

Venue Managers Guide for Evaluating Patron Screening (Metal Detectors) Solutions

Purpose

This guide assists venue managers in better understanding patron screening solutions and the operational considerations for deploying patron screening technology. The information contained in this guide is for guidance purposes only and is not a requirement under any regulation or legislation. This document does not include an exhaustive list of solutions and should be supplemented with applicable governance and venue-specific needs.

Instructions

This guide provides end-users a list of general technology considerations to determine the type of solution most appropriate for the application. Once an end-user begins connecting with solution providers, incorporated checklists can assist venue managers in reviewing the following:

- Solution documentation and technical specifications.
- Operator needs and capabilities.
- Detection and operational considerations.

Itemized checklists include questions end-users should be asking solution providers when considering their solution. Checklists include additional information to provide further insight and context.

References

Security Level 2, as defined in NILECJ-STD-0601.00, is commonly used as the standard for sports venues. NIJ 0601.01 superseded NILECJ-STD-0601.00 in September 2000, and NIJ-0601.01 was replaced by NIJ 0601.02 in January 2003. For the purposes of this guide, NIJ 0601.02 will serve as the primary reference document in this series.

ASTM International. (2021). ASTM C1238-97. *Standard Guide for Installation of Walk-Through Metal Detectors*. Retrieved from [https://standards.globalspec.com/std/14376436/ASTM%20C1238-97\(2021\)](https://standards.globalspec.com/std/14376436/ASTM%20C1238-97(2021))

U.S. Department of Justice. (2003, January). NIJ Standard-0601.02. *Walk-Through Metal Detectors for Use in Concealed Weapon and Contraband Detection*. Retrieved from <https://www.ojp.gov/pdffiles1/nij/193510.pdf>

National Center for Spectator Sports Safety and Security. (2020). *Professional Sports Safety and Security. Best Practices Guide, 5th Edition*. The University of Southern Mississippi.

Technology Considerations

When choosing between traditional walk-through metal detectors (WTMD) and higher throughput weapons detection systems, organizations should consider the following:

- **What are your hardware/software needs?** Although detection requirements and testing criteria are available through reputable sources (i.e., NILECJ, NIJ, ASTM), venue managers' should consider several options before purchasing (installation, size, alarm indicators, user interface, etc.). Organizations should carefully consider what solution meets their operational needs. Recommend conducting an operational environment assessment and focused review of the current risk assessment for deployment areas.
- **What is the acceptable level of risk?** Higher throughput systems prioritize the detection of ferromagnetic metals and larger objects (guns, pipes, etc.). If the venue would like to consistently detect smaller objects (i.e., knives) or nonferromagnetic metals, a traditional WTMD may be most appropriate. Organizations should thoroughly test the detection capabilities of solutions before purchasing.
- **How will staff be positioned?** Organizations should evaluate the methodology and process of their security screening and ingress operations to understand the staffing requirements for the technology under consideration. Is a pacer necessary? Will a supervisor be dedicated to each screening location? How many tablet operators or monitors are required? How many secondary screeners are required to keep up with throughput? Where will law enforcement be positioned?
- **How will bags be screened?** Higher throughput systems and decreased sensitivity settings on traditional WTMDs allow patrons to process through screening without divesting innocuous items (keys, watches, wallets, belt buckles, glasses, etc.). Some higher throughput systems also claim to be capable of screening clutch purses, large bags, backpacks, etc. However, patron screening solutions without supplementary x-ray screening dramatically increase the probability of prohibited items entering the venue. Systems can be used in combination with x-ray screening but will impact screening throughput. Consider designating lanes or ingress points for patrons with bags.
- **What are your training requirements?** Manufacturers should provide training tools and technical manuals to assist with staff training and equipment maintenance.

Documentation & Technical Specifications

Item #	Title	Description	Yes	No
1	Operating Instructions	<p>Does the manufacturer or distributor supply an operators manual that, at a minimum, includes the following:</p> <ul style="list-style-type: none"> • Purpose of the detector • Description of operator controls • Listing of features • Detection principles and capabilities • Diagrams showing functional components • Applicable exposure and warning information, unless the FDA has determined no warning is necessary 		
2	Operator Training	Does the manufacturer or distributor provide a training package? If so, determine how to effectively deploy the training to those who need it within your organization.		
3	Technical Manual	<p>Does the manufacturer or distributor provide a technical manual that includes, at a minimum, information to assist with:</p> <ul style="list-style-type: none"> • Maintenance • Troubleshooting • Repairs • Calibration frequency/criteria 		
4	Technical Specifications	<p>Does the manufacturer or distributor have the following specification available upon request:</p> <ul style="list-style-type: none"> • Detector <i>object size class</i> • Mechanical drawings • Mass/size of the detector • Allowable range of power supply • Battery type, quantity, live • Magnetic field strength • Weather/temperature information and ranges 		
5	Certifications, Inspection, and Conformance	Can the manufacturer provide certification information on mandatory tests? Are additional certifications or inspections available (SAFETY Act, DT&E, etc.)?		
6	Environment Considerations	<p>Has the technology been tested in a variety of environments and conditions? Environmental conditions include, but are not limited to:</p> <ul style="list-style-type: none"> • Indoor vs. outdoor • High winds • Extreme temperatures (hot and cold) 		

		<ul style="list-style-type: none"> • Precipitation (rain, snow, sleet, etc.) • Sand and dust • Corrosion 		
7	Maintenance Package	Does the manufacturer offer a maintenance package for the technology?		
8	Replacement Parts	Can parts be replaced and technology be updated cost-effectively and with minimal disruption? It is essential to understand the efficiency of supply chain management.		
9	Installation (Permanent)	Does the provider offer a permanent installation? The manufacturer should provide detailed instructions for location selection and installation of metal detectors.		
10	Installation (Temporary)	Does the provider offer a temporary installation? Temporary installations and leasing can provide savings in cost and time. Additionally, the temporary installation of purchased equipment can also provide mobility. If the temporary installation is desirable, carefully consider assembly and transport requirements.		
11	Network Access	Does the solution require access to the network infrastructure for storage, applications, data, or services? If so, organizations should ensure the technology meets venue security standards. The Department of Homeland Security (DHS) Cybersecurity & Infrastructure Security Agency (CISA) offers recommended practices for security network infrastructure and networked devices.		
12	System Width	Does the solution meet the minimum width requirement (28") specified by the American Disabilities Act (ADA)? Organizations should confirm the width of systems meet existing standards and operational requirements.		
13	Technical Support	Is 24/7 technical support available? Consider the kind of support offered (on-site or remote) and the type of response time guarantee available.		

Operator Considerations

Item #	Title	Description	Yes	No
1	Power On/Off Switch	Is the device equipped with an on/off switch?		
2	Audio Alarm On/Off Switch	If equipped with audio, can the audio alarm be disabled?		
3	Reset Button	Will the detector reset automatically to the set parameters in the event of a detector or system failure or overload? Take note of the amount of time necessary to power on, reset, and calibrate the system. This time can vary significantly between systems.		
4	Alarm Indication	Does the device signal or warn the operator after identifying an object (visual and auditory)?		
5	Positive Alarm Indication	Does the alarm indication correspond to a metal object? The system should not alarm without the presence of a detectable object.		
6	Proportional Alarm Indication	Is the alarm indication proportional to the size, proximity, orientation, and material of an object?		
7	Sensitivity Programming	Can the sensitivity be programmed electronically to reflect venue needs and target the desired object size classes?		
8	Integrated Technologies	Is the device equipped with all integrated technologies (cameras, sensors, etc.) advertised by the manufacturer or distributor?		
9	Reports/Analytics	Can the device software generate reports (event logs, alarms, etc.)? Know how to access information and where they are stored. Ensure the technology meets venue security standards.		
10	User Interface	Is the interface user-friendly? Can permission levels be set and managed?		
11	Mobility	Is the detector mobile? Does the weight or design hinder event staff from moving the device?		
12	Durability	Is the detector ruggedized and impact resistant?		
13	Ease of use	Is the detector easy for the operator to use? Ease of use will largely depend on the skill level of staff (novice, competent, expert).		
14	Calibration	Does the manufacturer provide the tools, equipment, and training for calibrations and operational checks?		

Detection Considerations

Item #	Title	Description	Yes	No
1	Speed	Does the device produce a positive alarm for test objects moving at the speeds outlined in applicable standards? Test objects should be processed through the detector at varying rates to account for expected patrons' processing speed through screening.		
2	Throughput Rate	Is the throughput rate appropriate for the application? Consider the impact of venue ingress procedures (ticketing, X-ray, bag searches, etc.) and service rate. Advertised throughput rates may not be accurate when factoring in additional conditions.		
3	Interference	Once set up, does the detector produce a positive alarm to interference (body interference, bumps, patron screening, etc.) when no tested object is present?		
4	Visual Alarm Indicators	Is the detector equipped with a visible alarm? The visual alarm should be active (illuminating) and inactive (non-illuminating).		
5	Test Objects	Does the device detect the object sizes specified by the manufacturer or distributor? Test objects should correspond with applicable standards. Additionally, test objects should be processed through the system in accordance with the requirements of that same standard. As a reminder, higher throughput systems and event settings often focus on larger objects.		
6	Discrimination	Do alarms of innocuous items (coins, belt buckles, phones, keys, watches eyeglasses, etc.) exceed a 20% false alarm threshold? Operators should process items through the system 25 times at each measurement location. This threshold may be lower depending on applicable standards and expectations.		
7	Ferromagnetic Metal	Will the device detect ferromagnetic metal (iron, nickel, cobalt, most steels, etc.)? Note that some earth metals are magnetic.		
8	NonFerromagnetic Metal	Will the device detect nonferromagnetic metals (gold, silver, copper, lead, zinc, tin, etc.)?		
9	Bags	Will test objects be detected when concealed by bags? Be specific and thorough when documenting		

		the types of bags, content, and sources used for this assessment.		
10	Sensitivity Test Settings	Was the detector sensitivity adjusted during testing? The sensitivity setting should not be altered between trials of test objects and should reflect the setting used operationally.		
11	Alarm Indication Speed	Was the operator notified at or exceeding the speed advertised by the manufacturer or distributor?		
12	Program Storage	Will the detector maintain its programming in the event of a loss or disruption of power? Cycle the system on and off ten times, checking the setting each time (NIJ Standard 0601.02).		
13	Sensitivity	Is the sensitivity level appropriate for the venue and its events? Can sensitivity be adjusted to accommodate various event types and security needs?		

Operational Check Locations

When considering a solution and during pre-event operational checks, conduct a performance test. In the absence of or addition to a test object platform, the NCS⁴ recommends positioning test objects on clean testers (a person not carrying electrically conductive and magnetizable objects) at the approximate test measurement locations (Figure 1). At a minimum, test objects should be positioned in the following areas:

- Head height, centered along the z-axis
- Left shoulder
- Right shoulder
- Just below the armpit, centered on the z-axis
- Left hip
- Right hip
- Groin area, centered along the z-axis
- Left ankle
- Right ankle

Distributing performance checks amongst locations is critical to confirm integrated sensors can detect objects at varying distances and positions.

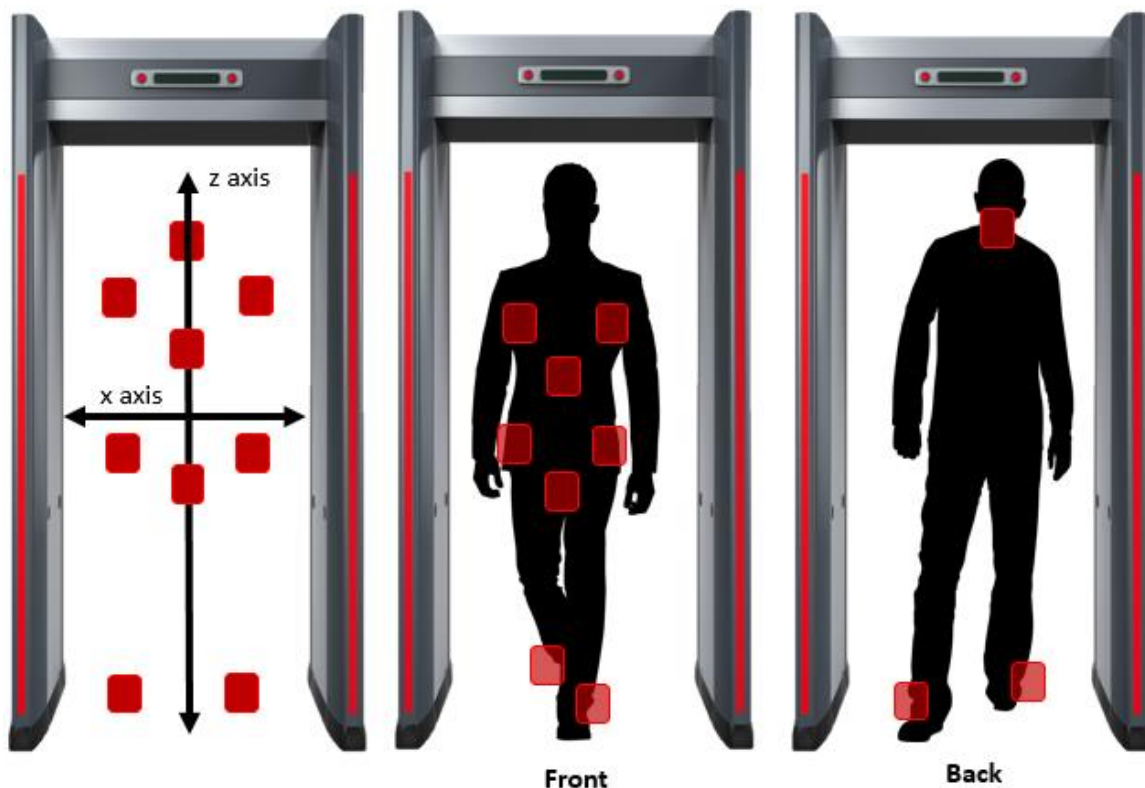


Figure 1. Diagram illustrating the nine operational check locations concerning the x-axis and z-axis.