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To: Public Safety and Regulatory Services

From: Lt. Gregory W. Reinhardt

CC: Chief William P. McManus, AC Timothy Dolan, Inspector Scott Gerlicher

Date: December 14, 2005

Subject: Gun-fire detection systems (ShotSpotter™)

Background: Local law enforcement agencies have relied on traditional rapid street interdiction to prevent gun violence. This is a dangerous task, it oft times puts the safety of the public and police officers at risk. The right technology coupled with a dedicated and directed police response can decrease this risk. Gunfire and weapon-fire detection systems can precisely pinpoint the location of gunfire or weapon fire to the Department within in seconds, thereby speed police response, save lives, add to weapons related arrests, and increase the level of perceived and actual safety of our neighborhoods.

The problem: During the first six months of 2005 there was a significant increase in the number of homicides and aggravated assaults occurring throughout the City of Minneapolis. Many of these violent crimes had guns, drugs, and gangs as points of commonality. In addition, many of the crimes were concentrated in certain geographic areas within the 4th and 3rd Precincts. Residents were no longer feeling safe within their neighborhoods.

This summer the Department engaged in a successful program (Strategic Safety Partnership-SSP) which in fact broke the momentum of rising gang shootings and homicides. MPD leveraged its resources and maximize collaborative efforts with other law enforcement agencies and community partners. The SSP focused work help significantly decrease the number of homicides, including those motivated by gang activity or gang retaliation.

Despite this summer's success, some problematic violent crime patterns remain. Citywide robbery and aggravated assaults are each up over 20% YTD as of December 1st. The number of persons shot or shot at had declined 4% during the SSP program, but has now risen 4% YTD over last year's totals. The total number of weapons seized for evidence has increased 9% YTD. In 2005, MPD officers have been dispatched to 22% more shots fired calls of service (CFS) than last year (Y04/3381 to Y05/4141). All are indicators of rising gun violence.

Proposed Solution: Staffing increases will certainly put more officers on the street combating these types of violent crimes. The Department eagerly waits to do so with the first of its 71 new hires. Collaborative efforts with other agencies and citizen groups are helpful, but difficult to sustain over an expended period of time. There exists a third option, which enhances the

strengths of both of these and other crime reduction strategies and provides additional tactical support. Gunfire/weapon-fire detection systems.

How it Works: The firing of a gun creates a loud, impulsive sound that is detectable above background noise up to two miles away from the firing location. When a rifle is fired, a powerful sound wave of amplitude 160 dB SPL emanates from the muzzle at the speed of sound, which is approximately 1100 feet per second. Gunfire sensors analyze the incoming acoustic signals for gunshots. In order to determine the location of a gunshot, the gunshot must be detected on three or more sensors. Detection of a gunshot at a single sensor does not provide a location; it only provides the time the sound arrives at that sensor. Figure 1 illustrates how gunshot pulses arrive at different sensors at different times. A gunfire location system computes the firing location from the arrival times using standard methods (similar to those used in locating earthquake epicenters). The technique is usually called “triangulation” because a minimum of three arrival times are required to compute the three unknown variables, the gunshot location (x,y) and the firing time (t_0) [ShotSpotter 2005].

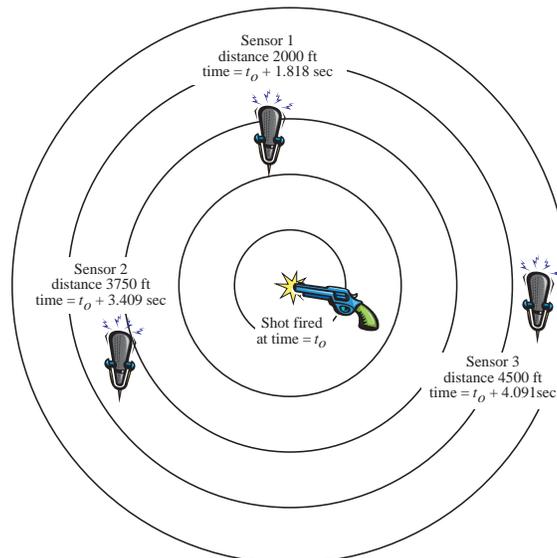


Figure 1

ShotSpotter™: MPD is interested in this technology to improve neighborhood safety and provide the much needed tactical help to augment police officers efforts. It is currently researching the available technologies and vendors who can supply this equipment. The ShotSpotter™ Gunshot Location System seems particularly well suited for MPD. ShotSpotter is a California based company which has successfully deployed gunshot location systems in several other cities nationwide including Phoenix, Glendale AZ, several cities in California, Gary IN, Rochester NY, and it is being installed in Washington D.C.

The ShotSpotter™ system uses wireless sensors (approximately 8 sensors per square mile). Anytime a gun shot is fired within the coverage area, notification would be sent to MECC within 3-6 seconds. MECC would be equipped with either a stand alone or CAD integrated system which would sound an audible alarm and show the location with address listed on a GIS map. The system can be integrated with existing cameras or with new cameras which could be

purchased and installed separately. The system records a permanent audio record of the gunfire event which can be used to enhance subsequent investigations or in court. It is portable and expandable. The initial installation of the system will cover four square miles of the high crime areas of the most shots fired and shootings.

Expected results:

- Deterrent to celebratory gunfire.
- Quicker police response to correct location.
- Quick response to Homeland Security crises.
- Improves officer and neighborhood safety.
- Identifies “hot spots” for effective police deployment
- Enhances crime analyst.
- Contributes significant evidence.

Process: The equipment and services contracted will be in excess of \$50,000. After approval from the standing review committee, the Department shall present a RFP to council for review and approval. The Department will interview qualified vendors and make selection based on meeting the City’s needs. A contract will be drafted and upon council approval executed. Installation would take place on or before June 1st, 2006.

Partnerships: Phillips and Central neighborhoods have expressed an interest to contribute up to \$45,000 to this initiative. Central Weed and Seed so strongly believe in the technology that they have allocated \$35,000 to this proposal in their 2006 budget. Other community groups are being contacted about co-sponsorship and participation.

Funding options: City 2006 Budget, Council member Gary Schiff has suggested that the city issue bonds to cover the cost of this initiative. Funds from the camera and technology line item of the police budget may also be dedicated to offset expenditures for this project.

OJP Initiative: The Office of Justice Programs (OJP), on an initiative led by Alabama Senator Shelby was successful in securing federal funding for their project of similar scope. With this initiative, the OJP would pay 75% of total cost and the City of Minneapolis would pay 25% of the total cost of the system. The IGR is currently working with the Minnesota delegation to make this an issue to be considered in 2006.

Federal Funding/COPS Grants: Rochester NY Police Department which recently installed the ShotSpotter system in their city. They were able to fund their entire system through federal appropriations by working with their U.S. Representative. There was a line item appropriation placed in a federal bill which funded the entire project. This process however, takes a lot of time (8-16 months). The funds, once approved by Congress, were forwarded to Rochester PD through a COPS technology grant. However at this time, there does not appear to be any open grant application process for other technology grants at this time.

Private corporations: Private corporations such as Target, General Mills, Allina, and Wells Fargo could be approached to assist in funding all or part of this initiative. They have been very supportive of our Strategic Safety Partnership. A gunfire detection system would compliment that

initiative very well by helping to reduce violence in the same areas of the city which our efforts have taken place throughout the summer. Funds from private corporations or foundations could be leveraged against city and Weed and Seed funds already allocated.

Leasing: ShotSpotter has indicated that the City could elect to initially lease this system. The advantage to this is that there wouldn't be a huge initial investment needed and City funds could be leveraged to expand proposed coverage areas.

Weed & Seed Funds: Central Weed & Seed has already allocated \$35,000 in their 2006 budget for the ShotSpotter system. Phillips Weed & Seed has allocated \$10,000 in their 2006 budget for ShotSpotter. These funds would be available by March of 2006. There is a possibility that both organizations could find additional funds to assist in the procurement of the system.

Conclusion: There are limited strategies that can be used to reduce gun fire and gun violence. Aggressive patrols in areas prone to gun violence seem to be a cornerstone of a police department's typical response. A gunfire detection system is not meant to replace these efforts but is an additional tool which can be used in such areas to compliment those efforts. Nor is it meant to replace citizen reports of gunfire. Both are invaluable assets. Deployment should have a profound impact on reducing gun violence in some of our most troubled areas of the city. If the ShotSpotter system is acquired, it would seem logical to widely publicize its deployment without notifying the community exactly where it is being deployed. Experience from other cities has demonstrated that gunfire detection systems creates the impression, if not the reality, that if you discharge a gun in the city you will be caught by the police. The goal is to reduce indiscriminate gunfire, reduce gunshot related injuries and deaths, and to increase arrests associated illegal gun related activities. Thank you for your attention to this matter.