



Leveraging Tech to Improve Safety and Security in Schools

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Introduction

Rapidly securing schools during dangerous situations to protect students, teachers, and administrators is essential and challenging. Among multiple solutions being applied, school districts are investing in smart security technology to save minutes by utilizing quick-acting access control and emergency response paired with communicated intelligence. Once a dangerous situation occurs, the best way to protect students and staff is to enable a rapid and unified response with technology that enables seamless communications and presents first responders with the most relevant details available.

While many solutions exist, there is no standard or mandate uniformly implemented across schools nationwide. There are 130,930 public and private K-12 schools in the US, according to 2017-18 data from the National Center for Education Statistics (NCES). Each school district and region have different needs dependent on population, region, and the specific characteristics of the community. This begs the question of how to best combat the fragmented nature of school systems in creating standard safety solutions that can scale and provide efficiencies which over time result in lowering costs for schools.

This whitepaper provides an overview of technologies that enhance security in school buildings and highlights market insights and legislation that support the increasing demand for innovative technology that can have a dramatic impact on school safety.



The Challenge of Responding to Security Threats

Since the tragedy at Columbine High School in 1999, school safety and security have become a growing concern. Schools began the search for security measures to minimize the possibility of students and faculty facing lethal risk. Data from the NCES shows that from 2000 until 2018, access control practices increased by roughly 20%, the use of a faculty badge system increased by 70%, and the implementation of security cameras increased by over 60% in schools across America.

According to *Education Week*, crime on school grounds has been reduced from 85% of public schools in 2010 to 77% in 2019.¹ This statistic supports the addition of standard security measures being implemented in schools; however, this type of security hasn't been able to defend from nor respond to violence effectively.

The School Survey on Crime and Safety (SSOCS) highlighted data from the 2017-18 school year reporting 71% of schools experienced at least one violent incident and 21% experienced a serious violent incident.

Over the 2019-20 school year, NCES found that 70% of schools experienced one or more violent incidents on their campus while 25% experienced a serious violent incident.³

While these data points are from different organizations, the numbers show a 4% increase in serious violent incidents even though the use of surveillance cameras, access control, and other security systems on school grounds are at all-time highs.

“Violent incidents” include all serious violent incidents as well as physical attack or fight without a weapon and threat of physical attack without a weapon.

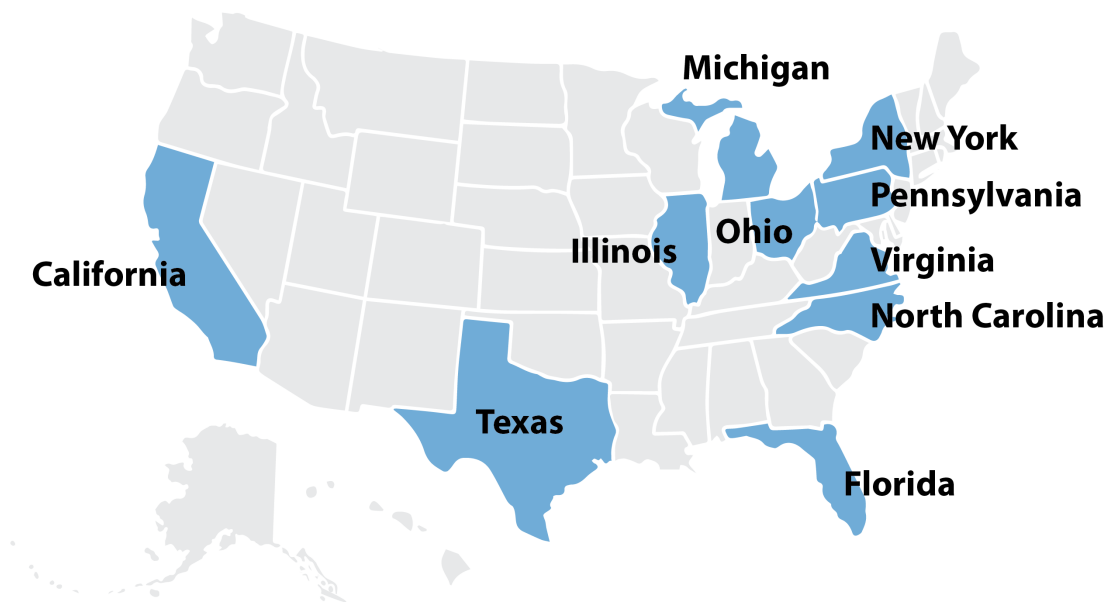
“Serious violent incidents” include rape, sexual assault other than rape (including threatened rape), physical attack or fights with a weapon, threat of physical attack with a weapon, and robbery.”²

There are serious concerns about security at schools in America and how to respond with effective solutions to reduce incidents and ensure a safe environment. How police and emergency services react to threats is an area of significant focus. Police response is based on the available information at the time. Increased volume of information can hinder response unless that information is relevant, accurate, and timely. Rapid and efficient response requires immediate access to the right information about the incident and the location of individuals.

The top ten states with the highest number of threats and incidents mirror the top 10 most populous states with one exception, Georgia. While Georgia is a top 10 population state, it is not on the top 10 most violent list; Virginia takes its place.

10 Worst States for School Violence⁴

These are the states with the most number of threats and incidents during the 2017-18 school year.



K-12 School Shooting Database

- | | |
|-----------------------|--------------------------|
| 1 - California (215) | 6 - Michigan (87) |
| 2 - Texas (177) | 7 - Ohio (86) |
| 3 - Florida (120) | 8 - New York (76) |
| 4 - Illinois (113) | 9 - Georgia (72) |
| 5 - Pennsylvania (88) | 10 - North Carolina (69) |

US Stats

- 2,067 School Shootings since 1970
- 96 School Shootings in 2020
- 202 School Shootings in 2021

Data Map For SHOOTING INCIDENTS AT K-12 SCHOOLS (Jan 1970-Jun 2022) - CHDS
School Shooting Safety Compendium. <https://www.chds.us/ssdb/data-map/>



Moving Beyond Lockdowns

Faculty and students rehearse scenarios to prepare for a potentially lethal security breach. This lockdown practice normally consists of these actions:

- **Locking Door**
- **Turning off Lights**
- **Barricading the Doors**
- **Staying Silent**

Lockdown drills alone are not the solution to this ongoing issue, as Massachusetts Teachers Associations President Max Page states, "Active shooter training that involves students is traumatic and unnecessary. It reinforces a culture of fear and creates a false sense of security."⁵ School administrators are often between a rock and a hard place: they want effective drills and are concerned about traumatizing students unnecessarily.

Evolving school security technology offers increasingly capable assistance to respond more effectively:

- Advancements such as artificial intelligence (AI) and machine learning (ML) can identify suspicious activity, spot dangerous items, recognize patterns, and organize data/evidence. These are powerful abilities to improve security and response times, particularly when it can occur without the aid of an operator.
- Access control systems allow people to skip the step of keeping track of doors being locked. Access control systems allow people to not worry whether doors have been locked or not. Panic devices enable emergencies to be reported without explanation. In some cases, technology is more efficient and effective than humans. In the Uvalde tragedy, a door to the school that would normally be locked was left open, allowing the gunman to enter with ease. A machine locking system might have prevented that.

DEFINING AI AND MACHINE LEARNING

Within a business context, AI is the capability of computer systems to simulate human intelligence processes on a large scale. AI algorithms are trained to employ human-like intelligence in analyzing and solving complex business problems in a fast, efficient, and automated way.

ML is the ability of an AI system to autonomously learn from its data and improve its algorithms.

There are two primary ML techniques:

- In supervised ML, the AI system learns from human input by being trained on existing data. The AI develops its model based on its ability to accurately match correlations, predictions, and other analytical functions within sample data sets.
- With unsupervised ML, AI is not limited to the factors currently known by humans. Instead, the AI learns autonomously and detects anomalies and correlations that have yet to be identified, even across large, heterogeneous data sets.



Automated Measures to Improve Response

Automated response measures can improve the human response in a crisis moment. Gunshot detection, panic buttons in specific environments, and automated calls to 911 help neutralize a threat along with providing more details about the type of threat and current environment to the people onsite and those remotely monitoring the situation. People tend to panic and make rash decisions when under severe stress. “In natural or human-induced emergencies, the decisions that are made in the first minutes, hours, and days are critical to mitigate damage, prevent structure and human loss, control financial costs, and ultimately the overall conclusion of the disaster.”⁶

An Emergency Action Plan (EAP) at schools is essential to negate the devastating effects any natural disaster, emergency, or active shooter situation. An effective EAP includes:

- A preferred method for reporting fires and other emergencies
- An evacuation policy and procedure
- Emergency escape procedures and route assignments (i.e., floor plans, safe areas)
- Contact information for and responsibilities of individuals to be contacted under the EAP
- Information concerning local area hospitals (i.e., name, telephone, number, and distance from your location)

An effective EAP also includes an emergency notification system to alert various parties of an emergency including:⁷

- Individuals at remote locations within the premises
- Local law enforcement
- Local area hospitals

An EAP furthers the premise that not everything in security can be done by technology; schools need a well-understood plan to pair with their security systems.



Naval Postgraduate School

A new report was recently released by the Naval Postgraduate School focused on JASPR – Joint Active Shooter Protection and Response or JASPR.

JASPR is a Department of Defense (DOD) system “to help detect an active shooter, notify bystanders with alarms, alert local authority, and impede movement with active door locks.”

The study resulted in a model showing that the most critical factors in determining how many lives would be lost in an active shooter scenario. One key factor noted was doors being locked automatically through integrations or control mechanisms to prevent deaths.

Focus on Better Response: How Schools Are Evolving

Schools are responding to continued incidents of violence by adding physical security measures and trained personnel to react to threats in a quick and organized manner. "Growing numbers of public schools have brought more security guards, video surveillance, and controlled entryways into their buildings" than ever before.⁸ While this appears to be an effective way to reduce school threats, data show that school gun-related violence is at an all-time high.

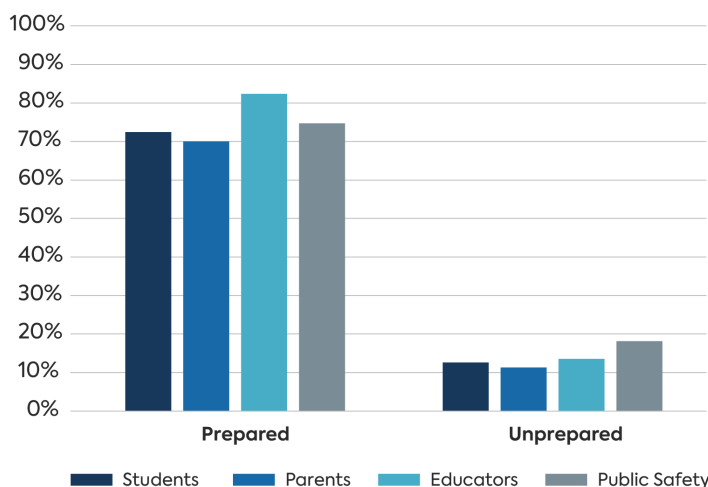
In 2022, as of September 13, there have been 29 school shootings killing or injuring 85 people.⁹ These staggering numbers result in fear among members of school communities.

2022 State of School Safety Report Stats¹⁰

Rate the preparedness of your school community in the event of an active shooter/attack.

While this survey data was collected prior to the tragedy in Uvalde, Texas, at Robb Elementary School, responses show that more students and parents feel that their school is prepared compared to 2021. This year, approximately 70 percent of students and parents reported that their school is prepared, compared to less than 50 percent last year.

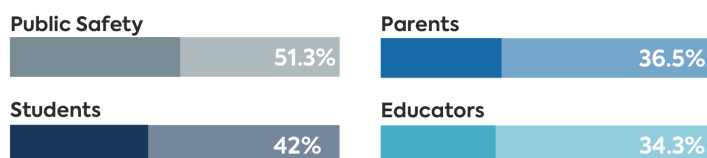
Consistent with previous years, a higher percentage of educators and public safety respondents reported feeling prepared. However, these numbers may differ in light of the recent school tragedy in Texas.



Top School Safety Concern Overall: Active Shooter/Attack

When asked to select their top school safety concern out of 19 listed concerns, the greatest percentage of each group rated active shooter/attack as their top concern.

Which ONE of these safety threats is your TOP concern for school(s)?





Education and Funding Are Critical

Many schools are challenged in understanding what is needed for security, the funding process, and the total investment required. Independent security consultants or the company itself can support school administrators by evaluating the current state of security and how the school can secure its campus, staff, and students effectively. Once a cost analysis is complete, schools must apply for a grant from the state, wait for approval, and then make the final decision on purchasing the new security technology.

The process of purchasing technology demotivates schools from enhancing their security.

Responding to the need for high security is complex for schools across the US, but with recent federal and state legislation offering funds and aid, this process may become easier. The “Bipartisan Safer Communities Act,” passed in June 2022, provides \$300 million in federal aid to schools and \$1 billion for Title IV block grants, which can be used for security enhancements.

The goals are to make it easier for schools to allocate funding for security upgrades and allow them to respond to the problem at hand more quickly. States have also acted on this issue by providing the grant programs below:

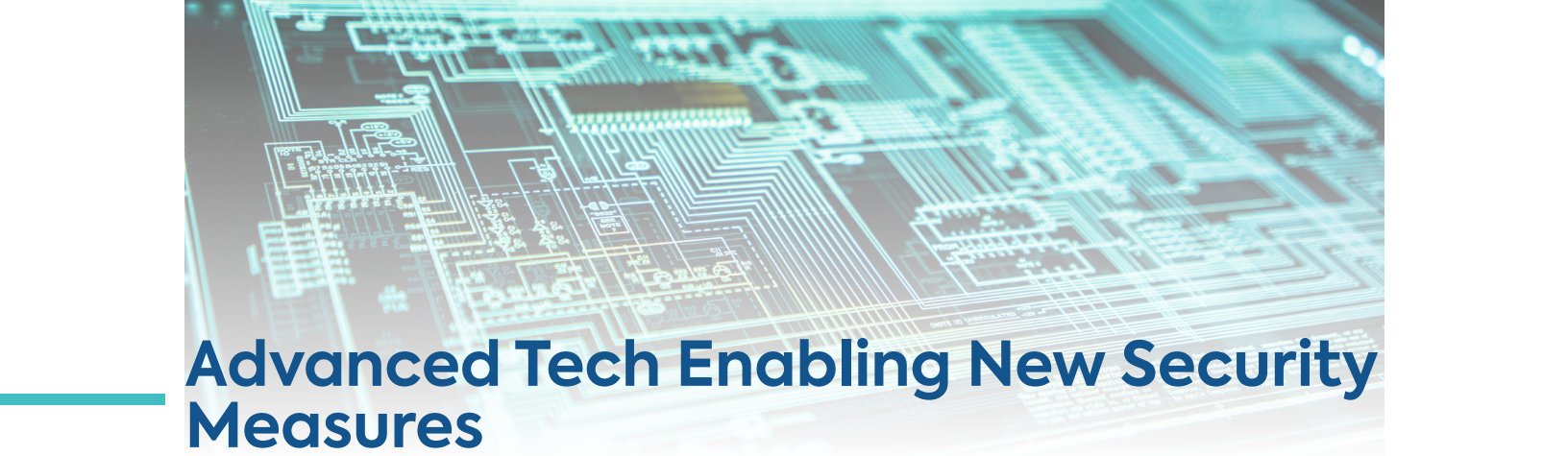
- New Jersey implemented Alyssa’s Law Compliance and School Security Grants program to help with funding for panic alarm systems in schools.
- Virginia added the School Security Equipment Grants program allowing school districts to be eligible for money through a competitive grant process. Virginia schools must use the money to equip their buildings with better security technology although this money isn’t limited to panic alarm systems as in New Jersey.
- Connecticut has made \$5 million of funding available in 2020 to help fund advanced communication systems in schools to connect directly to local law enforcement. The grant goal is to help facilitate better response from the different emergency responders in the community, throughout the district, and across the state.

Grant Program	Alyssa's Law Compliance and School Security Grants
Funding Available in 2021	\$75 million (2021)
Statewide Requirements	Panic alarms (Alyssa's Law)
Statewide Guidance	N/A
School Safety Center	New Jersey Center for School Safety

Grant Program	School Security Equipment Grants
Funding Available in 2021	\$12 million (2021)
Statewide Requirements	Exterior access controls and classroom locks
Statewide Guidance	N/A
School Safety Center	Virginia Center for School and Campus Safety

Legislation is an important part of improving school security, which is why associations are using their large platforms to help bring attention to it. Associations and their large membership bases are also investing resources towards endorsing security integrators and educating the industry on school safety guidelines. Security Industry Association (SIA) released a report, SIA Guide to School Security Funding, sharing details of the funding and to provide a centralized source of information regarding school security funding.





Advanced Tech Enabling New Security Measures

Several technologies being used frequently in premise security hold promises for school safety or protection. Examples of these include PERS (Personal Emergency Response Systems), controls for locking doors instantly, and communication that integrates and updates authorities to dangerous situations in real time.

■ The Use Case for Personal Alert Systems, Beyond the Medical Use Case

A quick and clear response is vital to saving lives during a lethal school security breach. PERS refers to “personal emergency response systems” and sends medical requests to emergency responders from pendants or devices provided by home security or PERS providers.

New solutions, much like PERS devices, enable school staff to simply press a button to contact first responders when needed. This valuable piece of technology improves and simplifies response time, which is one of the largest problems with active threats on campuses.

These devices are a low cost and viable solution for responding to campus threats and safety issues, which is why they are being used more frequently in schools. One challenge with this technology and security systems in general, though, is false alarms. According to Parks Associates research, about half of security owners say their security system triggers too many false alarms. Additionally, 62% of home security owners report experiencing a false alarm in the past 12 months, and nearly 10% report they experienced more than five false alarms in the past year.

Many false alarms are triggered by user error, and false alarms can be mitigated through training, mechanical safety features, and verification like two-way voice to mitigate unnecessary dispatches.

LiftMaster

POWERED BY myQ

Recently, LiftMaster announced an initiative to give away 100 Smart Video Intercom systems to K-8 schools across America. This technology aims to simplify access control at a school’s main entrance by allowing users to talk, hear, and view visitors before allowing them into the building. The technology is customizable to create scheduled access for staff and guests.

The Smart Video Intercom system has a simple installation and only requires the school to have an internet connection, an electronic/lock door strike system, and a power source to operate. LiftMaster has partnered with the Partner Alliance for Safer Schools (PASS) to further its efforts of keeping schools safe.

Video intercoms are a tier 1 requirement on the PASS Guidelines, meaning they should be highly considered by schools when looking to improve security.

It is possible to accidentally press the panic button or use it for a scenario that doesn't require first responders. AI can slow down the frequency of false alarms, especially through video verification and video analytics.

The number of false alarms continue to grow, bringing into light how responders are coming to the scene and the actual response to the threat. According to the Educator's School Safety Network, there have been 99 false reports of school shootings, 40% more than the entire 2018-19 school year.¹¹

An alternative for PERS devices is smart tags. Parks Associates' consumer data shows that 37% of users use smart tags because they are concerned about another's safety, and 30% of users use them to keep track of another's location. Further, 32% of users say their child always has a smart tag with them. This suggests that smart tags are becoming a tool for children's safety. While they cannot send a panic message, they have precise location accuracy, which is helpful for parents to know if their child is safe.

| The Use Case for AI

There has been a rise in the power of AI over the past decade, which allows its implementation in critical areas such as security. The main area where AI now appears within the security industry is in surveillance cameras. AI firearm detection would be highly useful in schools. The ability to detect a gun before it even enters the building can save lives. If the gun is detected on the campus, a distress signal can immediately be sent to 911, demonstrating to authorities the gunman's current location and perhaps his next likely location. In addition, the ability to understand the number of people who have come into a building and departed is a powerful use case. This helps emergency response understand the number of people still in the building, before, during, and after an incident.

AI video cameras can do more than just detect firearms; they can have situational awareness which allows them to determine if there is suspicious activity on the premises. It can flag this behavior, making it a lot easier for operators to find past footage in an investigation.

AI is also appearing in auditory detection systems specifically for gunshots. These are compact pieces of hardware that are placed throughout a building. When a gunshot is fired, the receptors communicate with each other and make an educated guess of the gunshot's location and what type of weapon was fired. As emergency personnel is contacted, they have information on the threat at hand.

| Securing the Campus Quickly

Unsecured doors are a key issue for school security breaches. The ability to lockdown a campus swiftly is vital to containing a dangerous situation. Havenlock is a security technology that uses powerful locking mechanisms for school campus doors, including a platform that detects the shooter at the door once vibrations from gunshots going through the door or kicking against the door is sensed.

Havenlock gives teachers the ability to engage locks on their classroom doors with the press of a button. A main control panel enables the operator to control over all Havenlock-equipped doors. In addition, automatic notifications are sent to whomever is to be notified of the threat. This technology makes access control simple and effective for schools and enables protection, detection, and notification. The added layer of access control makes any school a difficult target.



Weaving Everything Together for Better Response

School security technology has different benefits and use cases, but each remains limited in isolation. School security needs multiple types of technology for optimal response. Mutualink, for example, offers a holistic form of security paired with an emphasis on rapid and informed response. The software leverages existing and new security infrastructure to enable an intelligent response by giving police immediate and instant access to relevant conditions in threatening scenarios. The software is installed at both the school and the neighboring police station, in addition to the 911 call center and other public safety jurisdictions. This gives police firsthand access to the school's security systems, along with a plethora of real-time information, including the school radio voice, when a quick response is needed. School IT infrastructure is rarely a barrier because if the school can support a security camera system and a push-to-talk radio system, it can support the Mutualink software.



Mutualink does not make cameras, access control, or PERS devices. The company has software that can quickly respond to a threat while utilizing existing security to give information to first responders. Essentially, this is software that enhances hardware. Industry players shared with Parks Associates that the best solution to securing schools is combining the strongest security solutions in each sector and integrating them into the same software system. The ability to prevent a threat is the ultimate goal, but beyond that, the value lies in effectively responding to an active threat so that harm is minimized or prevented.

Easy Integration



Johnson Controls provides a wide range of simplified security solutions for K-12 institutions. Its encrypted two-way wireless protocol can reach any part of a campus, can be integrated with any existing construction of the school, and is scalable to meet larger security requirements. Since the system is wireless, installation is less intensive. This system allows schools to have customized, simple, and reliable security on campus without needing intensive instruction on the operation of the system.

Visitor Management



Raptor Technologies is another company that simplifies school security by offering the management of emergency, visitor, and volunteer personnel to help schools improve their security practices. The emergency management also helps analyze school safety drills, features a silent panic button via the Raptor mobile app, sends information about an emergency to first responders and staff, and creates status reports during and after an incident. Raptor is used by 35,000 schools, out of 130,000 schools in the US.¹² The system has screened 350,000 visitors and responded to 5,000 school emergencies.

Enhancing Intelligence



New technology can provide information to better locate and understand a situation that needs immediate attention from first responders. Rapid SOS is a data platform for simplifying emergency response and is in use today by law enforcement. This technology can be beneficial to schools when integrated with existing security to relay information in emergencies. It can provide law enforcement with a map of the school, access to cameras, and be paired with gunshot detection to help locate a threat. The system requires minimal installation and training; once deployed by a school's police department, the platform handles data integration and communication.



A photograph of a modern building's interior, featuring a multi-level atrium with a complex ceiling structure. The ceiling is composed of large, angular panels, some of which are illuminated from within, creating a warm, yellow glow. A staircase with a glass railing is visible on the upper level. The overall design is contemporary and architectural.

Summary: Leveraging Tech to Improve Safety and Security

To effectively secure a school, multiple technologies must work together. Every school has a different layout, population size, and funding, meaning that one set of security solutions isn't going to work for all. Every state has different regulations and grant systems for their schools, which in turn makes it difficult for security companies to be integrated nationwide. Often, we see security consultants evaluating a campus and giving a recommendation on how to best secure it by utilizing grant and school budget money. While these technologies are marketed and referred to as solutions for school security, nothing is certain to protect a school from a threat.

While there may not be an all-encompassing perfect solution for school security, there are guidelines that aim to help schools determine the current state of their safety measures and what they can do to improve it. The Partner for Alliance for Safe Schools (PASS) was co-founded in 2012 by the National Systems Contractor Association (NSCA) and SIA to help provide procedures and guidelines that schools can take to ensure better safety and security for students. It provides a checklist that helps schools understand the state of their security and recommends measures to mitigate the risk of a violent intruder.

Security technology can be complicated to understand and control effectively, and school staff is no exception. Education and training are typically required. Companies aim to simplify security for schools, and easy installation, wider compatibility, and simplistic operability are necessary steps towards that aim.

Standardizing, creating, and implementing security practices catered to the needs of individual schools is critical. Several states have instituted base security requirements for schools, such as New Jersey, Florida, and New York approving Alyssa's Law. This law requires K-12 institutions to equip their campuses with silent panic buttons that are connected to law enforcement.

Time will tell how these new technologies perform. School security technology is advantageous, but currently, more metrics are needed to evaluate tech used for school safety. Technology cannot guarantee flawless defense against security breaches and threats, but it can help reduce the chance of a dangerous situation occurring and create efficiencies in emergency response.

Technology is becoming an essential component in strengthening a campus against possible threats. While this technology is well-developed and powerful, it takes the members of the school and community to help it reach its best potential.

"Multidisciplinary safety teams are critical to school safety. A high-quality plan addressing prevention through recovery requires multiple perspectives and areas of expertise in order to meet all needs. And it truly takes a village!"

Melissa Reeves, PhD
Past President,
National Association of School Psychologists

¹ EdWeek, School Crime and Safety: What a Decade of Federal Data Show, Libby Stanford July 8, 2022, <https://www.edweek.org/leadership/school-crime-and-safety-what-a-decade-of-federal-data-show/2022/07>

² Exploring School Violence and Safety Concerns, Emilee Green, November 23, 2020, <https://icjia.illinois.gov/researchhub/articles/exploring-school-violence-and-safety-concerns>

³ NCES Fast Facts: School Crime, <https://nces.ed.gov/fastfacts/display.asp?id=49>

⁴ Data Map For SHOOTING INCIDENTS AT K-12 SCHOOLS (Jan 1970–Jun 2022) – CHDS School Shooting Safety Compendium

⁵ CBS News

⁶ Active Shooter: How to Respond US. Department of Homeland Security Data, N/A, <https://www.ursinus.edu/live/files/1609-active-shooter-how-to-respond-508pdf>

⁷ https://calhoun.nps.edu/bitstream/handle/10945/65391/20Jun_Lovejoy_Charles.pdf?sequence=1&isAllowed=y

⁸ Politico, Classroom vs. fortress: States push a slew of new school safety measures, JUAN PEREZ JR. and KATELYN CORDERO, August 27, 2022, <https://www.politico.com/news/2022/08/27/schools-security-students-return-00053989>

⁹ EdWeek, School Shootings This Year: How Many and Where, Reporting & Analysis: Lesli Maxwell, Holly Peele, Stacey Decker, Hyon-Young Kim

¹⁰ 2022 State of School Safety Report, Research by Safe and Sound Schools in partnership with Raptor Technologies and Lightspeed Systems, <https://safeandsoundschools.org/wp-content/uploads/2022/08/State-of-School-Safety-Report-FINAL.pdf>

¹¹ The cost of false reports of school shootings go way beyond the financial – Marketplace, The cost of false reports of school shootings go way beyond the financial – Marketplace

¹² National Center for Education Statistics (NCES)

Thank you Industry Contributors

- Alex Bertelli – **Havenlock**
- Jennifer Doctor – **Johnson Controls**
- Peter Giacalone – **Giacolone Associates**
- Merlin Guilbeau – **ESA**
- Mark Hatten – **Mutualink**
- Jennifer Lytle – **Chamberlain**
- Kirk MacDowell – **MacGuard**
Security Advisors, SIAC, SIA
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About Parks Associates



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Parks Associates, a woman-founded and certified business, is an internationally recognized market research and consulting company specializing in emerging consumer technology products and services. Founded in 1986, Parks Associates creates research capital for companies ranging from Fortune 500 to small start-ups through market reports, primary studies, consumer research, custom research, workshops, executive conferences, and annual service subscriptions.

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As President, Elizabeth supports all teams within Parks Associates, a woman- and family-owned market research and consulting firm. She oversees research topics and coverage areas for the company and directs the integrated strategic communications plan for Parks Associates, including advertising, public relations, and marketing.

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RESEARCH & ANALYSIS

for Emerging Consumer Technologies

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