

Program Narrative

Statement of the Problem

Baltimore is the most populous city in Maryland with 622,671 residents, as of 2013. The city has historically been one of the most violent cities in the U.S. In fact, based on 2013 Uniform Crime Report (UCR) data, Baltimore is the seventh most violent city in the country (population > 100,000) at a rate of 1,406.4 violent crimes per 100,000 people. Furthermore, its murder rate (37.4), robbery rate (603.0), and aggravated assault rate (718.0) are amongst the highest ranks (i.e., fifth, fifth, and twelfth, respectively) in the country.

Baltimore Crime Rankings 2013		
Crime	Rate Per 100,000	National Ranking (cities with a population > 100,000)
Murder	37.4	5 th out of 290
Robbery	603.0	5 th out of 290
Aggravated Assault	718.0	12 th out of 290
Violent Crime	1,406.4	7 th out of 290

The crime in Baltimore has a disproportionate impact on Maryland's citizens. In fact, the State of Maryland has consistently ranked as one of the 10 most violent states in the country and the elevated crime rate in Baltimore City is the main contributor for this ranking. More specifically, Baltimore City makes up slightly less than 11% of the Maryland population but represents 60% of the murders, 25% of the rapes, 37% of the robberies, 28% of the aggravated assaults, 32% of total violent crime, and 63% of non-fatal shootings.

Baltimore City has recently made national news in light of the substantial increase in gun violence in Baltimore City over the past month and a half, following the Freddie Gray incident. During this period of time, Baltimore has had the most homicides and non-fatal shootings in the past 40 years. The 43 homicides in the month of May were the most since August of 1972 when

the city's population was over 900,000. The total homicides in the month of May this year were nearly double those in May of last year (43 compared to 23) while there were almost three times as many non-fatal shootings in May 2015 compared to May 2014 (110 compared to 38). Homicides are currently up 47% over the first five months of the year (116 vs. 79) while non-fatal shootings are up 82% (218 vs. 120).¹

Research suggests that 911 calls for "shots fired" are often indications of where future homicides and non-fatal shootings will occur. Unfortunately, communities that are most affected by gunshots are the least likely to call police. In fact, less than one in five shooting incidents are reported to 911 which indicates that gun crime is vastly underreported. When 911 calls are made, the information provided is typically inaccurate. Without knowing exactly where to respond, police waste valuable time and resources driving block by block looking for evidence as criminals escape the scene. In addition, dispatching officers to an active shooting without all available information is a threat to officer safety and needlessly places the public at risk.

As an integral part of reducing gun violence, the Baltimore Police Department (BPD) has embraced technology as a means of preventing and solving gun-related crime. In fact, BPD continues to seek opportunities to reduce gun violence. While members of BPD are asked to carry out one of the most dangerous jobs in the city, reliable data and real-time intelligence is needed to prevent and solve crimes.

In order for Baltimore City to resolve this issue, funding from the solicitation, *Technology Innovation for Public Safety (TIPS) FY 2015 Competitive Grant Announcement*, is needed to provide BPD with the technology to receive real-time notification of gunshot

¹ Please refer to the following attachments for more information regarding the precipitous increase in Baltimore City's violence: Baltimore Monthly Homicide Trends, Baltimore Monthly Non-Fatal Shooting Trends, Comparison in Homicides in Baltimore City, Comparison of Non-Fatal Shootings in Baltimore City, and Protest Turns Violent in Baltimore.

locations, as well as improve response times and capture pertinent information to enhance investigations of gun-related violence.

Project Design and Implementation

BPD already uses various technologies to analyze and fight crime. These efforts have, until recently, enabled BPD to substantially reduce gun violence. Nevertheless, more information is needed to serve as a force multiplier to reduce homicides and non-fatal shootings and provide real-time data to BPD to analyze crime patterns and trends, develop suspects, track the movement of known offenders, and pinpoint locations that are frequently visited by such offenders. The proposed solution is the implementation of an automated gunshot detection technology system, which will work in consort with Baltimore's existing CitiWatch Closed Circuit Television (CCTV) camera network.

Gun Shot Detection

Gun Shot Detection (GSD) assists law enforcement agencies by directing police to the precise location of illegal gunfire incidents. This technology instantly notifies officers of shootings in progress with real-time data delivered to dispatch centers, patrol cars and even smart phones. Instant alerts enable first responders to aid victims, collect evidence and quickly apprehend armed, dangerous offenders.

Success Stories

According to Watkins, Mazerolle, Rogan, and Frank (2002), gunshot detection technology may be used as a "problem-solving tool to detect, reduce, and prevent incidences of random gunfire."² Using a quasi-experimental design, Watkins et al. (2002) conducted an evaluation of the GSD system in Redwood City, California. Based on a controlled field

² Watkins, C., Mazerolle, L., Rogan, D., and Frank, J. (2002). Technological approaches to controlling random gunfire: Results of a gunshot detection system field test. *Policing: An International Journal of Police Strategies & Management*, 25(2), 345-370.

evaluation, the gunshot location technology successfully detected 81% of the gunshots and located 84% of the gunshots within an average margin error of 41 feet.

The success of this tool has also occurred in other locations within the U.S., such as Washington, D.C. (District of Columbia), and Milwaukee, Wisconsin. According to the Washington Post (2013), “the District’s [GSD system] has detected 39,000 outdoor [shots fired] incidents in the past eight years. Sensors cover about a third of the city and are concentrated where gun crime is highest. It allows police to respond immediately to the exact location where shots are fired and provides a dramatic picture of the danger faced in many neighborhoods.”³ “It is a valuable tool that provides almost instantaneous alerts that allow officers to be dispatched quicker for the sound of gunshots,” Police Chief Cathy L. Lanier said in a written statement. “It has been instrumental in determining crime trends and establishing information in investigations.”

In addition, the Milwaukee Police Department implemented a GSD system which allowed them to build a GSD Desk within their Analytical Intelligence Section to conduct data mining for information related to previous gunshot detections or violent offenders from the area, in an effort to locate possible suspects or identify addresses that officers may wish to canvass. Using this technique, the Milwaukee Police Department was able to execute several search warrants, as well as recover guns and an improvised explosive device. They were also able to use an “investigative package” to support prosecution of cases, as well as provide supporting documentation for search warrants.

³Received from http://www.washingtonpost.com/investigations/shotspotter-detection-system-documents-39000-shooting-incidents-in-the-district/2013/11/02/055f8e9c-2ab1-11e3-8ade-a1f23cda135e_story.html.

Police Response

Utilizing the GSD technology, BPD will be able to target the times and locations of gunfire, as well as improve investigations of gun-related crimes. Through strategically placed real-time automated gunshot acoustic sensors, BPD will enhance its capacity to detect and apprehend gun offenders, and reduce the violence that has recently plagued Baltimore. In order to utilize this technology to its fullest potential, as well as ensure the most up-to-date information is shared in a timely manner, the gunshot detection technology system will send alerts to three city entities, simultaneously: the Emergency Communications Section for Baltimore City, the Baltimore CitiWatch, and BPD's Watch Center.

Once an alert is sent to the Emergency Communications Section, it will be instantly transferred to a Computer Aided Dispatch (CAD) system and generated as a call for service. The call will then be dispatched to a police officer in the field via radio and/or in-car computer. This call will serve as a CAD entry to document the event and "file" the information for further review or analysis. Using these entries, police will prepare reports for the Daily Crime Briefing detailing any intelligence or evidence collected based on GSD alerts. The Command Staff will use the Daily CAD Map to display shots fired incidents in relation to other calls for service (e.g., car stops, field interviews, and on-view arrests).

The Baltimore CitiWatch is the hub for Baltimore's vast network of CCTV cameras. GSD alerts will be integrated with the CitiWatch CCTV network so that the alerts provided by GSD will automatically focus nearby CCTV cameras on the area surrounding the location where gunfire was detected. Video evidence of the incident will be captured and the alert will help ensure that personnel in the CitiWatch center can view images from these cameras to relay real time information to officers responding to the call. This integration of the GSD system with

CitiWatch will help BPD gather valuable investigative information, to include video of actual incidents and video of potential suspects and witnesses in the area.

In 2005, the Baltimore CitiWatch Program was implemented within the city to enhance the safety and security of residents, workers, visitors, public buildings, educational institutions, healthcare facilities, cultural and entertainment attractions, and other tourist venues. This program began with 50 cameras which were directly installed on the city's network to cover the commercial areas of downtown. Almost a decade later, this program has expanded to more than 700 CCTV cameras which are mounted on street poles to provide 24-hour surveillance of downtown tourist areas, some of the city's most violent neighborhoods, and in several public housing projects. CitiWatch provides state-of-the-art CCTV cameras to assist law enforcement and public safety partners in the fight against crime. These cameras are monitored 24-hours a day and 365 days per year by certified CCTV monitors with law enforcement backgrounds to prevent violent crime and direct police officers to the scene while providing maximum intelligence on what arriving officers will find. An added benefit of CitiWatch is its ability to capture video feeds which preserve visual evidence for BPD and aid in prosecutorial efforts. The integration of the GSD system with CitiWatch will further enhance BPD's ability to reduce gun violence.

BPD's Watch Center is located in the headquarters building and is the Intelligence Hub for the police department. Personnel in the Watch Center can access and monitor all CCTV cameras; communicate with other agencies in the city; allow commanders to monitor and evaluate an event in near real-time; and serve as the base of operations for the Analytical Intelligence Section which improves strategies to combat gangs, crime and violence, and increase crime prevention efforts through the dissemination of intelligence information. Within the Analytical Intelligence Section, BPD will build a GSD Desk to conduct data mining for

information related to previous gunshot detection alerts to locate possible suspects or identify addresses that officers may wish to canvass.

Utilizing the gunshot detection technology and the shared information from the three city entities, BPD will be able to use existing crime analysis software to compile data from the strategically placed networks of GSD sensors and CCTV cameras to analyze crime patterns and trends, develop suspects, track the movement of persons of interest, and pinpoint locations where shots are fired. The implementation of GSD will also be used by analysts, within the Analytical Intelligence Section, to accurately predict the locations of future shootings, armed robberies, and homicides through processes such as clustering. All information captured will be imported into BPD's crime analysis database and will be mapped because the sensors have geographic coordinates assigned to each alert captured. BPD will also be able to download any audio files and prepare an "investigate package" for detectives. The investigative package will include audio from sensors, CCTV footage, and stock reports produced by the GSD system.

In addition, BPD will use analytical findings at CompStat each week for discussion. One of the most important indicators of police/community relations is whether or not citizens are willing to contact police to help them solve problems. We know from research that people contact the police in about one out of every five discharging of firearm incidents. Part of the CompStat discussion may involve addressing the level of police legitimacy in neighborhoods with low rates of citizen reports of discharging firearms.

The data will also be shared with other crime prevention partners and regional law enforcement personnel, to serve as a force multiplier in combating violent crime in Baltimore City. Through the deployment of GSD technology, BPD stands a greater chance of identifying and apprehending the offenders who are responsible for gun-related violence. In addition, this

project will provide BPD with the ability to obtain vital criminal intelligence data on gunshot activity which may not otherwise be obtained, and share this information with regional law enforcement personnel. If awarded, a detailed analysis of homicide and non-fatal shooting incidents will be conducted, as well as calls for service for shots fired, to determine where GSD acoustic sensors ought to be deployed.

Because the implementation of the GSD system may result in annual fees to continue the real-time notification of gunshots fired, BPD and the State of Maryland intend to pilot this program over a twelve month period to examine its effectiveness. Based on the results of this pilot program, BPD and the State of Maryland will determine future use of the GSD system, as well as the potential expansion of this automated system.

Capabilities and Competencies

The Governor's Office of Crime Control & Prevention, located within the Executive Branch of State Government, is Maryland's one stop shop for resources to improve public safety. GOCCP's mission is twofold: (1) to serve as the State Administering Agency in the application for, and the administration of, federal and state funds for public safety, crime control and prevention; and (2) to coordinate interagency public safety and crime control prevention efforts throughout the state. Such efforts include the establishment of partnerships between state and local agencies to improve public safety through seamless coordination and consistent information sharing. One of GOCCP's partners in these collaborative efforts is BPD. BPD is the eighth largest municipal police force in the U.S., staffed by nearly 4,000 civilian and sworn personnel. The primary objective of BPD is reducing crime throughout the city by targeting gangs, guns, violent repeat offenders, and the conditions that allow crime to flourish. In partnership with state and local agencies, BPD strives to bolster support systems to strengthen

data quality and improve information sharing to provide actionable and timely intelligence and support field operations. Other law enforcement and public safety partners – to include the Division of Parole and Probation, the Department of Juvenile Services, and the Baltimore City State’s Attorney’s Office – will help support this initiative.

Plan for Collecting the Data Required for this Solicitation’s Performance Measures

Because the success of this project hinges, to a large degree, on collaboration and cooperation, GOCCP and BPD will hold bi-monthly meetings to review progress and establish work priorities. Information from the GSD system and CitiWatch will also be made a routine part of CompStat meetings.

If funding is received, data will be gathered and compiled into a reportable format to provide a statistical breakdown of the accomplishments achieved as a result of this grant award. In order to track the success of this project, baseline statistical data reflecting the number of incidents (by type) of crime reported in the target area, as well as the number of data requests/inquiries that could be made prior to the implementation of the technical solution will be collected and compared with quarterly performance measures. These quarterly performance measures will include the following: number of GSD alerts, number of incidents of crime (by type) reported in the target area; number of new cases investigated; of the cases investigated, the number of referred for prosecution or to a prosecutor; of the cases referred for prosecution, the number of cases prosecuted; of the cases prosecuted, the number of convictions; number of leads identified as a result of regional or multi-agency partnerships/collaboration; number of new formal agreements/partnerships established with other agencies; number of agencies/organizations that commit formally through a Memorandum of Understanding and informally as a results of the implementation of the technical solution; number of

agencies/organizations receiving and sharing information within and among criminal justice agencies due to the implementation of the technical solution; number of formal information data and information-sharing agreements with identified key organizations; number of governance meetings conducted within and among agencies; types of agencies/entities participating in the collaborative governance process; number of new policy or procedure templates, guidelines, or publications developed, revised, and/or rescinded; number of justice information-sharing programs implementing an evidence-based program or practice model; number and type of GSP components leveraged to support technical solution implementation; date of full implementation of Global-supported technical solution; number of personnel (analysts) hired to process and analyze the data; number of personnel trained to process and analyze the data; number of IT personnel hired to develop and maintain the data collection/sharing technology; number of internal and/or external training attended by staff; number of automated criminal justice and related cross-boundary information exchanges occurring due to the implementation of the technical solution; and number of data requests/inquiries that can be made as a result of implementing the technical solution.

Additional Attachments

In addition to the *Project Abstract*, *Program Narrative*, *Budget Detail Worksheet*, and *Budget Narrative*, please accept the following attachments which have been included for your review: *Baltimore Monthly Homicide Trends*, *Baltimore Monthly Non-Fatal Shooting Trends*, *Comparison of Homicides in Baltimore City*, *Comparison of Non-Fatal Shootings in Baltimore City*, *Protest Turns Violent in Baltimore*, and *Letters of Support*.