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Spot the Shot

On a late winter day, police arrested three men after receiving a report of gunshots in a neighborhood of North Charleston, South Carolina. One of the men arrested was carrying a weapon that had been reported stolen just 30 minutes earlier. Although reports of shots fired are common occurrences in urban areas, in this particular incident, the report did not come from a human witness but from a gunshot location system.

At the time, the gunshot location system was not even officially operational. The installation process—testing and calibration of the sensors—had just begun when the system provided its first hit.

Two gunshot location systems produced by ShotSpotter® began operation in North Charleston and Charleston in spring 2003. At that time the National Law Enforcement and Corrections Technology Center (NLECTC)—Southeast, a program of the Office of Justice Programs' National Institute of Justice, was called in to help evaluate the technology, which relies on fixed telephone lines. In addition, NLECTC—Southeast became involved in the initial evaluation of the wireless version of the gunshot location system with the Charleston Navy Yard and the Richland County Sheriff's Department in Columbia, South Carolina. Availability of a wireless system will allow jurisdictions to choose between the original location system, which relies on fixed telephone lines but is small and inconspicuous, and the larger wireless sensors, which are not as easily hidden from the criminal element but are easily moved. The wireless system has a higher initial cost, while the landline version has ongoing telephone charges.

ShotSpotter uses a network of weatherproof acoustic sensors to record and locate gunshots and other loud noises. The system uses relative arrival times from a minimum of three acoustical sensors to triangulate and determine a location, employing technology similar to that used by geologists to pinpoint the epicenter of an earthquake.

When the sensors pick up a sound in the appropriate frequency range, the system ties into geographic information system technology and generates a colored dot on a

city map. Gunshots show as red dots; firecrackers and other loud noises have their own colors. The marked map shows a 911 dispatcher the location of the gunfire; the dispatcher can then listen to a WAV file of the report, verify it as a gunshot, and dispatch officers. The entire process usually takes no more than 6 to 10 seconds, which leads to more rapid incident dispatch that could help save victims' lives.

According to Coleman Knight, deputy director at NLECTC—Southeast¹, dispatch reports in Charleston and North Charleston have placed officers within a 20-foot range of where shots were fired. Officers can be notified via dispatch radio, cell phone, mobile data computer, e-mail, pager, or personal digital assistant. The system also records a WAV file of the number of gunshots detected by sensors. This file can be used in court to support or refute, as needed, observations by witnesses, victims, and suspects.

Officers headed toward the scene of a gunshot location system report are confident that the information came in not only quickly, but accurately, Knight says. When (and if) witnesses report gunshots heard, however, their information may be delayed and may conflict with the location and direction of the gunfire identified by ShotSpotter. The precise location information generated by gunshot location devices increases an officer's chances of finding spent casings or even catching a perpetrator with a weapon in hand. In multishot incidents, the system reports the location of each individual shot.

Charleston and North Charleston received initial funding for their gunshot location projects under the U.S. Department of Justice's Safe Neighborhoods program. The U.S. Attorney General for South Carolina chose reduction of street violence and gunfire through an initiative named Project CeaseFire. The initiative provided \$750,000 to install the two gunshot location systems, which featured 32 sensors (8 per square mile). Charleston has added eight more sensors to fill in gaps or weak areas in targeted areas and North Charleston is in the process of adding four to six more to cover gaps. The cities

selected coverage areas based on their frequent appearance on reports related to violent crimes, firearms offenses, and drug-related incidents.

For more information on gunshot location systems and the ShotSpotter evaluations, contact NLECTC–Southeast at 800–292–4385 or e-mail Charles Stephenson at stephenson@nlectc-se.org.

¹Mr. Knight passed away in January 2007, after this article was written.

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GUN LOCATION SYSTEM SUCCESSSES

In addition to Charleston and North Charleston, South Carolina, gunshot location systems have been deployed across the Nation, with more in the planning and development stages. Systems can be found in such diverse areas as Washington, D.C.; Los Angeles, California; Gary, Indiana; and Glendale, Arizona. Systems are also in use by the FBI, the U.S. Attorney's Office, the U.S. Joint Forces Command, and the U.S. Army. Successes have included the following:

- Rochester, New York. Officers responded to a shots-fired incident so quickly that a suspect was still holding a shotgun when they arrived.
- Los Angeles County, California. The sheriff's department conducted a study in target areas where a gunshot-location system was in use and found that citizens reported gunshots in only 11 percent of the cases detected by the system.
- Gary, Indiana. In one evening, use of a gunshot location system resulted in 15 multiple-charge arrests and 45 confiscated weapons.
- State of Ohio. Temporary deployment of a gunshot location system covering 90 miles of State highway helped lead to the capture of the Columbus highway sniper in 2003.
- Redwood City, California. A gunshot location system helped to reduce the threat of random gunfire in one part of town. The result? People felt safer, businesses began returning to the area, and property values increased.