



# TECH b.e.a.t

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## Within Earshot

**U**ntil recently, the Los Angeles Sheriff's Department (LASD) had no idea how many incidents of actual gunfire occurred near its Century Station, one of the highest crime areas in Los Angeles County. Some were random shots fired into the air; others were drive-by shootings. Some were nothing more than firecrackers or backfiring cars. Either way, the majority went unreported.

*But a new technology may make this lack of reporting a thing of the past. Although still in the experimental phase, gunshot detection technologies are showing promise as a new way to detect and pinpoint the location of gunfire.*

Based on acoustic sensing technology, these location systems consist of sensors or microphones that detect the sound of gunfire, transmitters that send a "location message" to the dispatch center, and a computer that receives and displays the message. When the message arrives at the police station, the dispatcher can have a patrol unit respond to the call.

LASD installed a trial system just days before the millennium New Year's Eve. The department inundated citizens with information, staging a press conference to brief everyone from the local weekly newspapers to the major television networks, national news agencies, and even the foreign media. Department officials made it clear that if a citizen fired a weapon, the system would detect it, and deputies would not hesitate to arrest the shooter. On December 31, 1999, in a brief 3-hour period, the Century Station system detected 1,100 incidents of gunfire.

LASD Deputy Tom Fortier is heading up the department's testing of gunshot location technology. Thus far, Fortier deems it a success. "Before we put in this system, we had no idea how many incidents of gunfire were occurring in our area," he says. "What we've found out is that for every 10 activations, we might get 1 call [reporting shots fired]. We have a lot more shooting out there than we ever knew about."

Gunshot location technology is based on the same premise as earthquake location technology, which uses triangulation to determine the time it takes sound or vibration to travel from a web of sensors to a certain location. With gunfire, these sensors, or microphones,

are placed at the highest point of a pole or rooftop. When the system is activated, the microphones determine the direction from which the sound originated and communicate that information back to a computer at the dispatcher's location.

The LASD system not only uses sensing technologies, it also incorporates mapping capabilities and an automatic notification system. This allows the dispatcher to manually highlight on a map the location of the gunfire and to instruct the computer to automatically telephone a message to residents in the area telling them of the shots-fired incident and asking them to call police if they have any information. Although none of these individual technologies is "new," the LASD system may represent the first time they have been merged into one device.

Last April, LASD made its first arrest as a result of the gunshot location technology tests. Deputies arrived on the scene to find two men, one of whom admitted to firing a shot in the air. Deputies found a 9mm casing next to the man, who then consented to a search of his house. Inside, officers discovered a rifle and three handguns, one of which had been reported stolen. "One in custody and four guns off the street," Fortier says with satisfaction. "We like that."

But Los Angeles County is not the only jurisdiction putting gunshot location technology to the test. SECURES (System for Effective Control of Urban Environment Security) has been in development since the mid-1990s. In 1996, the National Institute of Justice (NIJ) funded the evaluation of a SECURES setup that had been installed in Dallas, Texas, in addition to a more limited study of gunshot location technology in Redwood City, California. In this study, conducted by the University of Cincinnati, researchers from the university's Center for Criminal Justice Research concluded that while gunshot location technology is promising, its advantages and disadvantages need to be carefully considered. Three potential uses of gunshot location technology are:

**Officer Response.** Gunshot location systems have shown that most shots-fired incidents are not reported. (This was also seen in Dallas.) Of those that are, each

citizen often claims the gunshot came from a different direction. Says Fortier, from LASD, "One person will say it's coming from the east. Another person will say it's coming from the west. That makes it almost impossible for us to locate." Officers at the Century Station have discovered that with the location system they can be dispatched, and in many cases on the scene, before a 911 call comes in, if it ever does. However, when researchers in Dallas compared response times between those that were citizen initiated and those that were technology initiated, they found little difference. Also to be considered is that departments may not have the resources in place to respond to a sudden influx of shots-fired calls. In addition, gunshot location systems cannot identify the seriousness of a particular situation, which may range from celebratory to serious.

**Problem Solving.** Gunshot detection systems can be used with police data in mapping and crime analysis. They can help identify problem areas in a neighborhood and help crime analysts study the many dimensions of the problem by considering such factors as gun ownership or income level. Information taken from these systems also can help analysts determine the effectiveness of solutions.

**Crime Prevention.** Deterrence is possible, according to the study, if department officials publicize the existence of locator systems and follow up with response and arrests.

NIJ recently began funding a 12-month testing and evaluation project relating to SECURES in Austin, Texas. According to Chris Miles, program manager for the project, one goal of the study will be to make the tests statistically valuable. "In previous tests we got a sense of how the system did from the people who used it, but we didn't measure any real crime statistics," Miles says. "This time we have an entire year to work with NIJ's Office of Research and Evaluation. We'll look at things like, if crime went down, did it go down all over town or just in the neighborhood where the system was located?"

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Did the system cause crime to go down, or did it happen for other reasons?"

Unfortunately, the very nature of research and development is that nothing is ever perfect the first time. If it were, it probably would be by accident. This holds true with gunshot location technology. During its initial testing, SECURES failed to perform the triangulations. Since then, another company purchased the technology and has reworked it into a functioning, real-time, triangulating device.

The LASD system has not been problem free either. Since the trial phase officially started in March 2000, the system has required almost daily adjusting. In addition, the telephone lines transmitting the information from the microphones to dispatch have gone down for as many as 5 days at a time. "Then all of a sudden they'll start working again . . . and nobody can tell us why," Fortier says.

But rather than wait to put the perfect product into the hands of law enforcement, most inventors and manufacturers relish the chance to work directly with their intended customers. In this way they get direct feedback on how the device is working and can continuously tweak it to meet end-user needs.

***For more information about gunshot location technology initiatives being conducted by the National Institute of Justice, contact Chris Miles at 202-616-1110 or [milesc@ojp.usdoj.gov](mailto:milesc@ojp.usdoj.gov).***



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