



Whitepaper

A New Standard for Weapons Detection

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INTRODUCTION

New Threats Demand New Standards

Security leaders at venues and facilities worldwide strive every day to make members of the public under their care safe from mass casualty events. But current standards for weapons screening in the US are decades old: dating back to 2003 and based on standards first authored in 1974. While initially authored for use in jails, courthouses, and airports, these standards have since been used in a wide range of venues far beyond those they were originally intended to address.

While these standards have remained largely unchanged over the past 50 years, the threat and operating environments has transformed in important ways. New technologies have emerged, visitor experience has taken priority, everyday metallic objects we carry have changed dramatically, and new security threats have arisen. Considering all these changes, past standards for metal detectors have become obsolete.

In contrast to the facilities for which these standards were originally designed, sports and entertainment venues, performing arts centers, museums, casinos, tourist centers, schools, houses of worship, workplaces, casinos, and theme parks are seeking to welcome their visitors and to prioritize the guest experience. With past standards, these kinds of venues are forced to choose between physical safety and guest experience—a painful tradeoff that is unnecessary in the current technological landscape.

Physical security is always about more than detection technology alone. In the real world, security screening involves an integrated system of people, processes, and technologies that work together to address the threat in a specific operating environment. And defining the right technology to balance physical safety and guest experience relies on understanding how it fits within this broader system. While the right technology can harmonize with the people and processes that deploy it and thereby improve physical security, the wrong technology can in fact hinder the important work of safeguarding the public, putting an undue burden on security teams and increasing the risk of physical harm.

Every operating environment is unique, which is why re-evaluating what worked for airports, prisons, and municipal buildings is so critical to understanding the right security solutions for significantly different types of venues, their unique visitors, and the potential threats they may encounter. Critically examining historical standards based only on the technologies available at the time is the first step in this re-evaluation.

▶ The next step?

A new standard that is better aligned to more types of venues, their business goals, their visitors, and their security needs. By exploring what's possible with modern technology, what's operationally sustainable for the people and processes across security teams, and how the system as a whole can better meet its objectives, venues can address the needs of both their employees and the visiting public alike, all while maintaining the high standards of weapons detection required to prevent the catastrophic loss of life.

Re-evaluating Historical Security Standards

Released in 1974, the NILECJ 601.00 Standard for Walk-Through Metal Detectors for Use in Weapons Detection was the first standard of its kind. It specified standards for walk-through metal detectors used in courtrooms and prisons. It indicated five levels of sensitivity, including lower settings used just for monitoring and deterrence with allowances for hand-carried items, increased throughput, and lower false alarm rates for places where threats are lower.

“A wide variety of venues and facilities quickly defaulted to metal detector-based weapons screening without fully considering the impact in a non-airport environment. Just like the airline industry purposefully adapted its standards and technologies to the shortcomings of metal detectors, venues across other industries have an opportunity—and an imperative—to do the same.”

Sensitivity levels indicated by the NILECJ 601.00 standard ramp up from there, ranging to increasingly higher levels where false alarms, according to the standard, “are expected”; normal items “must be removed before monitoring if alarms on nearly all persons are to be avoided”; and finally culminating at the highest setting, where all metal, including zippers, snaps, and metal buttons in clothing are intended to be detected – the levels required for security in prisons.¹

Detection success throughout the standard is measured based on the technology’s ability, at the indicated sensitivity level, to find any quantity of metal large enough to be a weapon and to ignore smaller quantities of metal. Also noted in the original standard: throughput rate per minute was indicated at 15 people at the lowest sensitivity setting, down to a rate of 4 per minute at the highest setting.

The standard has evolved throughout the years – with reissuances in 2000 and 2003 under the NIJ 601.01 and 02 standards – but these updates make no mention of the requirements for throughput and venue type, and instead focus mainly on specifying appropriate testing procedures to prove the technology’s ability to detect increasingly smaller sizes of metal objects. The upshot of these new revisions has been to focus only on the technology’s ability to find metal, but not on its ability to discriminate between different types of metal objects, threat or benign, nor to balance the need to move entrants through quickly for a better visitor experience.

Although designed for prisons and courthouses, walk-through metal detector technology was adopted to support airport security in the 1960s and 70s when hijackings became an increasing threat to air travel. And while finding even the smallest metal object that could do harm on an aircraft was paramount, infamous failings over the following decades ensued—not the least among them being 9/11—leading the airport security industry to adopt new technologies and protocols of their own.

Following 9/11, the U.S. government formed the Transportation Security Administration. The TSA developed and implemented a variety of new standards and procedures for airport security screening in response to the changing threat environment. In many cases this involved using higher sensitivity settings on metal detectors, increasingly divesting and re-routing items that metal detectors failed to detect, and replacing metal detectors with other screening technologies. This included having passengers remove their shoes in the wake of the 2001 shoe bomber attack, restricting liquids in amounts over 3 oz in 2006 after British police uncovered a plot involving liquid explosives targeted at airlines, and culminating with the introduction of full-body x-rays following the underwear bomber incident in 2009. The impact of the new TSA guidelines and procedures for air travel reached far beyond airports in the post-9/11 environment.

¹NILECJ 601.00 Standard for Walk-Through Metal Detectors for Use in Weapons Detection., 1974.

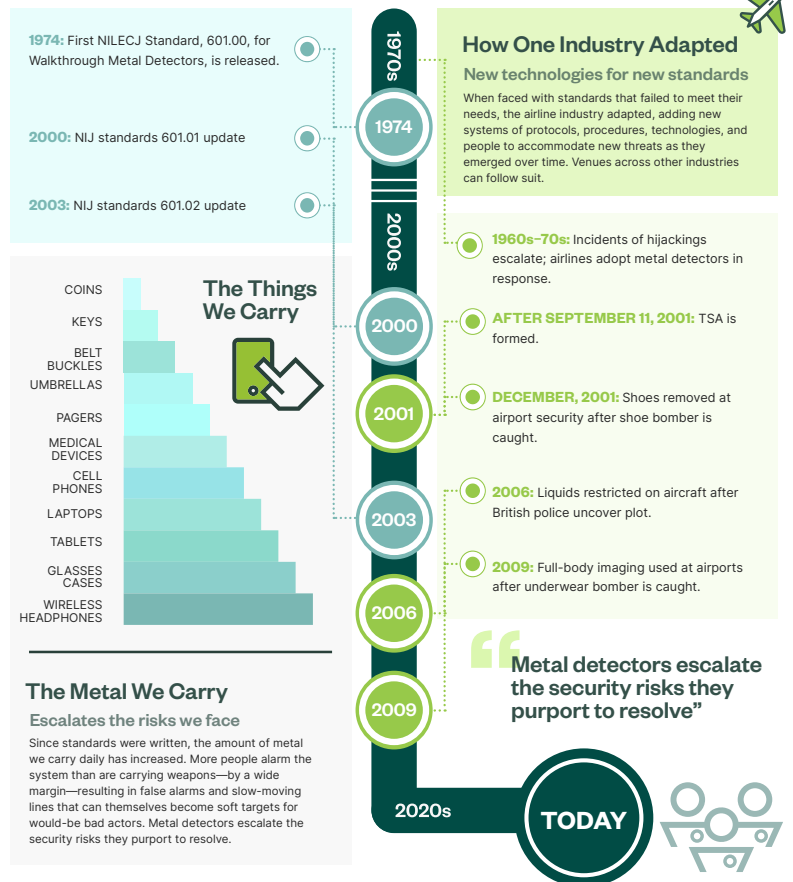
Meeting Evolving Security Needs

In recent years, new threats of mass casualty events have emerged as people gather publicly in large, unsecured crowds. The Boston Marathon bombing; the Pulse nightclub in Orlando; the Las Vegas shooting at an outdoor concert—all of these tragedies have impacted crowds of people gathered in or around public spaces that had no weapons screening in place. Today, it is as important to protect those visitors that are inside the venue as it is to protect those waiting to gain entrance in a long queue outside—a “soft target” for those intending to do harm.

Ironically, metal detector weapons screening can actually increase the risk of harm because it creates long, slow-moving lines when a large number of people want to enter a venue quickly. Because of their excessive alarm rates, metal detectors slow down crowds of people who are inevitably carrying something metal and, most likely, harmless.

The technology simply hasn't kept up with the changing realities of everyday life, including what we carry with us daily, over the last 50 or so years. When metal detectors were first introduced, pocket change, plus a key or two--house and car--would be normal items to divest of, plus maybe a belt buckle or an umbrella.

In the last few decades, the metal items we carry with us have evolved from pagers to cell phones to smartphones; we've added metal implants throughout our bodies to heal joints and limbs; we carry laptops and tablets and wireless headphones in our bags; and we've even adopted new popular uses for metal like water tumblers and glasses cases.



In short, we simply carry more stuff that looks, to metal detectors, like a threat. Under those conditions, metal detectors alarm on “nearly everyone”, as they are designed to do, and as their standard indicates. Extensive lines— Potential soft targets for those intending to do harm—form simply by people using the technology as it was designed to be used; divest of everyday belongings, hand over your bags, rejoin the line when you are found to have alarmed from something you’ve forgotten. Get your bag wanded, or your person; or, worse yet, get stopped for a pat-down.

Contrast this experience with the organizational objectives of venues where the public gathers: delightful, entertaining, and often expensive. They seek to be of great value to their guests—to welcome, not deter. Guest experience is paramount for these venues. Submitting their valued guests to not only unpleasant but potentially dangerous security screening scenarios is not desirable, nor does it reflect positively on their brands.

But neither can these venues ignore the very real possibility of tragic mass shootings occurring on their watch, which is why the ability to balance security and guest experience is so important for them to address.

The problem to be solved by weapons detection at the threshold of most public spaces isn’t the problem of finding every piece of metal on a person, the way it may be at the prisons and courthouses that the technology was originally designed for. Instead, the challenge is to find those weapons most likely to be used in mass casualty events.

In recent years, the weapons that have tragically been used to perpetrate most mass casualty events in the US have been assault rifles, shot guns, semi-automatic rifles and handguns, revolvers, and IEDs (improvised explosive devices). And outside the US, where knife attacks are far more common in these incidents, the weapons used represent the largest, fixed-blade knives capable of inflicting the most harm to the most people.

“Potential soft targets for those intending to do harm—form simply by people using the technology as it was designed to be used.”

In the US: Weapons Used in Mass Casualty Attacks at Facilities and Venues

Firearms



IEDs



World-wide: Weapons Used in Mass Casualty Attacks at Venues and Facilities



The ability to reliably detect these significant threats to public safety, while balancing the need to move everyone who doesn't pose a threat—that is, the vast majority of guests—through entryways as quickly and safely as possible, is an important measure of success for a new technology standard.

Achieving Operational Sustainability

Past standards and the metal detectors that support them introduce an alarm rate that is not operationally sustainable. In other words, the system (people, processes, and technology) is overwhelmed by the excess of false alarms. In this system, when the error rate of the technology rises high enough, the front-line staff who execute the screening process are relied upon to replace the technology; and even the most experienced employee can be subject to fatigue.

Walk-through metal detectors and wand technologies rely on the expertise and astuteness of guards to find the metal item on the person or in the bag that alarmed. With so many common metal items alarming the system along with any potential weapons threats, the guards—not the technologies—are the ones doing the work of discerning everyday items from actual threats. And it becomes increasingly easy to miss the weapon you don't expect to see.

The many everyday items that can alert in metal detectors are taxing security personnel beyond their capacity to manage. This can be a safety risk in and of itself: if security staff is overworked and exhausted by so many alarms, they may be more prone to see an ordinary item than an actual threat and wave the individual on, not checking them thoroughly. In fact, the more nuisance alarms that are experienced, the less likely it is that a human will identify true threats among the stream of all the harmless items that the technology has identified. Humans simply get fatigued and become more likely to miss true threats.

Because metal detectors are not held accountable to a specific level of threat detection accuracy at an acceptable alarm rate, they are allowed to externalize the errors they encounter, pushing detection responsibility to the people in the system. This can quickly overwhelm the system as a whole, increasing the risk of threats getting through.

Venues should not allow the security technologies they rely on to externalize error correction in this way. Weapons detection technologies must be accountable to a reliable level of detection accuracy for specific threats at an operationally acceptable alarm rate. They must be able to demonstrate this accountability through quantitative measurements of their own success—like visitor count, alarm rate, time spent in resolution, a count of threat types and benign objects detected. These capabilities will grant a higher degree of operational excellence to the process, better supporting security personnel and their processes, and helping to reduce their overall error rates, as well.

Of course, operationally acceptable alarm rates can differ based on venue type. Some venues—like airports, prisons, and courthouses—can afford to spend several minutes with each visitor, checking them thoroughly for all potential threats. In a prison environment the potential risk, however small, outweighs the time spent and the aggravation to those being screened. Other venues, like 50,000-person stadiums, can't afford to even spend 5 seconds with each guest, as they need to load visitors quickly into the venue, both for safety's sake—to avoid “soft target” scenarios—and to ensure a high-quality guest experience alongside highly effective physical security.

In a modern weapons detection standard, the detection technology should be flexible enough to allow organizations to balance higher alarm rates with a better guest experience—without the risk of letting large weapons, capable of mass casualty events, into the venue. The detection accuracy and alarm rate of the technology must match the context of the venue, the capacity of the security staff, the business objectives of venue leadership, and the expectations of guests to be operationally sustainable.

Improving the Experience for Security Personnel

Relying on old standards alone, today's systems of people, processes, and technologies are simply not equipped to handle the current environment, and this problem negatively impacts the security personnel we rely on daily to keep our public spaces safe.

While the private security industry employs over 1 million people at any given time ([Forbes](#)), it is subject to as much as 300% turnover annually ([guardsystemsinc.com](#)), which means that roughly 3 million individuals work as security officers every year—for an average of just 4 months each. What's more, when pay is often very low, and visitor frustration with guards in slow-moving, high-contact entrances can be so high, it's no wonder security personnel quickly move on from their roles. All of this amounts to low levels of experience and expertise on guards' part—which of course can contribute to more potential threats getting through.

IN 1 YEAR, THE SECURITY INDUSTRY:



EMPLOYS 1M PEOPLE AT A GIVEN TIME ¹



WITH A 300% TURNOVER RATE ²



RESULTING IN UP TO 3M SECURITY PERSONNEL



AVERAGING 4 MONTHS' TENURE EACH

1. Forbes

2. Guard-Systems, Inc

Defining a **New Standard**

Defining a new standard in venue security for the public spaces we gather in and enjoy, and evaluating the technologies that can maintain this standard, relies on the following core tenets:

▶ **Guest experience:**

A new technology standard for weapons detection that is operationally sustainable will meet venues' objectives to elevate both guest experience and safety, helping venues ensure their visitors can avoid unsafe and unpleasant crowding while enabling the highest degree of safety. Venues that prioritize a delightful guest experience, and a safe one, should not need to choose between the two.

▶ **Speed into the venue:**

The new standard will enable entry into the venue at regular walking pace, allowing visitors to flow in freely and eliminating crowded entrances and long lines—both unpleasant and unsafe experiences for visitors. It must clear guests quickly without causing them to stop and divest of their bags and personal items, so as to avoid creating “soft target” scenarios.

Stopping fewer persons—and only those who truly pose threats based on a system that detects weapons, not just any metal object—protects more individuals and safeguards the venue as a whole from harm to both its visitors and its brand.

▶ **Weapons detection—not metal detection—through AI and automation:**

Modern technologies like sensors and artificial intelligence are capable of distinguishing everyday metal items from weapons threats. Adding the ability for individual venues to flexibly set sensitivity settings, to ensure everyday items are not mistaken for weapons capable of resulting in mass casualty events, allows venues to achieve the detection accuracy and alarm rate suitable to their operational needs.

Knowing which visitors are walking through with simple, harmless everyday metal objects and which have potential threats on their person will go a long way toward relieving guard fatigue—as will the ability to pinpoint where on a person's body or bag a potential threat item is located, accelerating and focusing the search and issue resolution process.

▶ **Improved security posture:**

A new standard should make guards' lives easier, resulting in improved operational sustainability and reduced security staff fatigue by not only reducing the alarm rate but facilitating the “next step” every metal detector introduces: pinpointing where on a person or bag the threat was found, so that the guard's search can be narrowed, streamlined, accelerated, and simplified.

“**In a modern weapons detection standard, the detection technology should be flexible enough to allow organizations to balance higher alarm rates with a better guest experience.**”

▶ **Operationally sustainable alarm rates:**

Alarm rates must more closely represent the actual threat levels at a venue, reducing the error rate to a more sustainable level for security staff while not compromising detection of weapons capable of mass casualty events. In reality, high alarm rates are not indicative of the true threat profile of a venue, since very few people are entering carrying weapons with the capability and intent to do harm. But finding those very few is nevertheless critical to securing our public spaces.

Removing the burden from security staff to visually assess high false alarm rates, by deploying automated weapons detection technology, could relieve the high potential for fatigue that security officers so often experience. And while no detection technology is perfect, dramatically lowering the alarm rate to more closely match the actual threat profile of a venue could help guards target their efforts only on those individuals who present a threat: increasing security overall and improving the accuracy and effectiveness of the work they do.

▶ **Measurable outcomes for continuous venue improvements:**

A new standard for weapons detection would ensure the technology is accountable for its own performance—leveraging modern data gathering and analysis methods to provide valuable information to venue security leadership about visitor flow rates and alarm rates so that they can always improve and refine their venue's security posture using data-driven decision-making.

The ability to review and compare these metrics across years, months, weeks, days, or even down to short, minute-by-minute intervals can give security teams the insights they need to understand when to increase or decrease staff, open or close entrances, redirect visitor flow, and more efficiently deploy resources.

Improving the use of available staffing resources can have a positive impact on overall venue security—not just at entryways. With more opportunities to redeploy available staff from entrances to other locations and rotate guards more frequently, venues can improve their ConOps (concept of operations) with a multi-layered approach, covering more of the venue and its patrons. It also relieves the burden on them to constantly evoke an unpleasant and inconvenient experience for guests, which could significantly improve job satisfaction and reduce guard turnover rates.

Even just cutting back on the number of guards needed at a venue could save venue operations and security teams a great deal of money, potentially allowing them to employ better paid, more highly skilled staff that may stay longer and help alleviate some of the turnover the industry experiences today.

Access to these metrics, including detailed metrics about what types of threats are being caught by security screening systems, can also assist in operational decision making, helping venue management teams take a security-first approach to resourcing decisions in support of teams across concessions, retail, merchandise, and other venue operations.

Increasing efficiency without sacrificing guest security—all while maintaining a delightful guest experience across every venue entrance—is possible with better metrics for better operational and security planning purposes—and these can be gathered at the entryway of major venues with the right physical security technology.

▶ Technology and communications integration:

Finally, under a new standard, technology for weapons detection at entryways should integrate seamlessly with other venue technologies, so as not to create an undue burden on IT teams to operate and integrate it, and to avoid introducing the further risk of human error into the system.

Digital technologies have the potential to add eyes and ears to critical entryways, and the ability to integrate a new technology like automated weapons detection with existing camera and video management systems, communications, analytics, and other venue security technologies is critical to establishing an overarching, integrated security ecosystem that can become more than the sum of its parts.

When security teams keep an eye on critical entryways across their venue remotely, from a central command or SOC (Security Operations Console), they can respond more quickly and even proactively to mitigate and prevent threat scenarios as they unfold, wherever they occur.

Likewise, when guards at entryways detect potential threat scenarios like unruly patrons, a threat resolution issue requiring backup, or simply additional staffing support due to increasing guest volume, they should be able to reach out along existing communications channels discreetly and quickly to alert security leaders and other colleagues like law enforcement to the need for backup.

CONCLUSION

The Path to a New Standard

There is no current weapons detection standard that meets the needs of today's threat environment and the public spaces that must operate in it. But we propose there should be.

Weapons capable of producing mass casualty events at public venues differ fundamentally from those most likely to cause harm on airplanes, which differ still from the threats most likely to be encountered in court houses and jails. Every venue requires its own unique approach to security. The ability to distinguish everyday metal items from guns, large knives, and IEDs—really, any threat item at the size that your venue's team determines is important—is vital to achieving the operational sustainability that best suits the unique needs of your location, people, and processes.

By leveraging modern technologies, this new standard should not only provide for weapons detection by distinguishing weapons capable of

mass casualty events from those everyday metallic objects we carry with us every day, it should also help to focus guards' efforts during the resolution step: a two-fold approach to moving the vast majority of crowds into a venue quickly, safely, and in an enjoyable way, reflective of the brand and visitor experience the venue leadership wants to achieve while advancing potential threat actors to and through resolution steps swiftly and discreetly.

That same standard should help teams to better understand their venue, improve their ConOps, and connect seamlessly with other security technologies deployed throughout the venue, achieving a multi-layered approach.

We propose that this standard would rely on the latest technologies available to achieve weapons detection sustainably across venues and flexibly balance a exceptional guest experience with extremely high levels of physical security. We also propose that this standard would integrate smoothly with other venue technologies, to ensure that no IT team would bear the undue burden of connecting these technologies and operating them in complex or non-failsafe ways.

Finally, we propose that this standard would be accountable for its own success, ensuring that people can use digital information, gathered at the threshold of their venues, to account for visitor arrival curves and alarm rates, to learn what items are detected and to account for differences among event types, and to further reinforce successful ConOps across the venue using the information that the system itself has gathered about its own operation.

Modern technology, when well-designed, can offer a flexible platform capable of expanding and adapting to suit new technologies as they emerge. For example, by its very nature, artificial intelligence (AI) learns, meaning that, as additional threats emerge and we begin carrying perhaps even more harmless metal-based technologies with us daily, a system can be trained to detect and distinguish new everyday items and new threats. What's more, a technology platform can be flexible enough to integrate with additional security and communications technologies

as they're introduced to the ecosystem. Future-looking, increasingly integrated "smart venues" and "smart cities" are anticipated to be built on these technologies. What's more, integrating systems to safeguard physical security closely with other smart, connected technologies for venues and even whole cities in the future, will add significant value for everyday citizens and security teams, alike.

We leave it to the standards-setting bodies to consider how a new standard for weapons detection would be defined and codified. But for venues seeking to meet the new, higher standards of both a better guest experience and a safer venue, we submit these requirements for a new standard together with evidence of the success Evolv customers are experiencing as they deploy our weapons detection technology throughout their leading venues around the world.



Contact us to learn more about how to protect your visitors, workforce, and facilities with touchless security screening.

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