Active shooter events, a challenge

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ABSTRACT

An active shooter event is one of the most complicated situations a police officer could face. Today the standard procedure for an active shooter event is to enter the scene and try to prevent casualties. This involves taking great risks and puts the police officers in a situation they have not been trained for. This is a work in progress paper where the long-term goal is to develop modern technology that could increase the chance of saving lives and decrease the risk of being injured or killed during an active shooter event. Six active shooter event exercises taking place in Sweden have been studied using an ethnographic field study approach. Four themes have been identified where we argue that technology could enhance the police mission: A) Situational awareness; B) Decision making/prioritization; C) Localization of both sound and people; D) Decreasing time of intervention.

Keywords

Active shooter event, police tactics, police interventions, lifesaving

INTRODUCTION

An active shooter event/incident or active killer event/incident it is one of the most challenging situations for law enforcement to deal with. The U.S. Department of Homeland Security (2008) defines active shooter as "An Active Shooter is an individual actively engaged in killing or attempting to kill people in a confined and populated area". The event is often very short and can be over within 10–15 minutes (U.S. Department of Homeland Security, 2008). In the U.S only, there was a total of 61 active shooter events in 2021, with a total of 140 wounded and 103 killed. Of these casualties two law enforcement officers were killed, and five were injured (Federal Bureau of Investigation, 2022). In the U.S., the average numbers of casualties in active shooting events between 2017 and 2020 were 345/year. Even if you consider 61 active shooter events in a year a high number, it is a very rare situation, but each event leads to many casualties. For police officers, active shooter situations are extremely dangerous – one out of eight calls about active shooters resulted in an injured police officer.

Procedures for how to deal with an active shooter event have been developed since the tragic event at Columbine high school April 20, 1999, where 13 people were killed and 21 injured. At the time of the Columbine shooting the standard procedure for the first police unit at the scene was to secure the premises and wait for specially trained units. The aftermath of the Columbine shooting resulted in criticism of this approach. Instead a more rapid response has been developed (Martaindale & Blair, 2019). The new procedure taught to law enforcement in the U.S. is that the first patrol/unit at scene is responsible of trying to stop the active shooter and save lives. This procedure is extremely dangerous, and while it has resulted in more saved lives, it has also resulted in more injured and killed police officers (Blair & Duron, 2022; Martaindale & Blair, 2019). When the first police arrive at a scene and tries to stop an active shooter event, they are likely to be smaller in number than a special unit, and they are unlikely to have the same training and equipment. Martaindale and Blair (2019) describe many examples of how a single officer has saved many lives. There is also an example from Kenya 2019 when there was a terrorist attack at a hotel complex, where a single SAS-operator[1] saved many lives when he searched the complex alone[2],

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[1] Special Air Service SAS is a special force unit from Great Britain
https://en.wikipedia.org/wiki/Special_Air_Service
[2] https://www.theguardian.com/world/2019/jan/16/sas-member-helped-secure-nairobi-hotel-complex

but as mentioned, most of the law enforcement patrol units that are first at the scene of an active shooter event do not have the same training as an SAS operator. This problem is the foundation of this ongoing research on active shooter events.

The long-term aim of this research is to develop technology that could help first patrol/patrols at the scene of an active shooter event – a technology that could increase the chance to save lives and decrease the risk of being injured or killed during an active shooter event. According to Martaindale and Blair (2019), speed is one of many success factors and we hope technology could enhance the chances of success. This paper is a work in progress paper where the initial findings from field studies are presented.

ACTIVE SHOOTER EVENT AND PROBLEM AREA DESCRIPTION

Research on active shooter events, especially from the police perspective, is very limited. Out of what has been published, most are from the U.S. As mentioned, the U.S. is also where many active shooter events take place. One branch of research focuses on the police and their tactics during active shooter events, or how the tactics have evolved. As presented by Martaindale and Blair (2019), the standard procedure prior to the school shooting in Columbine was very reactive – to be specific, the first patrol at the scene should secure the premises and wait for a more skilled and trained police unit, often a SWAT team (Special Weapon And Tactics), which would deal with the suspect. The problem detected in the aftermath of Columbine was that the shooting was over much quicker than first expected – the time required to enter and search the school building was far from ideal. After Columbine, the procedure of an active shooter event has been identified as more rapid – police officers are encouraged to enter the scene directly without waiting for reinforcement with the aim to save lives (Martaindale & Blair, 2019). This new approach is very dangerous for police officers; the risk of being shot and injured is very high during active shooter events. According to Blair and Duron (2022), police tactics usually aim to reduce complexity, which can be done by e.g. keeping distance and/or introducing more skilled and trained units at the scene. The procedure of stopping an active shooter event by quickly entering the scene rather increases the complexity and puts the police officer at higher risk. Blair and Duron (2022) identified that in 43 out of a total of 277 active shooter events from 2000 to 2018 at least one police officer was shot. They also identified two distinct differences between how the police officers entered the scene. In 15 events the shooter ambushed the police and in the rest of the situations the police officers knew what kind of situation they entered. Knowing that there is a risk of being injured or killed affects the police officer's willingness to enter a situation. There is a new rather unstudied relationship between the modern police tactics and the tactics applied in an active shooting event. Modern police tactics are often based on a defensive approach, where the police officer keeps distance, minimizes, and aims to de-escalate the situation. With active shooting events you need to be more offensive and try to stop the ongoing situation (Phillips, 2020). According to Phillips (2020), not all police officers will act as taught, because many aspects affect how an individual reacts when facing a high risk of being seriously wounded or killed. Law enforcement authorities need to find a balance between the police officer's personal safety, victim safety, and people's expectations on how the police should react during an active shooter event, when establishing training. Even if the standard procedure is to try to engage the suspect directly, the police officers must interpret the situation and assess the potential of succeeding to stop the shooting or to be shot by the suspect (Phillips, 2020). According to a statistical analysis by Blair et al. (2021), the majority of active shooter events taking place in schools or at retail locations were carried out by a male Caucasian using at least one pistol, which could be combined with other types of weapons. The suspect was most often stopped by the police, but it was not unusual that victims stopped the situation as well as the suspect (Blair et al., 2021). The latter could be a strong argument for the recommendation for victims to attack if possible during an active shooter event (U.S. Department of Homeland Security, 2008).

In the development of how to deal with an active shooter event, computer based- simulations is one technique with potential. Briggs and Kennedy (2016) show in a simulation that victims trying to collectively attack suspect is of course putting themselves at high risk, but with a fair chance to succeed. Victims overpowering the suspect is not uncommon (Blair et al., 2021). Simulations are also very useful tools to understand victims' reaction during an active shooter event, to be able to plan evacuation but also pre-made plans for law enforcement (Smith et al., 2010). Simulation has also been used to better understand communication (Reichart et al., 2019), and the effect of various parameters such as an armed security guard, locked doors, how to evacuate etc. Using simulation can help save lives proactively (Kirby et al., 2016). Technology is used to minimize the suspect's capacity to move in, e.g., a school building, by for example remote-controlled door locks. The effect of an automatic door lock has proved to be successful in simulation, when the victim tries to shelter in, e.g., a classroom. However, if the victims try to run and/or evacuate, an automatic door lock rather increases the risk of being hurt or killed (Lee & Dietz, 2019). There are warning, alarm, and shot-detection systems developed for active shooter events, for example guidance on how to evacuate (Gunn et al., 2017). The idea is for these systems to help the potential victims to act in a way where they increase their chances of survival. However, these systems exist side by side with other more social warning systems. Lu et al. (2021) tested the effect of gunfire on location systems by using VR. They found

that the chance to survive was higher using a gunfire location system compared with no system at all. One of the co-existing information sharing technologies that Lu et al. (2021) investigated was social media and information shared in social media amongst potential victims in an active shooter event. Social media is something to consider when trying to share and spread information amongst potential victims (Egnoto et al., 2016). Data from surveys after the active shooter event at Texas University in Austin in 2010, indicated that it is difficult to predict how individuals are motivated to share information during an active shooter event. To use VR technology to train police officers to be prepared for an active shooting event is probably very useful, as experiments show that VR experiments result in increased salivary and subjective markers of stress (McAllister et al., 2022).

Even if this has not been a complete and extensive literature survey of active shooter events, the above provides a rather clear view. The research on the police and how they act during an active shooter event is rather limited, and there is greater focus on things that are measurable. Research shows that information technology is either used to better understand the phenomena active shooter event and to be able to establish strategies and plans for how to act in a worst-case scenario. Information technologies are also developed to aid potential victims if the active shooter event occurs, to increase the chance to survive. We argue that there is a need to develop technology that enhances the police officers' chance to intervene with a suspect during an active shooter event, without being killed or injured.

Research method

The data and findings in this paper are based on a qualitative research effort (Myers, 2009; Myers & Avison, 2002) carried out by two researchers. Both researchers have a background as sworn police officers for almost 20 years before fully entering academia. The two researchers have extensive practical experience with weapons and tactics, one of the two researchers from a regional SWAT team and as a teacher at a police academy, and the other from work for many years as operator at the national counter terrorist unit, and after that as weapon instructor.

The long-term goal of the research is to develop technology that could enhance the police officers' action during an active shooter event. The first phase of the research is rather explorative and is about understanding how the police officers act during an active shooter event, and to get an understanding of the challenges of police tactic decisions. In this article we have collected data from large exercises. This data collection method is best explained as ethnographical field studies (Van Maanen, 2011), where the data presented in the paper should be seen as tales from the field (Van Maanen, 1988).

The exercises

Data have been collected during police exercises targeting active shooter events. The **first** exercise was a large collaborative active shooter event exercise in Jämtland County in Sweden in May 2022. The aim of the exercise was to train police, fire department and medical collaboration during an ongoing active shooter event. The scenario was a school where two suspects had started to injure students with both a sword/long knife and a handgun. The first responder at the scene was the fire fighters because the first alarm that came to the dispatch central was about a car on fire outside a school. The fire department found a wounded person at the scene (figure 1) and alerted the police. The underlying idea of the exercise was to train a realistic active shooter event in Jämtland County, where 2–3 police units could be available within 15 minutes, and the regional SWAT unit could be at the scene at the earliest within 45 minutes. Three stages were planned in the exercise: 1. Understand the situation, i.e., that it is an active shooter event, and make the call for more backups; 2. Act according to the defined tactical method, to stop the ongoing situation as quickly as possible; 3. Secure parts of and then entire school, make it "safe enough" for medical staff to save lives. Safe enough is when a medical staff could treat wounded. The entire exercises including preparation at scene and after-action review lasted for six hours.

Figure 1. A figurant in exercise one masked as knife/sword wounded.

The **second** exercise in the county of Västerbotten. The second exercise was repeated five times with different police personal. The exercise lasted over two days, where three groups of police officers carried out the exercise the first day and two groups the second day. The scenario and set up was identical during the five exercises. The police officers were organized in two or three police cars, depending on if they were 5 or 6 officers. The exercise started as a call to the police units about an emergency at a school in Umeå where fights had broken out. When the first unit arrived, there was a series of gun shots, and if the police officers entered the hallway of the school they should find a seriously wounded person, and an ongoing deadly knife attack 30 meters down a corridor. For the officers the exercise included the following 1. Understand the situation, i.e., that it is an active shooter event, and report it to the dispatch central; 2. Act according to the defined tactical method, to stop the ongoing situation as quickly as possible; 3. Save lives if possible; 4. Secure the school – make it "safe enough" for medical staff to enter. The exercise ended with a after-action review with all five groups.

During the six exercises, all police officers and suspects used weapons with Simunition[3] (Fx) to be able to work with as realistic engagement as possible. All involved in the exercise used the protection required for using simunition. In the following we refer to the above exercise as exercise one, and exercise two. If needed for exercise two we also refer to repetition 1,2 etc.

Researcher involvement

The data was collected in different ways during these two exercises. During exercise one, one of the researchers followed the police action. During the exercise two, and the five repetitions at least one of the researchers followed the police officers' movement and action in the school as observers from a short distance, wearing a blue and yellow vest with the writing "police training". During two of the repetitions, one of the researchers was acting as a police officer, working together with the police officers that were training, and was put in a unit with one of the 5–6 officers. This was possible because of the researcher's work experience. Finally, in the last repetition, one of the researchers acted as one of the assaulters to get also this perspective. The researcher participated in the after-action review in the role of police officer.

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[3] Simunition is a non-lethal training system www.simuition.com

RESULTS

This section presents the results from the observation. The results are divided into time dependent themes to make the results more readable. The results are primarily detailed descriptions of how the police officers acted. The themes used are a) Alarm/at scene – grasp the situation; b) Intervention – stop the active shooter event; c) Lifesaving.

Alarm/at the scene

Even if the police officers involved in these six exercises knew that it was an exercise and that it probably would be an active shooter event, the first challenge they faced was to understand what was going on. During exercise 1, the alarm was raised by the fire department who found a seriously injured male in the hallway of the school, who could not speak (fig 1). They called for police officers as they dragged the injured person out of the building to a secure location. The first police unit arriving at the scene in exercise one had difficulties understanding what was going on, but perhaps most difficult was to decide where to go, and what to prioritize. In exercise one at the main entrance of the school there was a large hallway where you could either go down to the basement, into a corridor, or up to the second floor. The two first police officers stopped for a while to listen and then decided to move into the corridor. An obvious struggle for the police officers was to dare to leave areas that had not been searched and were therefore still unsecure. They looked back while moving along the corridor towards the part of the school where there was noise. In exercises two the first unit at the school was met by gun shots. There was also very loud music playing, which made it even more difficult to locate where the shots came from. When the first patrol entered the school they met a wounded person, sitting just inside the hallway. When they also saw movements further down in a corridor and a person sitting on the ground screaming, they realized that it was not just a "normal fight", it was something different and they started intervention.

A challenge for the second and third police unit at the scene was to understand where the first unit had gone, what areas had been secured, etc. In exercise one there was a longer delay between the first and second police unit arriving to the school, which forced the units to communicate via radio, a radio communication is not as dynamic as face to face. To describe what had and had not been searched, and where the first unit was, turned out to be quite difficult. The underlying tactical approach during an active shooter event is to try to stop the killing as soon as possible. However, when you do not know where to go, this turned to be challenging. During exercise two, there were gun shots during the initial search in the corridor, but very few police officers noticed it and quite a few of the participants were surprised to learn this during the after-action review.

Intervention

There is no way to pinpoint exactly when a police patrol/unit grasps the situation and starts intervention. But in exercise one, the intervention started when the police unit decided where to start the search and when they proceeded into the closest corridor. The speed of the police unit obviously depended on whether the police unit detected and interpreted the threat correctly. During exercise two, the scenario was written so that when the first police unit entered the school, a knife assault should be visible 30 meters down a corridor. This should trigger them to speed up the intervention and chase after the suspect. 2 out of 5 of the units in exercise two noticed the situation, while 3 out of 5 just noticed a sitting person in the corridor. This difference in awareness of what was going on affected how quickly the police acted. The police units who identified a suspect with a knife stabbing a victim, also interacted much quicker and passed many unsearched areas to confront the person with the knife. The other units tried to reach the sitting person that was screaming loudly as quickly as possible, but without leaving unsearched rooms behind them. Another difference was that the units who identified the situation correctly knew what they were looking for, i.e., a suspect with a knife, and they were targeting the suspect. The units that did not notice the suspect assumed that they were looking for a suspect probably armed with a knife, based on the wounds of the victims they had passed.

In exercise two, when the police units got in contact with the suspect, there was a standoff. The suspect had a knife in his hand, and before he was either arrested or shot (the scenario could end differently depending on how the police acted) it took some time, that delayed the units to proceed. The police in exercise one also encountered a suspect with a knife, and during the engagement with the suspect the police (only 2 officers) had difficulties securing the area, because they had corridors, small hallways close by, and a stairwell behind them. They also had many victims to take into consideration to make sure no hostage situation developed.

In all exercises there were two suspects, one that was armed with a knife or small sword, and one armed with a pistol. A confrontation between a police officer and a knife-armed suspect is very different from a confrontation

between a police officer and a pistol-armed suspect. When the police ended up in a part of the school where it was obvious that the armed suspect was located, but not visible, the police suddenly slowed down the speed of the search, and the police officers needed to apply the trained room entry techniques.

The scenario in all six exercises was such that a too slow intervention and confrontation from the police resulted in more injured victims. It could be noted that the police officers clearly showed symptoms of stress even if it was only an exercise.

Lifesaving

The police role during active shooter event is clear, first stop the killing, second take care of wounded victims while at the same time making the premises secure enough for paramedics to enter. However, lifesaving is both about stopping the killing and making sure that wounded victims have a chance to survive. During one of the exercises two, an officer was injured and couldn't continue. First-aid competence for others as well as yourself is very important. It was noticeable during all exercises that even police officers not directly involved in the ongoing search after the suspect did not prioritize giving first aid to wounded victims. First aid could for example be to put a torniquet on the arm or leg of a wounded victim. The procedure clearly prioritizes to stop the killing first, so even if it was obvious that lifesaving interventions could be carried out, none was unless ordered by an officer.

DISCUSSION

In this section the results will be discussed using a thematic and task-oriented categorization. As stated in the introduction the long-term aim of this research is to develop technology that could help first patrol/patrols at the scene of an active shooter event – a technology that could increase the chance to save lives and decrease the risk of being injured or killed during an active shooter event. The areas in which design implications are possible to find has been thematic presented below. We have used the following thematic headings: Situation awareness; Decision making; Prioritizing; Localization. The themes are used because it is the thematic areas where we find there is a potential for information technology support.

Situation awareness

To understand what is happening could be the most important challenge for police officers during an active shooter event. Both for the officers at the scene but also for those at the dispatch central. The process of continuously and iteratively collecting and assessing the information to establish a new situation awareness indicates that information sharing, and information gathering is crucial. During this search, the officer is focused on one task and tries not to be shot and injured. We noticed several situations where information shared over the radio was not captured nor responded to.

Decision making/prioritization

An active shooter event even in a large city will probably result in a situation where the first unit at the scene will need to enter the building. While not all schools are large in size, even an average high school in Sweden has around 500 students, which means that when you enter from the main entrance you might have several alternatives to choose from, i.e., one or two corridors, a second and third floor, a basement etc.

Another decision-making dilemma can be explained as prioritizing. During a large active shooter event in a large building, it is likely that the police will need to start lifesaving work before the building is declared safe enough for paramedics and fire department. In the majority of cities in Sweden there will be few police officers and the numbers of victims might be more than the police can manage. Even if police officers have basic training in first aid, they are not trained to prioritize lifesaving. During the intervention/action phase the police could also face situations like in exercise two where the police met two seriously injured victims who with quick help probably would survive. Should you stop for a while and try to save this life, risk being slowed down and the suspect killing or injuring more? A dilemma for sure.

Localization

The six exercises studied provided many examples of difficulties localizing screams, shots and understanding to where people were running. Of course, one would expect that during a real active shooter event the police will meet terrified and scared people. In the active killing situations that have taken place in Sweden where a single suspect has assaulted people at schools, the suspect has been using knives, axes, and a sword. There have been no gunshots, and this makes it difficult for potential victims to understand what is going on, so that they will call for

help, and for the police to localize where the call for help came from.

So, the localization dilemma concerns both localizing where certain sounds come from, but also localizing where the emergency call/call for help came from in situations where there is loud scream amongst students or teachers.

Temporal aspects

International experience clearly indicates that time and speed is what saves lives. During exercise one it took around 30 minutes from the alarm until the two suspects were neutralized. It then took over 2 hours before the police could announce that the building was safe enough for paramedics to enter. During exercise two, the two suspects were neutralized after 15–20 minutes and the building was safe enough after a total of 40–45 minutes. The temporal aspects were primary dependent upon that exercise one was in a region with few police officers, but the building was large. In exercise 2 the training units represented a larger police authority, and the school was not that large. However, a design challenge is to be aware of the large temporal variations that could exist.

Criminal investigation

Even if the primary task during an active shooter event is to stop the killing, the police also have a criminal investigation responsibility. During the search, and the intervention with suspects, lots of evidence go by unnoticed, as do many injured and un-injured victims that could be witnesses of a serious crime, and in a worst-case scenario one of these persons could be one of the suspects trying to hide and escape.

CONCLUSION AND NEXT STEP

In this paper we have tried to present tales from the field, i.e., a presentation of what an active shooter event could look like and how it could be understood from the police officers' perspective. We argue that it is important to present this in a rather descriptive way so the next step in our research becomes more natural. The themes we presented in the discussion section cover areas in which we believe information technology could contribute. But as can be noted, time is crucial, and we will therefore aim to identify and design technology that is easy enough to use and which does not take time to arrange. At this stage of the ongoing research a continuing of understanding the uniqueness is needed. As the tragic shooting in Nashville on the 27th of Mars[4] show this kind of situations happen very rapid. In Nashville it took 14 minutes from the entry of the shooter to the school until the police had neutralized the shooter. Such short time makes it important to scrutinize the phenomena very thoroughly before presenting design suggestions.

One could say that an active shooter event should be managed by police officers that are trained and equipped to do so, such as special units, but even in the best of worlds these units will always be too late at the scene to save lives. This means that for most police officers they could be standing in front of the most dangerous situation they have ever been facing, without the training needed to feel confident in how to manage the situation.

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