ZEROEYES

Operational Case Study

August 2019

ZeroEyes Integration into Active Shooter and First Responder Drills

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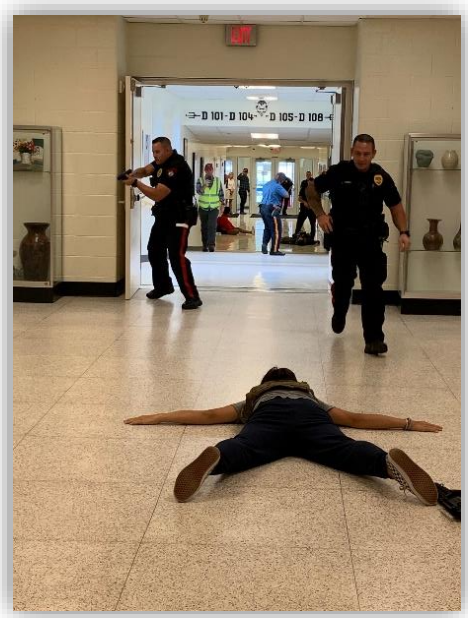
Executive Summary

In August 2019, the ZeroEyes team supported a series of active shooter drills at Rancocas Valley Regional High School (RVRHS) in Mount Holly, NJ. Over the course of two days, approximately 60 police officers from six local townships participated in scripted drills that utilized multiple “active shooter” scenarios and responded to tasking from Burlington County 9-1-1 dispatch.

The ZeroEyes FirstSight™ platform was integrated into RVRHS’s existing security camera system. The platform uses an artificial intelligence (AI) algorithm to conduct real-time weapons detection and triggers automatic alerts to school security, faculty, and local police. For the first time, the ZeroEyes platform was also integrated into local 9-1-1 Dispatch, allowing for continuous real-time alerts, suspect descriptions, and situational intelligence to flow directly to responding officers.



The drills were conducted iteratively – the first set of drills did not employ the ZeroEyes platform, and responding officers had to rely on simulated 9-1-1 calls and role-player interaction to determine the location of the threat. During the second set of drills, which used the ZeroEyes platform, responding officers interacted directly with their 9-1-1 Dispatch to located and neutralize the threat.

Key outcomes from the exercise:

1. On average, the response time (from first notification of an active shooter to first contact with the active shooter) was ***reduced by 50%*** when using the ZeroEyes platform.

2. 9-1-1 Dispatch, using the ZeroEyes platform, was able to ***continuously update*** responding officers on suspect location, physical description, weapon type, and disposition, which resulted in ***demonstrable improvement in tactical situational awareness*** by responding units.

3. Utilizing the ZeroEyes platform, 9-1-1 Dispatch was able to conduct ***real-time forensics***, which ultimately resulted in identifying a shooter hiding among students.

Problem Statement

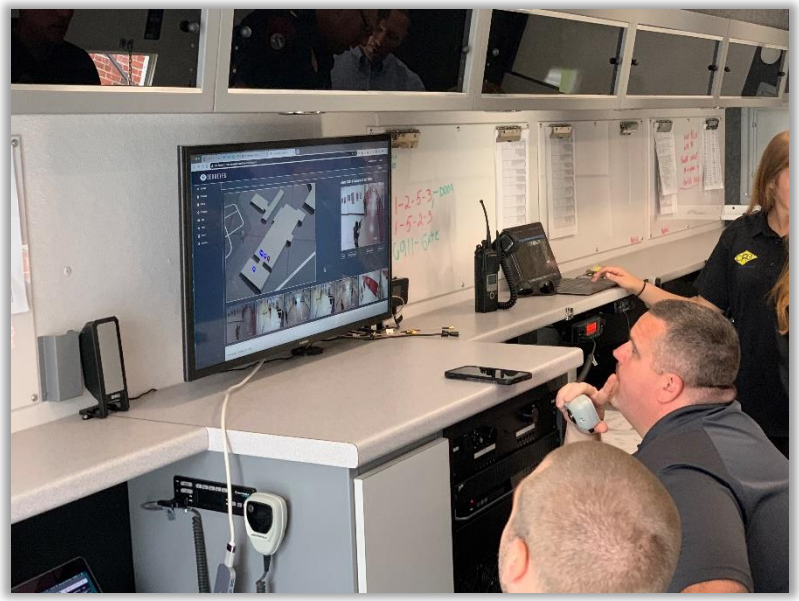
Active shooters continue to represent a significant threat to American schools, office buildings, shopping malls and stores, and other public spaces. Recent mass shootings in El Paso, Virginia Beach, Marjorie Stoneman Douglas High School in Parkland FL, and Santa Fe High School in Santa Fe TX have illustrated numerous issues with active shooter prevention, police and first responder response, initial inaccuracies in public and media reporting, and overarching political indecision on gun laws and regulation.

Our research suggests that the average police response time nationwide for an active shooter event is approximately twelve minutes. Protocols for reinforcement, threat intelligence, and clearing methodology vary wildly from department to department, resulting in even more time lost before police make entry and neutralize the shooter. More often than not, conflicting reports on social media and news media deliver inaccurate intelligence about location of the shooter, number of shooters, armament of the shooter, and description. Because initial reports are often wrong or misleading, emergency dispatchers often have trouble vectoring in police to the real-time location of the shooter, and valuable time is lost while police unnecessarily clear rooms looking for the threat.

ZeroEyes FirstSight™ Technology Overview

The ZeroEyes weapons detection platform – named FirstSight™ - uses artificial intelligence to detect weapons. The software platform integrates with existing security cameras and associated video management systems. There are two variants of the platform – an “on premise” version that requires a nominal hardware installation, and an enterprise, cloud-based version designed for organizations that are already on the cloud. Both versions run ZeroEyes’s proprietary computer-vision analytic over the camera feeds, and the algorithm is

constantly scanning the camera frames for guns. Currently, the analytic is able to detect assault rifles, pistols, and shotguns with an industry-leading low false positive rate. Like any computer-vision analytic, performance variables are based on the quality of the associated hardware and network – in this case, variables include camera quality, field of view, height, digital vs. analog, lighting, network latency, and network architecture.



FirstSight™ employs an “open API” architecture that allows the platform to integrate with any emergency management application on the backend, to include notification applications and communication applications. Once a weapon is detected, an alert that contains a timestamp, keyframe image, and location is pushed over desktop and via mobile applications to faculty, staff, and first responders. FirstSight™ is also designed to be monitored 24/7 by a set of human eyes; the “human in the loop” will be able to determine if a weapons detection is a false positive or the real thing in under a second and dispatch the detection to first responders if applicable.

FirstSight™ also integrates into various CAD and mapping software platforms in order to show threat location in real time. This location is continuously broadcasted to first responders.

Rancocas Valley Regional High School Active Shooter Drill

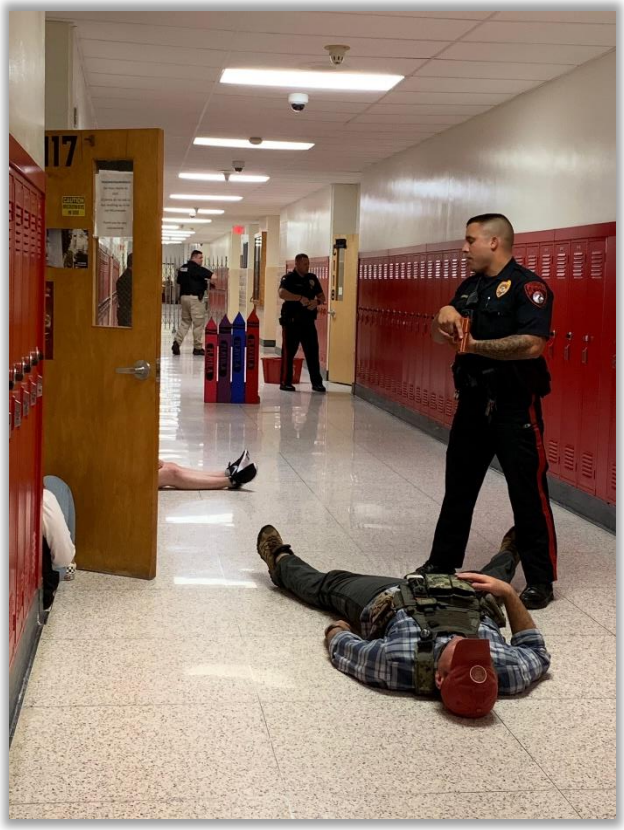
Over the course of two days, approximately 60 police officers from six local townships participated in scripted drills that utilized multiple “active shooter” scenarios and responded to tasking from Burlington County 9-1-1 dispatch. First, iterations of the drill were conducted without FirstSight™ (9-1-1 was notified via a phone call from the school, and police were dispatched accordingly). Next, FirstSight™ was employed – weapons detections from inside the school were broadcast to a Burlington county emergency command center vehicle that acted as 9-1-1 dispatch. From there, the 9-1-1 dispatcher was able to vector in police

response and update them in real time as to the location, disposition, description, and armament of the shooter.

The following scenarios were performed over multiple iterations:

- Single shooter
- Two shooters
- Three shooters
- Disguised shooter, hidden in with victims

With every scenario, the FirstSight weapons detection platform was able to identify the exposed weapons of the active shooters and alert 9-1-1 dispatch within seconds. Responding officers were vectored directly to the active shooter, and were fed real-time situational and locational intelligence by emergency dispatchers. Response times from drills without FirstSight™ to drills that used FirstSight™ saw time decreases of over 50% on average (time from notification to threat neutralization). The final scenario consisted of three active shooters, including one who dropped his weapon, changed clothing, and hid among victims. Police, using real time forensic imagery from FirstSight™, were able to identify the hidden shooter in a classroom hiding among other students.



Key outcomes from the exercise:

- On average, the response time (from first notification of an active shooter to first contact with the active shooter) was *reduced by 50%* when using the ZeroEyes FirstSight™ platform.

- 9-1-1 Dispatch, using the ZeroEyes FirstSight™ platform, was able to *continuously update* responding officers on suspect location, physical description, weapon type, and disposition, which resulted in *demonstrable improvement in tactical situational awareness* by responding units.

- Utilizing the ZeroEyes platform, 9-1-1 Dispatch was able to conduct *real-time forensics*, which ultimately resulted in identifying a shooter hiding among students.

- Police officers surveyed after the event enthusiastically recommended FirstSight for accuracy, intuitiveness, and effectiveness – *resulting in a Net Promoter Score of over 80%* - and the vast majority indicated that they would recommend the platform to colleagues at other agencies or departments.

- Rancocas Valley Regional High School became the *first school in the state of New Jersey* to purchase the ZeroEyes FirstSight™ platform.

The ZeroEyes Team

Headquartered in Philadelphia, the ZeroEyes team consists of US Military veterans with deep Special Operations and Intelligence Community experience, including Navy SEALs and Navy Intelligence Officers. Many members of the core leadership and operations team have MBAs from top-tier programs such as Wharton, Columbia, Cornell and Vanderbilt and corporate experience at companies such as Amazon, Walmart, Comcast, and PwC. The technology team consists of serial tech founders, application and software development experts, and passionate systems engineers. Regardless of individual background, each and every member of the ZeroEyes team is laser-focused on providing the nation's leading weapons detection solution that will ultimately protect schools and students!

For questions and comments concerning this white paper, please reach out to Kieran Carroll at kierancarroll@zeroeyes.com.