hour battery life
- Standards: NILECJ 0601.00; also has Underwriters Laboratory (UL) Listing, FCC Class B, and DHS Support Anti-terrorism by Fostering Effective Technologies (SAFETY) Act designation.
- Warranty: 2-year parts and labor
- Maintenance contract: available

The M-Scope is a modular-design detector consisting of interlocking panels that form the detector walls. It can be assembled or disassembled in 5 minutes and packed in a transport dolly. It has a digital keypad with security access controls, a memory feature for storing user settings, a transit counter, and three sensor zones; it can also be used both indoors or outdoors (with optional pop-up shelter). The M-Scope can run on AC power or up to 40 hours on internal battery power.

3.13 Garrett Electronics, Inc.: PD 6500i



PD 6500i

*Photo courtesy of
Garrett Electronics, Inc.*

- Dimensions: 87 in. H x 35 in. W x 23 in. D; Weight: 155 lbs
- Operating temperature range: -4 to 140°F
- Relative humidity range: up to 95 percent
- Waterproof (IP55), IP65 protection as an option
- Power: 100-240 VAC
- Battery: 10-hour battery life
- Standards: Meets TSA requirements for U.S. airports and additional standards for international airports. Meets electrical safety and compatibility requirements for the FCC and other international standards.
- Warranty: 24 months, limited parts/labor
- Maintenance contract: available

The PD 6500i is a 33-zone detector with transmitters and receivers in each side panel. It is suitable for use in airports, courthouses, prisons, schools, facilities, special events, and many other applications. Up to 100 units can be networked. A control monitor and analyzer module provides remote control, monitoring, data analysis, and group management. Different variations of the PD 6500i (e.g., color schemes, larger and smaller passage ways) are available.

3.14 Ranger Security Detectors: Intelliscan 33

- Dimensions: 87 in. H x 35 in. W x 23 in. D; Weight: 140 lbs
- Operating temperature range: 32 to 131°F

- Relative humidity range: up to 95 percent
- Waterproof (IP65) option: available
- Power: 115-230 VAC
- Battery: optional backup battery
- Standards: Certified by the FAA and meets or exceeds all requirements of the NILECJ Standard 0601.00, security levels 1-5
- Warranty: 2-year limited
- Maintenance contract: information not available

The Intelliscan 33 (also known as the Intelliscan II) has 33 zones with adjustable sensitivity and audible and visual alarms for each zone. It has 20 factory programs, 4 user-defined programs, and traffic pacing stop and go lights. It can operate in an “all metals” mode or discrimination mode to target specific types of metals or alloys.

3.15 Ranger Security Detectors: Intelliscan 18



Intelliscan 18

Photo: Walk-Through Metal Detectors Market Survey Report (July 2006)

- Dimensions: 87 in. H x 35 in. W x 23 in. D; Weight: 140 lbs
- Operating temperature range: 32 to 131°F
- Relative humidity range: up to 95 percent
- Weatherproof option for outdoor use
- Power: 115-230 VAC
- Battery: optional backup battery
- Standards: Meets or exceeds all requirements of NILECJ Standard 0601.00, security levels 1-5
- Warranty: 2-year limited
- Maintenance contract: information not available

The Intelliscan 18 has 18 detection zones with adjustable sensitivity and audible and visual alarms for each zone. It has 20 factory programs, 4 user-defined programs, and traffic pacing stop and go lights. It can operate in an “all metals” mode or discrimination mode to target specific types of metals or alloys.

3.16 Ranger Security Detectors: Intelliscan 6



Intelliscan 6

Photo: Walk-Through Metal Detectors Market Survey Report (July 2006)

- Dimensions: 87 in. H x 35 in. w x 23 in. D; Weight: 181 lbs
- Operating temperature range: 32 to 131°F
- Relative humidity range: up to 95 percent
- Weatherproof option for outdoor use
- Power: 115-230 VAC
- Battery: optional backup battery
- Standards: Meets or exceeds all requirements of NILECJ Standard 0601.00, security levels 1-5
- Warranty: 2-year limited
- Maintenance contract: information not available

The Intelliscan 6 has six detection zones with independent sensitivity adjustments. It has 20 standard detection programs and can operate in an “all metals” mode or discrimination mode.

3.17 Rapiscan Systems, Inc.: Metor 6WP



Metor 6WP

*Photo courtesy of
Rapiscan Systems, Inc.*

- Dimensions: 87.8 in. H x 39.8 in. W x 13.9 in. D; Weight: 90 lbs
- Operating temperature range: -4 to 140°F
- Relative humidity range: 0 to 100 percent
- Waterproof (IP65)
- Power: 100-240 VAC
- Battery: 8-hour battery life
- Standards: Meets or exceeds all requirements of the NILECJ Standard 0601.00, security levels 1-5. Meets European EMC directives and standards, FCC Class B standards, and standards for electrical safety.
- Warranty: 2-year parts
- Maintenance contract: available

The Metor 6WP is a lightweight, weatherproof, multiple-zone detector suitable for indoor or outdoor temporary and permanent installations. According to the vendor, the detector can be set up by one person in 5 minutes. Immunity to electromagnetic interference allows several units to be placed in close proximity to one another. A calibration guard provides a warning when any of the calibration parameters are changed from the saved values. This feature can be switched on and off.

3.18 Rapiscan Systems, Inc.: Metor 6M



Metor 6M

*Photo courtesy of
Rapiscan Systems, Inc.*

- Dimensions: 88.2 in. H x 35.4 in. W x 27.6 in. D; Weight: 130 lbs
- Operating temperature range: -4 to 140°F
- Relative humidity range: 0 to 95 percent
- Waterproof (IP55)
- Power: 100-240 VAC
- Battery: Optional battery backup, 8-hour battery life
- Standards: Meets European EMC directives and standards, FCC Class B standards, and standards for electrical safety. European Union aviation compliant.
- Warranty: 2-year parts
- Maintenance contract: available

The Metor 6M is a multipurpose, multiple-zone WTMD. It has multiple preset detection programs based on international standards, and fully configurable user levels to control who can view and change settings. Its immunity to electromagnetic interference and vibration allows installation in most environments and within close proximity to other units. The Metor 6M has an automatic interactive floor sensitivity calibration program for floor-level calibration and a calibration guard that can warn when any of the calibration parameters are changed.

3.19 Rapiscan Systems, Inc.: Metor 6S



Metor 6S

*Photo courtesy of
Rapiscan Systems, Inc.*

- Dimensions: 88.2 in. H x 33.5 in. W x 27.6 in. D; Weight: 128 lbs
- Operating temperature range: -4 to 140°F
- Relative humidity range: 0 to 95 percent
- Waterproof (IP55)
- Power: 100-240 VAC
- Battery: Optional battery backup with 8-hour battery life
- Standards: Complies with NIJ Standard 0601.02 for corrections and law enforcement agencies. Meets European EMC directives and standards, FCC Class B standards, and standards for electrical safety
- Warranty: 2-year parts
- Maintenance contract: available

The Metor 6S high sensitivity WTMD is designed specifically for detecting small ferrous and nonferrous items, such as disposable prison razors, metal shanks, handcuff keys, detonator caps, jewelry, coins, and microprocessor or memory chips. The Metor 6S can detect small metal objects hidden in body cavities and can be used for loss prevention. The detector is designed such that several units can be placed in close proximity to one another. It has an automatic interactive floor sensitivity calibration program for floor level calibration and a calibration guard that can warn when any of the calibration parameters are changed.

3.20 View Systems, Inc.: ViewScan



ViewScan

*Photo courtesy of
View Systems, Inc.*

- Dimensions: 81 in. H x 46 in. W x 2 in. D; Weight: 52 lbs
- Operating temperature range: 40 to 105°F
- Relative humidity range: 5 to 95 percent
- Not waterproof
- Power: 110/220 VAC
- Battery: over 8-hour battery life
- Standards: Complies with FAA detection specifications. Has DHS SAFETY Act designation.
- Warranty: 1-year warranty with extended warranty available
- Maintenance contract available

The ViewScan is a walk-through concealed weapons detection system that detects and visually indicates the location and number of possible threat objects such as guns, knives, or razor blades, while ignoring personal artifacts such as coins, keys, or jewelry. The graphical user interface takes a snapshot of the person being scanned and displays the location of the suspect object on the person's image to facilitate secondary screening. There is also an audible alarm that sounds if a suspected object is detected. The technology is passive and does not interfere with any medical devices.

4. VENDOR CONTACT INFORMATION

Additional information on the products included in this market survey report can be obtained from the vendors listed in Table 4-1.

Table 4-1. Vendor Contact Information

Company	Product(s)	Address/Phone Number	E-Mail/Website
AutoClear, LLC	CheckGate [®] 8000, CheckGate 9000, and MZ8	2 Gardner Road Fairfield, NJ 07004 800-231-6414	sales@a-clear.com www.a-clear.com
CEIA USA	Classic, HI-PE, PMD2 Plus, SMD600, SMD601, SMD601 Plus, 02PN20, MSD	9155 Dutton Drive Twinsburg, OH 44087 330-405-3190	info@ceia-usa.com www.ceia-usa.com
Fisher Research Labs	M-Scope	1465 H-Henry Brennan El Paso, TX 79936 915-633-8354 Ext 309	service-fisherlab@fisherlab.com www.fisherlab.com
Garrett Electronics, Inc.	PD 6500i	1881 W. State Street Garland, TX 75042 757-288-6604	pmiusa@earthlink.net www.garrett.com
Ranger Security Detectors	Intelliscan 33, Intelliscan 18, and Intelliscan 6	11900 Montana Avenue El Paso, TX 79936 915-590-4441	sales@rangersecurity.com www.rangersecurity.com
Rapiscan Systems, Inc.	Metor 6WP, Metor 6M, Metor 6S	2900 Crystal Drive, Suite 910 Arlington, VA 22202 571-227-6772	EParise@rapiscansystems.com www.rapiscansystems.com
View Systems, Inc.	ViewScan	1550 Caton Center Drive Baltimore, MD 21227 410-242-8439	info@viewsystems.com www.viewsystems.com

5. SUMMARY

WTMDs are devices used at building, transportation, or event access control points to detect concealed metal weapons or contraband. This market survey report includes 20 WTMDs ranging in price from under \$2,500 to over \$10,000.

WTMDs use active or passive detection techniques. Most of the detectors in this survey are active, using continuous wave detection, followed by a smaller number using pulse induction technology. Two of the detectors are passive, using the earth's magnetic field for detection. Many of the detectors can be used at a variety of locations ranging from schools to airports, with four detectors specifically designed for high-sensitivity applications, such as discerning concealed items in or on a body in a prison environment. Standard versions of some of the WTMDs can be used outdoors, and most have a weatherization option. Four of the WTMDs are portable enough to fit in a car trunk when disassembled. All have the ability to run off battery power. A battery could be used for either a portable deployment or as backup in case of power loss.

Two of the detectors are single zone, in which all metal objects on a person create a cumulative signal for alarm. The remainder are multiple-zone detectors that individually screen sections of the detection space and can pinpoint the location(s) of the object or objects detected. All of the WTMDs have adjustable sensitivity levels and most have a choice of built-in programs for different security needs. Many of the detectors have options for remote control and monitoring. Warranty types vary among the products, but are typically 1 to 2 years and may include parts, labor, or both.

Law enforcement or other agencies that may be considering purchasing WTMDs should carefully consider each product's overall capabilities and limitations in relation to their agency's operational needs. Different venues and applications will have different requirements for sensitivity, ruggedness, and other features.

APPENDIX A. INGRESS PROTECTION (IP) RATINGS

The International Electrotechnical Commission (IEC) Ingress Protection (IP) Rating is composed of two digits. The first number in the rating refers to protection against solid objects, and the second number refers to protection against water. The highest possible rating is IP68.

First Digit	Meaning	Second Digit	Meaning
(Refers to protection against solids)		(Refers to protection against water)	
0	No protection.	0	No protection.
1	Protected against solid objects over 50 mm (e.g., accidental touch by hand).	1	Protected against water falling vertically.
2	Protected against solid objects over 12 mm (e.g., accidental touch by finger).	2	Protected against direct sprays up to 15 degrees from vertical.
3	Protected against solid objects over 2.5 mm (e.g., tools, wires).	3	Protected against direct sprays up to 60 degrees from vertical.
4	Protected against solid objects over 1 mm (e.g., small wires).	4	Protected against sprays from all directions. Limited ingress permitted.
5	Protected against dust-limited ingress (no harmful deposit).	5	Protected against low pressure jets of water from all directions. Limited ingress permitted.
6	Totally protected against all dust.	6	Protected against strong jets of water. Limited ingress permitted (e.g., acceptable for use on ship decks).
		7	Protected against temporary effects of immersion between 15 cm and 1 m for 30 minutes.
		8	Protected against long periods of immersion under pressure.