

ShotSpotter® SiteSecure™

Amityville, NY
 Atlantic City, NJ
 Baton Rouge, LA
 Bayamón, PR
 Bell Gardens, CA
 Bellport, NY
 Birmingham, AL
 Boston, MA
 Brockton, MA
 Cambridge, MA
 Camden, NJ
 Canton, OH
 Capetown, South Africa
 Chelsea, MA
 Chicago, IL
 Denver, CO
 East Chicago, IN
 East Orange, NJ
 East Palo Alto, CA
 Everett, MA
 Fall River, MA
 Fresno, CA
 Glendale, AZ
 Gretna, LA
 Hartford, CT
 Hempsted, NY
 Huntington Beach, NY
 Jefferson Parish, LA
 Kansas City, MO
 LASD, CA
 Long Beach, NY
 Miami, FL
 Miami Gardens, FL
 Milwaukee, WI
 Minneapolis, MN
 Montgomery, AL
 Nassau County, NY
 New Bedford, MA
 New Haven, CT
 New York, NY
 Newark, NJ
 Oakland, CA
 Omaha, NE
 Palm Beach County, FL
 Paterson, NJ
 Peoria, IL
 Pittsburgh, PA
 Plainfield, NJ
 Redwood City, CA
 Revere, MA
 Richmond, CA
 Riviera Beach, FL
 Rochester, NY
 Rocky Mount, NC
 Sacramento, CA
 San Francisco, CA
 San Pablo, CA
 San Juan, PR
 Savannah, GA
 Somerville, MA
 South Bend, IN
 Springfield, MA
 St. Croix, USVI
 St. Louis, MO
 St. Thomas, USVI
 Stockton, CA
 Suffolk County, NY
 Trenton, NJ
 Trujillo Alto, PR
 Washington DC
 Wilmington, DE
 Wilmington, NC
 Worcester, MA
 Wyandanch, MA
 Youngstown, OH



Protecting Critical Infrastructure

Mitigating active shooting incidents using indoor and outdoor gunshot detection and location systems.

We now have an extensive database of mass shooting statistics that underscores the critical importance of prompt threat detection, the initiation of internal protective measures, and the rapid, integrated response of police, fire and medical units. All three factors are important components of a threat identification and management system. The most compelling finding from years of research is that minimizing the time between the detection of a threat and the initiation of internal protective measures, the activation of public safety responders and engagement of the threat is the prime determinant of lives saved or lost.

The FBI recently released “A Study of Active Shooter Incidents in the United States Between 2000 and 2013” which contains a full list of the 160 incidents used in the study. These incidents resulted in a total of 1,043 casualties (486 killed, 557 wounded—excluding the shooters).

The largest percentage of incidents, 45.6%, took place in a commercial environment (73 incidents), followed by 24.3% that took place in an educational environment (39 incidents).

Background

Evolving Beyond Containment Strategies

Prior to the Columbine tragedy in 1999, law enforcement had developed and then refined a tactical philosophy which stressed prompt containment by patrol officers followed by subsequent activation of specialists—SWAT teams and hostage negotiators—to handle events of this nature. Within the framework permitted by that philosophy, patrol officers (the first wave of response) usually arrived on scene in minutes but lacked the equipment, teamwork, and training in advanced tactics to act swiftly and effectively during such high risk incidents. Their immediate focus was thus scene containment. Conversely, though they had the equipment, teamwork, and advanced training to handle such incidents, specialized units often took up to an hour or more to respond and deploy at incident scenes. The framework exhibited a major weakness in the law enforcement response to what are now called “active shooter incidents”—a weakness which became all too tragically clear in the delay in entering and clearing Columbine High School.

While law enforcement has adapted quickly in the aftermath of Columbine and developed improved tactics to confront “active shooters” rapidly, infrastructure security systems within the United States have been slower to adapt. Although protective infrastructure (e.g., fire alarms, sprinklers, CCTV, communication nets, evacuation maps) is standard at most locations to deal with common emergencies, such as fire or hazardous materials that usually require evacuation, shooting threats—have been largely ignored. As an example, during the past 25 years, not one single death has been attributed to school fires in the United States (excluding dormitory fires), while during that same period more than 200 persons—many of them children and teenagers—have been killed in “active shooter” incidents. It is a national tragedy that mass shootings pose the greatest threat to American school children today.

Early Detection

The research tells us that there is a substantial time continuum of possible threat detection, from the time that a shooter forms the intent to commit mass violence, to the time that he posts dark thoughts on social media or alerts friends, to the time that he acquires a firearm, to the time that he purchases ammunition on-line, to the time that he arrives at the site and enters, and, finally, to the final moment at which he actually starts shooting.

The most compelling finding from years of research:

minimizing the time between the detection of a threat and the initiation of internal protective measures, the activation of public safety responders and engagement of the threat is the prime determinant of lives saved or lost.

Everything prior to the shooter's arrival at the site can be classed as "early detection." Early detection promises the opportunity to interdict an event before it happens. In counter-terrorist circles, early detection is the stuff of intelligence agencies and legal interception operations. Such techniques are of limited (if any) availability to traditional law enforcement in combatting active shooters. Early detection thus presents both tremendous benefits and tremendous—and historically insurmountable—challenges: how to detect the intent or planning of a single, lone individual acting within legal boundaries and with the full benefits of privacy rights and legal protections against illegal search.

Enhancing Tactical Response—Seconds Matter

Suppose early detection fails? Suppose, for any number of reasons that early detection of the threat turns out to be impossible. What measures can be taken in the earliest moments of an active shooter scenario which might mitigate the damage, lessen the shooter's progress, or otherwise impede his ability to cause loss of life?

There is a crucial need to understand how changes in the law enforcement response model mesh with an organization's internal threat detection and management system. Improving an organization's ability to mitigate active shooting incidents involves developing both technology as well as protocols which minimize delays in threat detection, initiate internal protective measures, and rapidly

activate police, fire, and medical first responders.

Rapid Initiation of Internal Protective Measures

During an attack, critical time is lost as people on-site first seek to establish the nature of the attack—and indeed, if there is an attack in the first place. Further, they may be unable to alert 9-1-1 or trigger internal alerts because they are fully engaged in protective actions or are themselves under attack. Moreover, 9-1-1 centers themselves necessarily require a several minute protocol to establish the veracity and precise nature of calls reporting possible attacks. Each of these steps (first establishing what is going on, second reaching 9-1-1, and third proceeding through the 9-1-1 phone protocol) takes critical minutes—time during which an active shooter can proceed (and historically has proceeded) with his attack.

As the research shows, there may only be a ten-minute window of opportunity to intervene decisively, contain an active shooter and minimize harm. When a substantial amount of this time is spent following the existing protocols, with no technological assistance or speed improvement, the results have been tragic.

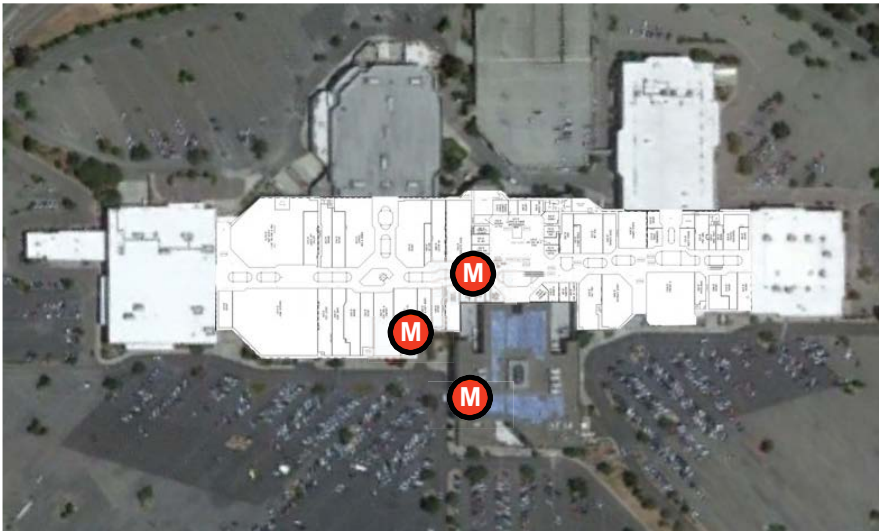
Outdoor and Indoor Threat Vectors: Facility-Wide Gunfire Detection

The data show that active shooter attacks often begin outside the building and progress indoors. In Newtown, CT, the assailant “shot his way in” through a locked outside door and then proceeded with his attack. Thus, the first line of defense lies outside the building, in a zone of protection surrounding it or comprising the entire outdoor area of a larger facility of many buildings. A combination of both indoor and outdoor gunshot detection is optimal.

solutions are deployed in 90+ cities nationwide and in many countries around the world. The usual scope of such urban deployments (many square miles) greatly exceeds those of a typical facility (several to tens of acres), so for the avoidance of confusion, we limit our discussion in this whitepaper to the geographic footprint of a typical government or business facility or campus. Nonetheless, within any given facility, the ability to detect so-called “breaching attacks” is critical, particularly as they may offer the best opportunity to alert those inside buildings to an impending attack.

Indoors: Gunfire Detection and Alert System (GDAS)

An indoor gunfire detection and alert system (GDAS), integrated into a comprehensive site-based—police-fire-medical response system, significantly increases the likelihood that active shooter threats will be identified quickly and that alerts will be triggered automatically and far more quickly than would an event reported manually by persons on-site. As an integral component of such a system, gunshot detection technology can immediately notify both public safety responders and persons on-site about the nature and location of the incident within a given facility. Internal notifications can immediately be transmitted to ensure that emergency protective measures are immediately implemented by on-site staff.



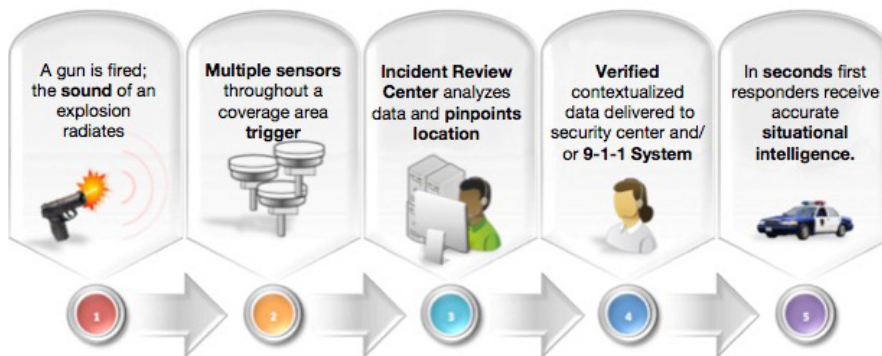
Outdoors: Wide-Area Acoustic Surveillance (WAAS)

Outdoor areas require wide area acoustic surveillance. While this whitepaper focuses primarily on analyzing the benefits of indoor detection, it should be stressed that SST pioneered the concept and implementation of wide area acoustic surveillance (WAAS) for gunfire and other kinetic events, and its ShotSpotter® gunfire alert and analysis

Performance Requirements

Gunshot detection and notification technology must meet a number of key performance requirements:

- **It must be reliable.** That is, it must provide accurate and timely information regarding gunfire occurring in both indoor and outdoor environments. Reliability has two dimensions: One is an extremely low rate of false positives (reporting events as gunshots which are not in fact gunshots); the other is a near-zero rate of false-negatives (all gunshots are detected and reported).



How it works: ShotSpotter helps local law enforcement agencies by directing police to the precise location of illegal gunfire incidents enabling first responders to aid victims, interview witnesses, collect evidence and even apprehend armed, dangerous offenders.

- **Must provide meaningful intelligence to expedite and guide the response to the threat by both safety responders in real-time.** By reducing uncertainty—the number of unknowns—gunshot detection systems can provide internal and external responders with clarity regarding a gunshot threat. As a result, rather than delaying action while they attempt to make sense of a confusing situation, internal staff can immediately initiate protective actions, knowing that the system is triggering internal and 9-1-1 alerts. Precious minutes are saved. The system, especially if technology components interact, can also provide police responders with updated information with which to track a shooter's movements.
- **Once notified of a shooting incident, it must disseminate tactical intelligence to first responders as quickly as possible.** Responding officers will probably have limited knowledge about the incident location's layout and traffic circulation. Thus, the most valuable intelligence needed by first responders is a detailed map of the facility with a chronological mapping of gunshot alerts. Again, gunshot detection systems can expedite police response, thus increasing the chances of swift threat interdiction and conserve precious minutes.
- **Must compress the detection-alert-response cycle** to contain and neutralize active shooter threats rapidly. Shaving time—minutes, even seconds—from each stage of

an active shooter incident can be life-saving.

- **Must provide redundancy to compensate** for the fact that on-site staff may not be able to initiate important actions, including internal and 9-1-1 alerts.
- **Must be integrated into a comprehensive threat detection-response management system** that integrates technology, written response protocols, and user training, both initial and refresher (including discussions, case studies, table talks, scenario-based talk- and walk-throughs, hands-on exercises).

Introducing SiteSecure for Critical Infrastructure

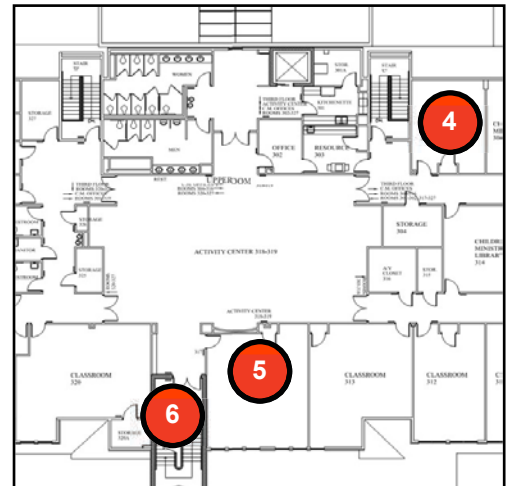
ShotSpotter SiteSecure provides indoor and outdoor coverage of your facility to protect your most important assets, your people, from an active shooter attack. Buildings and facilities of any footprint, layout, or size can be monitored and protected by ShotSpotter SiteSecure, mitigating the impact of such events by instantly detecting gunfire and notifying those who most need that information—security personnel and law enforcement first responders—in real-time. ShotSpotter has an 18-year proven track record of detecting gunfire in a wide-variety of environments in over 90 cities across the United States and the world.

Gunfire Detection Provides Real-Time Situational Awareness

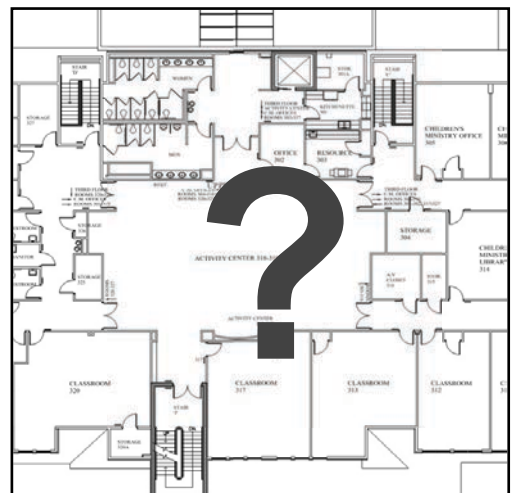
First responders need precise, accurate information when they arrive on scene:

When first responders arrive, the quality of tactical support information provided by ShotSpotter SiteSecure is unparalleled:

- Precise Location of Shooters
- Number of Rounds Fired
- Real-Time, Chronological Mapping
- Speed/Direction—Mobile Shooters
- Audio Playback of Gunfire



ShotSpotter SiteSecure Technology



Absent Gunshot Detection Technology

Post-Incident Medical Response

Gunfire detection augments post-Incident medical response.

Sharing Unique Experience: SST Monitoring Center

One of the most intractable problems in developing responses to active shooter scenarios is the inability for most people at any given facility to recognize the sound of gunfire when it first happens. Especially when surrounded by building walls which attenuate sound, most people simply do not have the practical, real-world experience immediate, experienced assessment of the threat.

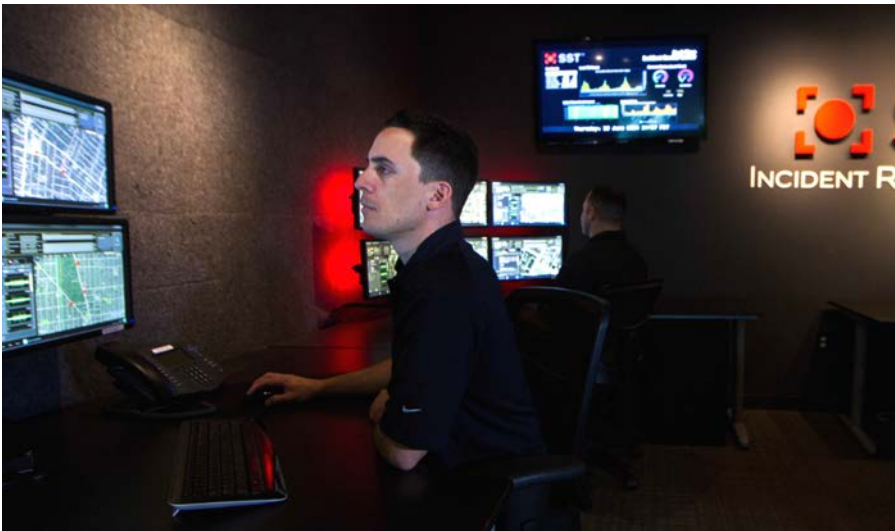
Since 2011, SST, Inc. has operated a 24x7 Monitoring Center at its national headquarters in Newark, CA.

This facility, with redundant connections to some 60+ systems nationwide, has as its sole aim monitoring gunfire acoustic events across the nation—and, indeed, now in several countries and on several continents.

We believe IRC personnel constitute the critical missing link in addressing the challenge of the ability for on-site people to recognize and identify the sound of indoor gunfire.

SST monitoring center personnel review hundreds of thousands of incidents per year. In the first six months of 2014, the center reviewed well over 250,000 incidents, of which approximately 19,000 were verified to be gunfire. Each individual reviewer listens to several thousand incidents and undergoes hundreds of hours of training before handling his or her first live incident.

The infrastructure thus exists to process incidents in a real-time manner, collecting data from sensors deployed worldwide, and deliver critical information to first responders in seconds.



24x7—Incident Review Center, Newark, CA

Complimentary Technologies

A number of associated and related technologies can be integrated to provide a 360-degree solution for end users. The following is intended as an indicative list of such technologies and not an exhaustive list:

- **Sensing/NetworkSecurity and alarm networks**
Existing technology networks (e.g., WiFi)
- **Video**
 - Video Surveillance
 - Video Management Systems (VMS)
- **Infrastructure**
 - Physical Security Information Management (PSIM)
 - Site security and building management technologies
 - Physical security measures (bollards, locks)
- **Organizational**
 - Computer-Aided Dispatch (CAD)
 - Common Operating Picture (COP) systems
- **Alerting**
 - First responder notification and alerting technologies
 - SMS and other facility-based electronic broadcast techniques
 - Public Address (PA) and alerts sirens

About SST

SST, Inc. is the world leader in gunshot detection, delivering the proven solutions that help public safety, law enforcement and security forces across the globe respond to gunfire more efficiently, more effectively and more decisively. Its public safety technology solutions are focused on improving public and community safety by locating, confirming and alerting on gunfire, and ultimately, helping reduce and prevent gun violence and improving intelligence-led policing and community policing initiatives.

SST solutions protect cities and countries worldwide, enabling police and law enforcement to respond more quickly, safely, precisely and consistently to gunfire, and to aid proactive anti-crime strategies and operations. SST possesses a multitude of patents that are the result of nearly two decades of innovation in the area of acoustic gunshot location technology.

For more Information about SST and ShotSpotter visit our website at www.ShotSpotter.com. You can also follow ShotSpotter on [Twitter](#), [Facebook](#), [LinkedIn](#) and [YouTube](#).

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