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We're Spending Millions On This High-Tech System Designed To Reduce Gun Violence. Is It Making A Difference?

EDITOR'S PICK
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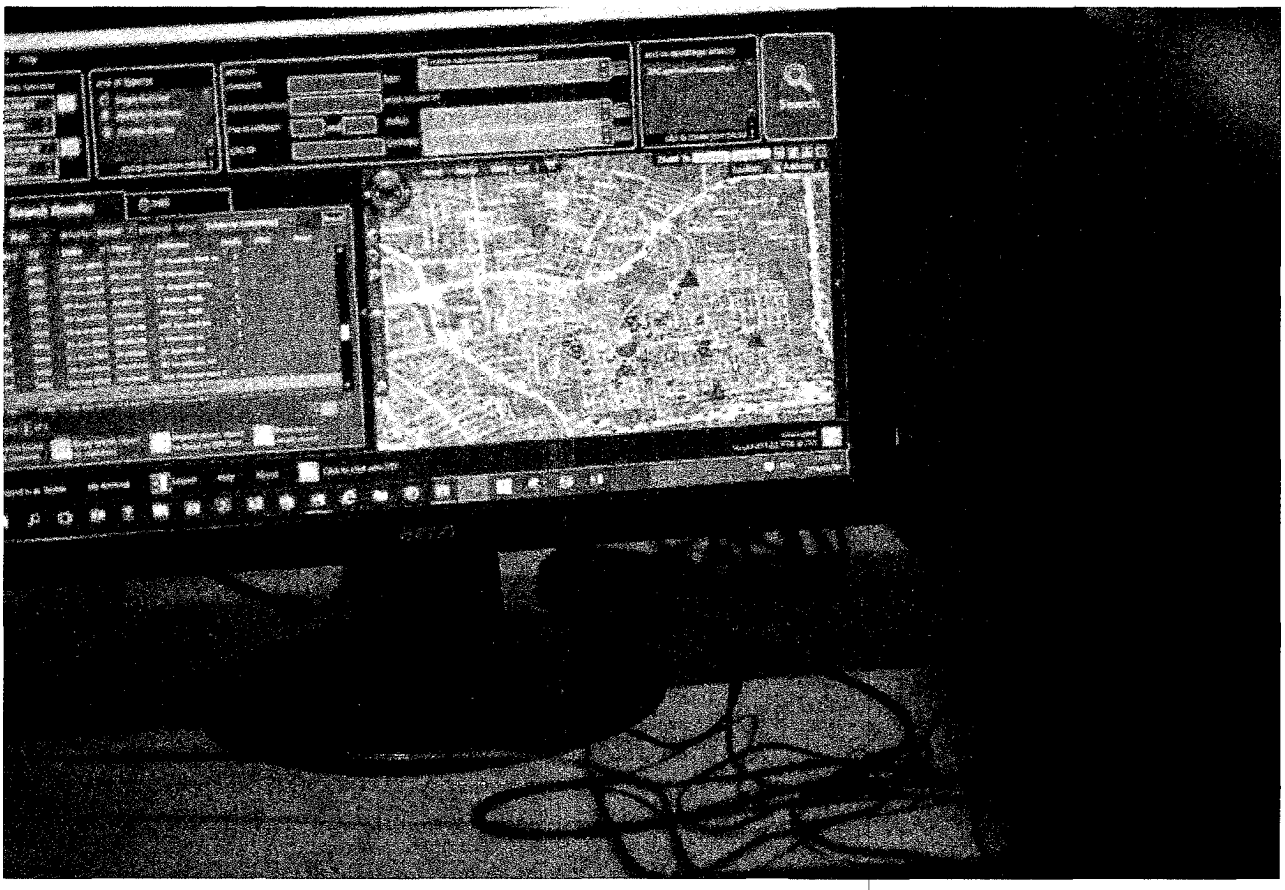

ShotSpotter is the largest gunshot detection system in the world. Installed in more than 90 cities across the United States, the technology alerts police dispatchers to suspected gunfire. (Photo by Rodger Bosch/AFP/Getty Images.)

For all the problems that Silicon Valley's technological innovations have sought t solve, there remains a particularly intractable one that still nags at Ralph Clark. The 58 year-old executive grew up in a crime-ridden neighborhood of east Oakland, an area where the steady beat of gun violence is still so persistent, Clark says, people rarely call the police to report shootings. It's the same story in cities across the country. As a result, the exact extent of illegal gunfire is a collective be guess. But what if police were alerted to suspected gunshots without residents ev picking up the phone?

Armed with a network of outdoor microphones that turn shots fired into dots on map, officers could respond to the scene more quickly and accurately than relyin on 911 calls alone. Could such a technology--relatively simple by Silicon Valley standards--help police solve crimes and reduce gun violence?

It's called ShotSpotter, and it was developed across the bay from where Clark gre up by a company called SST. That was 1994, when scientist Bob Showen was working in Menlo Park. He could hear gunshots in neighboring East Palo Alto, a Silicon Valley suburb known more for gangs and guns than startups. Showen, wh specialized in radio wave technology, wanted to know if he could detect where, exactly, the gunshots he heard were coming from. Using large microphones to isolate the staccato sound of gunfire, Showen proved that the answer is, in fact, yes. "I hadn't worked with sound waves before, but the idea of using them to triangulate the location of a gunshot seemed so elegant," he later told WIRED magazine. "In principle, the problem should have been easy to solve."

Today, ShotSpotter is used in more than 90 cities around the country. Big cities with even bigger gun violence problems, including Chicago, Los Angeles and New York, have all bought in, praising the technology for arming police officers with information they never had before. Overseeing ShotSpotter's expansion is Clark, who has more than doubled the number of customer cities since taking over as CEO in 2010. It wasn't long before Clark developed what would become his signature plan, a strategic shift that was supposed to lead to a federal contract,

elevating ShotSpotter's profile while providing steady revenue to offset an unevei stream of individual deals with cities.

But government interest in that scenario, if there ever was any, has faded. Along the way, Clark has struggled to maintain ShotSpotter's rapid growth. Some cities are opting out of their contracts, using the savings to hire additional police office and fund more traditional technologies such as surveillance cameras. This has lef the company's future in flux. Despite its presence in nearly every major metropolitan area of the country, there remains little external validation of ShotSpotter from researchers or government agencies, which often guide decisio made by local law enforcement. Now, the company may be forced to abandon pa of Clark's plan, as the CEO seeks to double down on the word-of-mouth recommendations from police that have propelled ShotSpotter to where it is toda This is the story of how it got here.

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Clark lives in an affluent part of Oakland, the kind of neighborhood where a gunshot triggers a half dozen calls to police. He keeps a ShotSpotter sensor on th roof of his home, but says it rarely goes off. He's quick to cite success stories law enforcement elsewhere have reported with his technology, rattling off dramatic anecdotes with ease. Clark is less comfortable talking about the viability of his company's 'big data play,' however. "We still have it in our objectives," he said during an interview earlier this year, before declining repeated requests for a follow-up conversation.

To find out what happened to Clark's plan, FORBES reviewed internal company documents and government records and spoke with current and former business associates of Clark's. What emerged is a picture of a company plodding along as i navigates a gun tech industry closely tied to law enforcement and beset with political pitfalls.

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SST president and chief executive Ralph Clark discusses the value of ShotSpotter. (Photo by Cody Pickens, special to FORBES.)

Clark's vision to fundamentally alter ShotSpotter's business model was hatched i the face of doubt. His idea was both simple and, for a crime-fighting technology, unprecedented: take a software as a service approach common among tech companies and apply it to crime analysis. Rather than ask customers to purchase ShotSpotter's equipment--a series of sensors that act like large microphones spread throughout a city, constantly listening for gunshots--the company would lease the system, reducing upfront costs. To make up for it, Clark would charge a annual subscription fee. In the short-term, this made implementing the technology more affordable for cash-strapped police departments and, crucially for ShotSpotter, allowed the company retain ownership of its data.

The next step would be packaging the individual datasets produced by the system and selling the information wholesale to the federal government for research purposes. If Clark was successful, he could further reduce installation costs and expand into new cities. It was an ambitious pivot and a bit of a gamble for the small, Newark, Calif.-based company, which was only used by a few dozen cities when Clark took over in 2010. The technology was there; big revenue wasn't.

Fast-forward to today, and this "big data play," as Clark puts it, has gone nowhere Clark recently lost a top lieutenant brought in from the federal Bureau of Alcohol Tobacco, Firearms and Explosives to convince the agency, and others like it, to pa ShotSpotter to access its data. Current and former ATF employees, meanwhile, sa that the privately held, venture-backed company's repeated attempts to gain a foothold with the agency are unlikely to get a jump start anytime soon. "Ultimately, we'd like the federal government to step in commercially and make ShotSpotter broadly available to a bunch of people," Clark said. "We think some [government] entity should take a leadership role in making that happen."

At nearly 20 years old, ShotSpotter is too old to call a startup, but young enough that many, including people living in cities that already deploy the technology, haven't heard of it. Based in a sleepy Bay Area suburb, ShotSpotter has convinced more than 90 law enforcement departments across the country that it can help them reduce gun violence, relying largely on anecdotal success and referrals from other police. In most big cities, violent crime is down in the two decades ShotSpotter has been detecting gunshots. At the same time, many police departments are strapped for resources following years of budget cuts. Given the situations, it's easy to see how a proprietary technology that promises to harness the power of 'Big Data' is an appealing solution.

The question isn't whether the technology works; most of the time, it does. What' unclear is whether ShotSpotter's use is actually reducing gun violence. By getting police to crime scenes faster and notifying them of gunshots they might otherwis never be aware of, ShotSpotter provides law enforcement with the most complete picture of gunfire available. And while false positives do happen (Fourth of July

and New Year's Eve celebrations are annual headaches for ShotSpotter analysts), tweaks to the system and a greater emphasis on manually weeding out false alarn have made them less frequent, police officials around the country say.

Yet, in some cities, ShotSpotter hasn't had the effect city officials and residents had hoped for. While officers are responding to more illegal gunfire, they rarely catch the shooter. And evidence that could be used to build a case and bolster a prosecution--such as shell casings left behind or witness testimony--isn't often attributed to ShotSpotter in police or court records. The question now is whether the technology is worth the millions of dollars it's costing taxpayers each year, an if the lack of tangible results is because we don't have the ability to measure them or that they simply don't exist.

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Creating a blueprint for success when traditional crime measurements are missir isn't easy. One way Clark has done this is by tightly limiting access to ShotSpotter data, while at the same time highlighting anecdotal success stories from key customer cities. "Sometimes," Clark explained, "the things that are most impactfi are the most difficult to measure."

To see what *could* be measured, FORBES obtained ShotSpotter data and supporting records, including public contracts and maps of existing systems, fror dozens of customer cities. ShotSpotter has aggressively fought the release of this information in response to both state and federal Freedom of Information Act requests. The company sent out a nation-wide memo to customers last summer, urging cities to issue blanket denials to such requests or disclose heavily redacted information, "in a form that would not harm SST's business and allow the customer to respond from a public goodwill point of view."

The data from seven customer cities are being published here for the first time. ShotSpotter alerts consist of basic metadata about when and where suspected gunshots are fired. When combined with police dispatch records that show what happened when officers responded to the alerts, a clear pattern emerges: lots of calls, but few tangible results. Of the thousands of ShotSpotter alerts in these

cities, police were unable to find evidence of gunshots between 30%-70% of the time.

While these figures surprised some veteran police officers who rely on the technology, it hasn't been an issue for ShotSpotter's directors. Randy Hawks is a longtime board member of ShotSpotter and cofounder of Claremont Creek Ventures, one of the earliest outside investors in the company. Hawks conceded that it would be beneficial to have some sort of independent study of the technology's effectiveness, but said it was unlikely to influence the decision to bu it. These decisions are more likely to be made based on recommendations from peers, Hawks said. "You'd like to see the ultimate market answer," he explained, "where a police chief won't ask 'Why should I buy ShotSpotter?' and instead it wi be his peers in other cities asking, 'Why *don't* you have ShotSpotter?'"

Clark has leveraged this strategy to grow SST's customer base. But he may be bumping up against the limits of the approach, as some cities are not finding enough reasons to justify the cost of keeping it. Typically, ShotSpotter charges between $65,000 and $90,000 per square mile per year. While less than before, it's proven too much for some cities. Charlotte, North Carolina, recently abandoned the technology in favor of installing more security cameras and hiring additional police officers. In Suffolk County, New York, ShotSpotter's future is in doubt, as officials grapple with mounting budget deficits while debating the effectiveness of a technology they've spent more than $1 million on since 2011.

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Back in Silicon Valley, investors have sunk more than $71 million into ShotSpotter, with little return so far. "One of the challenges with this, as a business, is that when you save lives, or make people's lives safer, there's no tangible ROI for that," said Gary Lauder, of the billionaire family's cosmetics empire. Lauder, through his venture firm Lauder Partners, led ShotSpotter's seri A round in 2004, a time when he said the company was "subsisting on fumes" an had a handful of contracts keeping it afloat. With Lauder's money on the table (h

says he's still the largest investor in ShotSpotter), other VC's followed suit, including Pascal Levensohn and Hawks, whose downtown Oakland office is often borrowed by Clark.

Once Clark took over, the CEO hired more sales staff to aggressively market the technology to law enforcement in other cities. At the same time, Clark began laying the foundation for his big data play, remaking ShotSpotter from a hardware-driven technology company into a data distribution service. One of Clark's key hires to implement the strategy was David Chipman, a 20-year veteran of the ATF who previously worked for the Michael Bloomberg-backed Everytown for Gun Safety, a gun control advocacy group in New York.

Clark convinced Chipman to run ShotSpotter's North America sales team in the summer of 2013. Bringing in someone with no sales experience who spent most of his career in law enforcement was a risky move. But it quickly paid off. In the two years that followed, bookings spiked under Chipman, as ShotSpotter inked contracts with new cities across the country. All the while, Chipman worked on his federal government contacts. He knew it would be an uphill battle.

Ultimately, Chipman's conversations with the ATF and other agencies failed to produce an agreement. "I don't think they were excited about buying the data," Chipman says, adding that agencies were more interested in funding individual ShotSpotter installations in new cities than buying the information wholesale. Current ATF agents who spoke to FORBES on condition of anonymity confirmed that the agency was unlikely to change its stance on this. (An ATF spokeswoman declined to comment for this story.)

Chipman quit his job at ShotSpotter in February, citing the wear of constantly travelling and the lack of a foreseeable federal contract as primary reasons for leaving. Still, he's optimistic the technology will be deployed in more cities. "A lot of why I left had nothing to do with the efficacy of [ShotSpotter]," Chipman said. I felt like I contributed what I could, which was help bring the technology to a level of legitimacy within law enforcement."

Without Chipman, Clark lost his best line of access to federal agencies, multiple people close to the CEO said. When asked whether Clark's big data play will ever come to fruition, Lauder was noncommittal, and emphasized that it wasn't part o the company's business plan before Clark took over. "All I can say is that's not wh I invested in the company," Lauder said. "It was always something that would be like icing on the cake, rather than the cake itself."

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It's not that Clark's idea--to subsidize ShotSpotter installations by reselling the data generated by existing systems--is a bad one. The majority of experts interviewed for this story said that, in theory, the idea could work. The reason it hasn't, says economist Jennifer Doleac, is because the government isn't incentivized to study gun violence the same way think tanks and academics such as herself are. Doleac is an assistant professor of public policy and economics at the University of Virginia. She's one of a handful of researchers who tried to get their hands on ShotSpotter data, only to be told it was considered "trade secret" and not subject to public records laws.

After Doleac was denied access to the information from ShotSpotter's customer cities, she turned to Clark directly. He told her the company would be happy to provide the data she was asking for, if she was willing to pay $50,000 for each cit she wanted to study. With a limited academic budget from the University of Virginia, Doleac declined. In the spring of 2014, she received a strongly-worded letter from Clark on ShotSpotter's letterhead, citing the company's shift to a "cloud-based services" model. "To put a fine point on the matter, SST's ShotSpotter information *is not crime data,"* Clark wrote.

This lack of transparency stands out in the field of public safety research. While Clark contends that preventing non-customers from accessing ShotSpotter data i in the company's best interest, the decision could limit future growth. Clark defended the letter in an interview with FORBES, and said that ShotSpotter is happy to work with outside researchers--provided that they pay for the access.

"We're saying, 'Hey, we like your idea a lot. But we're not in a position to make th available for free,'" Clark said. "Our business model depends on being able to sell it."

While ShotSpotter continues to keep a tight lid on its data, the company does release limited summary information. Each year, ShotSpotter publishes its "National Gunfire Index," with aggregate statistics from various cities. In its mos recent index, ShotSpotter said customers in 2015 saw a roughly 13 percent media reduction in total gunfire from the previous year. But criminologists warn that these self-reported figures don't tell the whole story. The approach to only analyz gunfire compared to the previous year is shortsighted, they argue, and doesn't account for long-term shifts in violent crime rates or the myriad factors that influence them.

The vast majority of ShotSpotter customers have never reviewed their own data, content to rely on the company to tell them how they are doing. The strategy has worked out well for ShotSpotter, which maintains a close relationship with many of its early customers, such as East Palo Alto. City and company officials have worked together behind the scenes putting on press conferences and publishing studies showing a decrease in violent crime, emails show. The partnership benefi both sides, as ShotSpotter gets a loyal customer that recommends the technology to other cities, and East Palo Alto gets a discount on its own system.

Despite glowing reviews from customers, the lack of outside validation may be catching up to ShotSpotter. In June, ex-Memphis police deputy chief Jim Harvey posted on his LinkedIn page a request for feedback on ShotSpotter. Harvey worked for Memphis for 33 years, most recently as its deputy chief of IT after overseeing an expansion of its extensive network of real-time crime cameras. He' now an outside consultant for the department, which is considering signing a contract with ShotSpotter.

After asking for feedback, Harvey's LinkedIn page was quickly inundated with replies. Most urged him to endorse ShotSpotter, citing their own personal

experience working with the company. None had what Harvey was looking for, however. "I have seen a lot of rhetoric from retired command staff that either wo for SST or used to work for them," Harvey wrote in response. "I am interested in data that shows an increase in arrests for gun crimes and a decrease in shots fire calls or alerts in an area. Anything short of this kind of information seems like marketing from SST. I am very skeptical of its usefulness."

When asked if he would recommend ShotSpotter's use in Memphis, Harvey told FORBES, "They haven't won me over, put it that way."

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Part of the challenge for Clark is convincing everyone else to measure gun violen the same way he does, which goes beyond gunshot victims. "Gun violence is anytime someone fires a gun, whether or not they hit anyone," Clark said. A community's acceptance of routine gun violence. A child's fear of gunfire when they go to bed. These are collateral costs of gun violence, Clark argued, and ones that ShotSpotter can address.

The company's marketing material claims its technology leads to "better community relations" and "enhanced situational awareness." But these metrics o success, however valuable or idealistic they may be, aren't necessarily the same criteria a city manager wants to see when approving a multi-million dollar contract extension. "I think the tool has great potential, and I wouldn't be at all surprised if it was having a huge public benefit. But we simply don't know," Dole said. "Someone needs to be asking the question, is this really worth it?"

So far, most cities haven't done that. Doleac said this is partly because in most cases, the initial installation is paid for with federal grant money. It's unclear exactly how many taxpayer dollars have been spent on the technology, since muc of the money is awarded to individual cities. ShotSpotter's contracts are generall hundreds of thousands of dollars per year, depending on the coverage area, suggesting that the total amount nationwide is in the tens of millions of dollars

each year. "When the local government agency is making the decision, they aren't paying for it," Doleac said. "In that situation, there's no pressure to evaluate the effects of the technology."

The lack of a clear impact hasn't stopped ShotSpotter from taking credit for reducing crime. In contract proposals submitted to customer cities around the country, the company often touts its role in successful prosecutions. This is often overstated, however.

Take Mahoning County, Ohio, for example, where ShotSpotter was used in the prosecution of a shooting that claimed the life of an elderly man mistaken for someone else. Assistant county prosecutor Dawn Cantalamessa said that playing an audio recording of the incident made it more personal for the jury. But an expert witness provided by ShotSpotter was unable to shed light on key details that would have corroborated other testimony. In the end, Cantalamessa said ShotSpotter's role in the case was minor compared to admissions the shooter made to jailhouse visitors. "We still would have been able to secure conviction [without ShotSpotter]," she said.

Much of ShotSpotter's most compelling anecdotal evidence comes from news stories, which are funneled up in reports prepared for the company's directors. One, titled "Proof: ShotSpotter Delivers Results," attributes a slew of promising results to the technology, including a reduction in violent crime and aiding police in making arrests. "Just Google 'ShotSpotter arrest,'" the document notes. "The results speak for themselves."

It's true that using ShotSpotter has led to arrests, including some where a 'smoking gun' isn't a cliche, but an actual description of a crime scene. Police dispatch records show that these instances are exceedingly rare, however, amounting to about one percent of all calls. Many cities that pay for the technolo thinking they will catch criminals in the act end up disappointed as a result. Thos close to ShotSpotter say this realization has prompted its leadership, including Clark, to consider making alert data more widely available, with the hope that empirical research could help stem the loss of customers.

For his part, Clark was steadfast in his belief that his plan will work, insisting tha it's just a matter of time. "We've been here 20 years. We'll be here another 20-50 years, God willing," he said. "The moral compass plays in our favor."

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