

ShotSpotter – Court Case Exposes Failures of ShotSpotter Technology

Executive Summary:

The *Silvon Simmons* case we recently uncovered reveals the many flaws of ShotSpotter (Nasdaq: SSTI) and why we are short the company. In *Silvon Simmons*, a police officer shot an allegedly armed black suspect (Simmons) in the back. The officer & suspect had 2 different accounts of what happened: the officer said the suspect had a gun and fired at the officer before he shot Simmons in the back, while the suspect said he was unarmed and never fired at the officer. The prosecution hinged their case on a ShotSpotter report saying there were 5 shots fired. Ultimately, the Judge ruled ShotSpotter data inadmissible, labeling it as “[unreliable scientific evidence](#).” Simmons was acquitted and is now suing ShotSpotter and the police ([Case - 6:17-cv-06176-MAT](#)).

The ShotSpotter deficiencies that *Simmons* revealed included unreliable data and results that could be modified after the fact. In addition, other courts have refused to admit ShotSpotter data because the technology has not “reached general acceptance in the scientific community” ([State of California vs Gillard - pg 54 line 27-28](#)), principally because SSTI has not done the work to get their results confirmed by independent analysis.

The *Simmons* case not only casts doubt on the integrity of the company’s data, but it also sheds further light on fundamental problems with ShotSpotter’s technology. For example, ShotSpotter initially mistook the gunshots in *Simmons* for the sound made by helicopter rotors. They failed to spot the shots. Only when the Police Department informed ShotSpotter that shots had been fired did they generate a report. That report said 4 shots were fired, so the police department informed SSTI of the officer’s story and requested them to look for more shots. Then, ShotSpotter employees modified that same forensic report (the “evidence”) again—days after the event—to say 5 shots had been fired.

This case and others have been overlooked by sell-side analysts, who maintain buy ratings and high price targets despite SSTI’s astronomical valuation (9.5x P/Sales). ShotSpotter has also changed company policies to ensure that humans, rather than their software, are reviewing & reporting possible shots fired. This is perplexing, since the company markets itself as a SaaS business.

Perhaps it is the flaws mentioned above that have led ShotSpotter to have difficulty retaining and growing their city customer base. Even after giving the product away for free for almost a year, ShotSpotter was unable to convince a customer to become a recurring payer! Fall River precinct decided against re-upping their contract after free service from SSTI because, according to the police chief, “ShotSpotter had reported too many false alarms of gunfire while missing actual shots-fired incidents in Fall River.” ([Source](#))

The Bull Case for ShotSpotter

ShotSpotter is a gunshot detection system. The company's marketing materials say that the technology detects at least 90% of gunshots fired within their deployment zones (a year ago, that ratio was 80%). Another part of SSTI's offering is that they provide detailed forensic reports and expert testimony that are meant to bolster investigation and prosecution. The overall viewpoint of customers is that it works—it's just a question of how useful it is. Some police chiefs love it ([Baltimore](#)) and others find that resources can best be deployed elsewhere ([San Antonio Police Commentary](#)). District attorneys we have spoken to are especially fond of the technology, since it enables them to play the sounds of live bullet fire inside the court room. They say it is a powerful tool for swaying the emotions of jurors.

The bull case on ShotSpotter is predicated on the company expanding its areas of coverage within existing cities, which ShotSpotter have done well so far, and on more cities signing up for ShotSpotter, which they have struggled to execute. There are also long-shot hopes of a big data play & federal government contracts, which have failed to materialize and which the company now downplays ([source](#)). Bullish investors believe that the company will finally earn an operating profit and generate positive FCF, something they have failed to do for over 20 years. Since their revenues are recurring in nature (although most are 1-year contracts), ShotSpotter has also gotten a SaaS company valuation multiple (9.5x sales) from Wall Street, despite the fact that humans are actually doing the analysis, not software.

Enter the *Silvon Simmons* Case

The cases of *NY State v. Silvon Simmons* and the follow-on lawsuit *Silvon Simmons v. Ferrigno, City of Rochester, and ShotSpotter, et al* ([Case - 6:17-cv-06176-MAT](#)) are an important challenge to the prevailing ShotSpotter investment thesis. Not only do these cases question the validity of the technology's results, but they also allege that ShotSpotter changed its report ("evidence") multiple times to comply with requests from local police. Furthermore, as part of these proceedings, the NY judge ruled that ShotSpotter data "[was not reliable enough](#)" to be the sole physical evidence in the gun possession charge against Simmons.

Legal cases are essential to analyzing ShotSpotter's effectiveness because the company avoids allowing media or investors to analyze actual data. It does this by [blocking Freedom of Information Act Requests](#) and avoiding subpoenas ([pg 10 paragraph 44](#)). Thus, court documents and testimony provide a rare glimpse into ShotSpotter's trade secrets & process.

Was it 4 or 5 shots fired? A Man's Life Hung in the Balance

Silvon Simmons is ultimately a dispute over 1 bullet. If there were only 4 shots fired, then Simmons' story was true: he was a defenseless black man shot in the back by a cop who has received over 20 citizen complaints, many for use of excessive force ([Pg 38 - Paragraph 264](#)). However, if there were 5 shots fired, then the cop's story was correct: he shot a fleeing suspect in self-defense after Silvon had fired first.

Simmons was ultimately acquitted of attempted aggravated murder against a police officer. He is now suing ShotSpotter, the police officers involved, and the City of Rochester for, among other things, “fabricating and falsifying evidence.” ([pg 30 2018-Q3-10Q](#))

Forensic evidence that supports Silvon’s story.

- DNA evidence: Simmons purportedly used a pistol, found at the scene, to fire at the police officer. DNA evidence on the gun did not match Simmons’ DNA.
- Mechanical evidence: The gun’s magazine was found empty, but the gun was not in a cocked-back position, as it should have been after firing the last round in the magazine. Thus, it is unlikely the pistol was fired.
- Gunpowder residue request denial: Simmons asked that his clothes and hands be tested for gunpowder residue, both verbally in the ambulance at the scene and again in writing while he was in the hospital under police custody. His requests were denied, and his clothes disappeared, so neither the clothes nor his hands were tested to see if he had fired a weapon.

Forensic evidence substantiating the officer’s story of a 5th shot:

- ShotSpotter: as far as we are aware, the only forensic evidence that supported a 5th shot was ShotSpotter’s modified forensic report saying there were 5 shots fired.

The reliability of ShotSpotter evidence comes into question because, according to the testimony of ShotSpotter paid expert Paul Greene and the forensic report itself, the analysis was actually changed multiple times after communicating with the local police force (ShotSpotter’s customer).

That’s right! ShotSpotter “forensic evidence” was altered twice.

ShotSpotter Change #1 – The ShotSpotter system did not catch the shots fired in real time. The critical gunshots from this case were originally mistaken for sounds from a helicopter. As a result, ShotSpotter only discovered the shots when Rochester PD contacted ShotSpotter and gave them a specific time & location of the weapon discharges. ShotSpotter’s system failed to do its one core job – detect gunshots.

Below is Paul Greene’s own testimony from the case ([Paul Greene’s LinkedIn](#)).

239. Defendant Greene acknowledged during his trial testimony at Plaintiff’s criminal trial that the system detected the incident that it classified as a helicopter, then it changed it to multiple gun shots after speaking with their customer (Rochester Police Department).

Source - Simmons vs ShotSpotter Inc, etc. 6:17-cv-06176-MAT ([Link](#))

ShotSpotter Change #2 – ShotSpotter then reported that the Simmons incident involved 3 to 4 shots fired. However, after being contacted by the Rochester PD, who asked the ShotSpotter team to look for a 5th shot, ShotSpotter changed the report. The final report matched the police officer’s testimony.

237. Defendant Greene acknowledged during his trial testimony that when he listened to the audio that was presented to the dispatcher, he could hear the sound of four (4) gunshots and subsequently he was asked by the Rochester Police Department to essentially search and see if there were more shots fired than Shotspotter picked up.

Source - *Simmons vs ShotSpotter Inc, etc. 6:17-cv-06176-MAT* ([Link](#))

Below is evidence from the Simmons case, never before seen by Wall Street, which shows multiple changes to ShotSpotter’s own forensic report. These adjustments to the evidence occurred in the days after the shooting.

Misclassification as Helicopter Noise & Reclassification as 3 Shots, Then 4 Shots



Analysis

Figure 2 – Incident review At 21:09:38 on April 01, 2016, ShotSpotter detected and located a Multiple Gunshot incident in Rochester, NY. Below is a table which shows the timeline of the incident being updated.

Source: RochesterNYWest
 Details: 4 ROUNDS
 Rounds: 4

Reclassified to Multiple Gunshots from Helicopter, Reason: per customer OIS.

Number of rounds updated from 3 to 4

Number of rounds updated from 3 to 4

Search Results: Flex ID #140660
 Source: RochesterNYWest
 Details: 4 ROUNDS
 Rounds: 4
 Zone: 281
 District: 43-160141
 Longitude: 77.643351
 Address: 9 Immel St
 CAD#: CAD#
 Date/Time: 4/1/2016 21:09:38

Figure 2 – Flex ID #140660 Incident review timeline

Change From 4 Shots to 5 Shots After Police Instruction

Conclusion

At 21:09:38 (9:09:38 PM) hours on April 01, 2016 ShotSpotter detected a Multiple Gunshot incident in Rochester, NY. ShotSpotter recorded the incident as Flex ID #140660 and located it at 9 Immel St.

After review, the locations and times of five rounds fired were calculated.

Acoustical data analysis of a gunfire incident is complex and not comprehensive. The conclusions above should be corroborated with other evidentiary sources such as recovered shell casings, and witness statements.

Source: *People of NY vs Silvon Simmons - Motion in Limine Indict No 16/404 pg 20, 26* ([link](#))

This begs the question: what other ShotSpotter forensic evidence can be changed upon request?

ShotSpotter Data can be Edited!

From further testimony by Paul Greene, the expert witness for ShotSpotter, investors learn that subscribers (police stations) and ShotSpotter are actually able to edit the audio data.

200. Defendant Paul C. Greene, manager of forensic services for Shotspotter (hereinafter "Mr. Greene"), testified at Plaintiff's criminal trial that customers who subscribe to Shotspotter have the ability to edit the audio data that is sent to them.

204. Defendant Greene testified that during the post-incident processing of a gunshot incident detected by Shotspotter sensors, Defendant Greene has the ability to alter the audio file himself.

Simmons vs ShotSpotter Inc, etc. 6:17-cv-06176-MAT ([Link](#))

If ShotSpotter data can be altered by multiple parties, how trustworthy is it?

ShotSpotter's Accuracy Claim was Invented by the Marketing Department:

In a 2017 attempted murder trial in San Francisco, Paul Greene testified that ShotSpotter's claim of 80% accuracy was invented by the marketing department.

"Our guarantee was put together by our sales and marketing department, not our engineers," Greene said. "We need to give them [customers] a number," Greene continued. "We have to tell them something. ... It's not perfect." ([source](#))

Is Precedent Being Set That Could Keep ShotSpotter Data & Testimony out of the Courts in 2 of Their Largest Markets?

In *Silvon Simmons*, the NY judge ultimately ruled that the ShotSpotter data “[was not reliable enough](#)” to be the sole physical evidence in the case.

In another case in California, *State of California v. Todd Gillard*, California Judge John Kennedy ruled ShotSpotter’s location data and Paul Greene’s testimony inadmissible because ShotSpotter has “not...reached general acceptance in the relevant scientific community”. ([pg 54 ln 20-28 – State of California vs Gillard case No 05-164004-0](#)). Despite Judge Kennedy’s ruling, which stipulated that ShotSpotter needed to have objective studies conducted and reviewed to meet the general acceptance requirements of the Kelly-Frye Rule, SSTI has failed to initiate such studies. ([pg 54 ln 1-19](#))

In fact, ShotSpotter has done exactly the opposite as far as transparency is concerned. They have coached cities on how to block Freedom of Information Act requests ([Memo to SSTI Customers, Birmingham, AL denials](#)) and have even avoided supplying data in response to subpoenas ([pg 10 paragraph 44](#)). Allowing the release of data would enable courts—and investors—to verify how accurate ShotSpotter’s technology really is.

If you are a defense attorney looking to keep ShotSpotter data out of your courtroom, you now have some powerful admissions from Paul Greene at your disposal:

- ShotSpotter & customers (Police Departments) can edit the raw audio data.
- ShotSpotter’s accuracy “guarantee” was created by their marketing department.
- The company will review & possibly change forensic reports after requests from police departments.

Why Does This Matter for ShotSpotter’s Stock?

To roll out ShotSpotter in new cities, SSTI needs both city governments and the public to be on board. The service is a large cost for police departments’ stretched budgets, so it needs to be both accurate and a net benefit for the community.

What the Simmons cases highlight is:

- ShotSpotter’s data is inaccurate – ShotSpotter missed shots fired right off the bat and then changed the analysis after the fact.
- ShotSpotter evidence is not reliable enough for some courts in California & New York – this makes it harder for other district attorneys to use the company’s forensic findings and expert witnesses in the future.
- ShotSpotter’s flaws create reason for community activists to fight ShotSpotter deployments in their cities, since police & SSTI can potentially change data, leading to wrongful convictions.

City Expansion has Stalled out for SSTI – 2.4% Organic City Growth:

The sales effort to get new cities on board is falling short. SSTI's bull case is predicated on more cities signing up for ShotSpotter's service; however, the number of sales to new customers (cities) has slowed to a crawl. The company has added only 5 net new cities in over 2 years, which amounts to 2.4% annual organic city growth.

City count in July 2016 was 90, with 4 out of the 10 largest cities in the US ([link](#)). City count as of Q3 2018 was 95, with only 3 out of the 10 largest US cities. Recent news reports published since show ShotSpotter has also added [Toronto, Canada](#); and a pilot in [Columbus, Ohio](#). Accordingly, we think they will report a Q4 2018 city count of 97.

Issues brought to light by former customers compound the problems already mentioned to make SSTI's sales effort challenging. Some recent anecdotes from canceled customers:

- Fall River, MA says ShotSpotter technology worked less than 50% of the time ([source](#)). Fall River Police Chief Al Dupree specifically cited that ShotSpotter missed detecting all 7 shots from a homicide in that city. Fall River was receiving ShotSpotter for free but did not renew their service.
- San Antonio, TX canceled service, saying that in 15 months, officers made only 4 arrests and confiscated 7 weapons that can be attributed to ShotSpotter. The technology cost the city \$136,500 per arrest. ([source](#))

Another large risk comes from ShotSpotter having a majority of their customers on 1-year contract terms ([pg 17 – 2018 Q2-10Q](#)). Thus, if dissatisfaction becomes widespread, the company could quickly see the number of cities and miles of coverage decline.

Disclosure Changes – More Humans, Less Software

SSTI markets themselves to Wall Street as a SaaS (Software as a Service) Company. This has resulted in the company's receiving a lofty valuation of 9.5x Sales. However, in Q2 2018, SSTI added an additional step to its description of the Incident Review Center's (IRC's) reporting process that reinforces how their approach is, in reality, a very human-based process.

- **Q1 2018:** If there is an interruption or delay in service from our IRC and a gunshot is detected but not reviewed in the allotted time, **our software will send an alert directly to our customers. These automatic notifications, without the benefit of review by our IRC, may be more likely to result in customers receiving a false positive alert, which could cause our customers to divert resources unnecessarily.** As a result, we could experience a decline in customer satisfaction with our solutions and our reputation and growth prospects could be harmed. ([pg 30 – 2018 Q1-10Q](#))
- **Q2 2018:** ... If there is an interruption or delay in service from our IRC and a gunshot is detected but not reviewed in the allotted time, **our software will queue the incident for off line review.** This may result in **delayed notifications to our customers** and as a result, we could experience a decline in customer satisfaction with our solutions and our reputation and growth prospects could be harmed. ([pg 32 – 2018 Q2-10Q](#))

These disclosures suggest ShotSpotter may not trust its “software” not to send false positive alerts. False positives have long been a major complaint of the company’s customers. After reviewing data from 7 cities, Forbes reported that “police were unable to find evidence of gunshots between 30-70% of the time.” ([source](#))

If the company doesn’t trust its own software to automatically send alerts, then how can public markets give ShotSpotter a software-sized valuation?

Conclusion:

We are short ShotSpotter because:

- The *Simmons* case alleges unreliable data & reports that can be changed after the fact.
- ShotSpotter’s accuracy percentage is a product of their marketing department, not their data scientists.
- ShotSpotter’s technology & testimony has been deemed inadmissible in certain courts in 2 of its major markets (CA & NY).
- ShotSpotter has made no known efforts to get independent confirmation of the validity of their data for court use.
- ShotSpotter requires human analysis to prevent false positives that their software generates.
- We believe 9.5x EV/Sales is an unsustainable valuation for this unprofitable company.

The insights into ShotSpotter’s flaws gained from the *Simmons* case shoot holes right through the Wall Street bull case.

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