Gunshot Detection: Implementation Practices, Navigating Potential Controversies, and the Impact in the Courtroom

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Webinar Agenda

- Overview and introductions.
- Recent research and public concerns.
- Gunshot detection technology implementation and lessons learned.
- Gunshot detection evidence and its role in the courtroom.
- Q&A.

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Introductions

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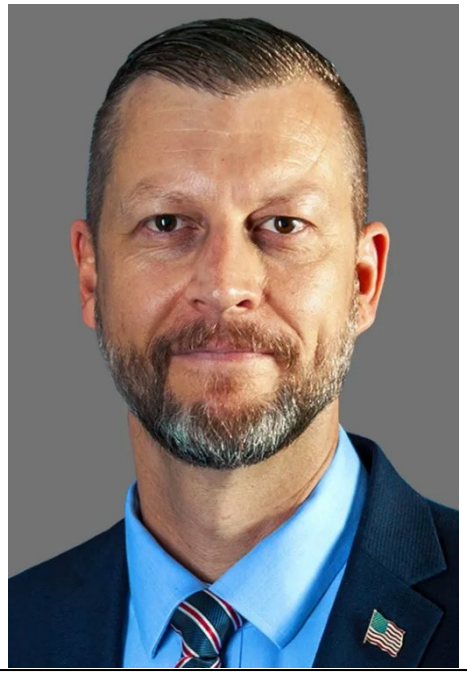

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Recent Research and Public Concerns

Dr. Dennis Mares
Center for Crime Science and Violence Prevention

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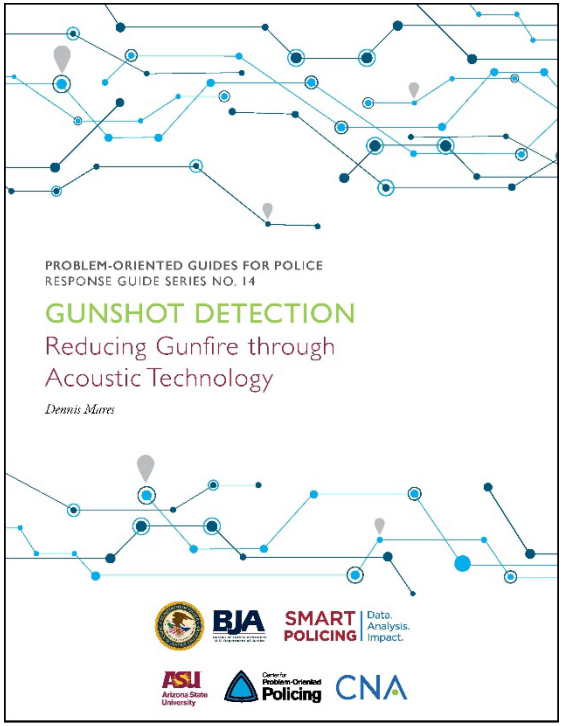
Gunshot Detection POP Guide

- Released November 2022.
- Emerging need to understand effectiveness and best practice with gunshot detection systems.
- Based on contemporary research, evaluation, and implementation in agencies.



https://www.smart-policing.com/tta/spotlight-reports/gunshot-detection-pop-guide

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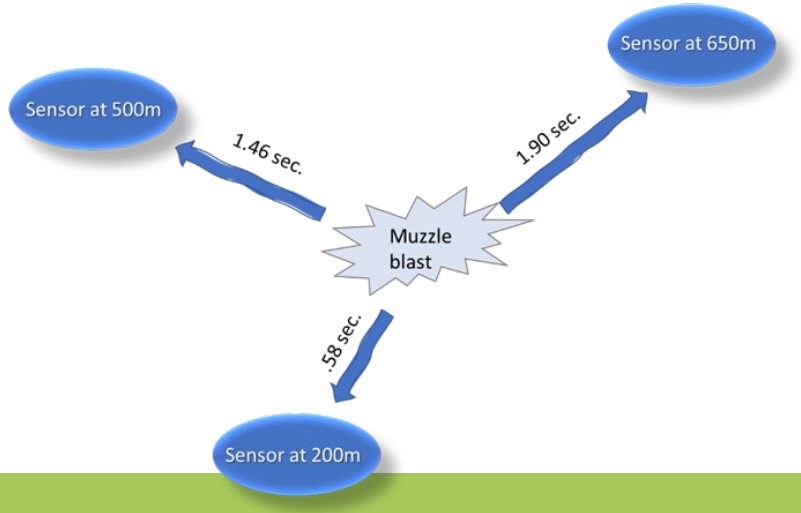
What is Gunshot Detection technology?

- Gunshot detection (GD) systems are sensors that detect loud sounds.
- Algorithm that determines if sound is gunfire.
- Forwards (automated) alert to police.



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How accurate is Gunshot Detection?

- Pinpointing origin of gunfire:
  - Highly accurate if properly triangulated.
- Gunfire vs non-gunfire:
  - Less clear and dependent on system.
    - False negative and false positives.
  - In field experiments accuracy of 80-90%.
  - In daily use, results are less clear.

Benefits of Gunshot Detection

- Documented:
  - Increased reporting of gunfire.
  - Faster response speed.
  - Quicker medical assistance/transport.
  - Increased evidence collection.
  - Accurate location and time help investigations.
- Unclear:
  - Better medical outcomes.
  - Reduction in gun violence.
  - Arrests/convictions.

Concerns with Gunshot Detection

- Privacy
  - Sensors do not continuously record.
  - Even if a conversation takes place near a sensor when gunfire erupts, the recordings are typically 10 seconds, or less, in length.
  - Even if a conversation would be audible, there is really no way to determine who the people are, especially if they were not involved in shooting.

Concerns with Gunshot Detection

- Concerns of over policing in communities of color.
  - Because gunfire is typically concentrated in disadvantaged communities an increased response could lead to:
    - (a) Increases in unjustified arrests,
    - (b) A possible increase in police use of force, or
    - (c) A general attitudinal change of officers to the area they police (more aggressive policing using alerts as pretext).

More stops and arrests?

- Most gunfire alerts occur late at night when few are out.
- A recent study by Piza and colleagues shows that GD does not contribute to additional disparities and that the stops and arrests resulting from GD alerts or calls for service from the public do not substantially differ.
  - https://link.springer.com/article/10.1007/s10940-024-09589-0
- More responses will proportionally increase stops and arrests as would similar responses to calls from the public.

Increase in use of force?

- It is reasonable to expect that use of force will occur during some responses to alerts.
  - The best response to public concerns is to have clear guidelines and training for officers who respond to these alerts.
- There is no real research that has examined this yet.
  - One way to examine this would be to compare trends in officer-involved shooting (OIS) and officer complaints before/after gunshot detection installation.
  - Another way is to explore what proportion of calls for service (CFS) and alerts have such actions attached to them.

More aggressive policing?

- The fact that an area gets gunshot detection does generally not change officers' views of an area or lead to more police attention in general.
  - Most typically the areas that have this technology have long been geographic areas with very high levels of gun violence.
- Focus on procedural justice.
- Bias training.

How can we engage the public about gunshot detection technologies?

- Current research suggests that responding to gunfire is not likely to increase dangerous interactions more than responding to similar types of calls for service by the public.
- The key thing to remember is that GD likely increases the volume of responses (given that ~80% of gunfire goes unreported).
  - OIS and arrests may well increase, however, this may also be because you get to the right people more quickly and possibly may prevent future shootings.
- Clearly, the outcomes of GD can be complex and may produce a myriad of outcomes. → Be proactive: Evaluate, evaluate, evaluate!

How do agencies best respond to concerns about equity?

- Remember - Places with the most to gain also have the most to lose.
- It is important to acknowledge community concerns and respond with factual information – this requires data tracking and effort.
  - Ensure solid response policies are in place.
  - Ensure officers are well-trained and stay up to date.
  - Equip officers with medical training & supplies (https://www.stopthebleed.org/training/).
  - Examine the data (arrests, OIS & complaints).
  - Provide transparency.
    - Develop a dashboard that display gun violence data along with GD alerts and community CFS.

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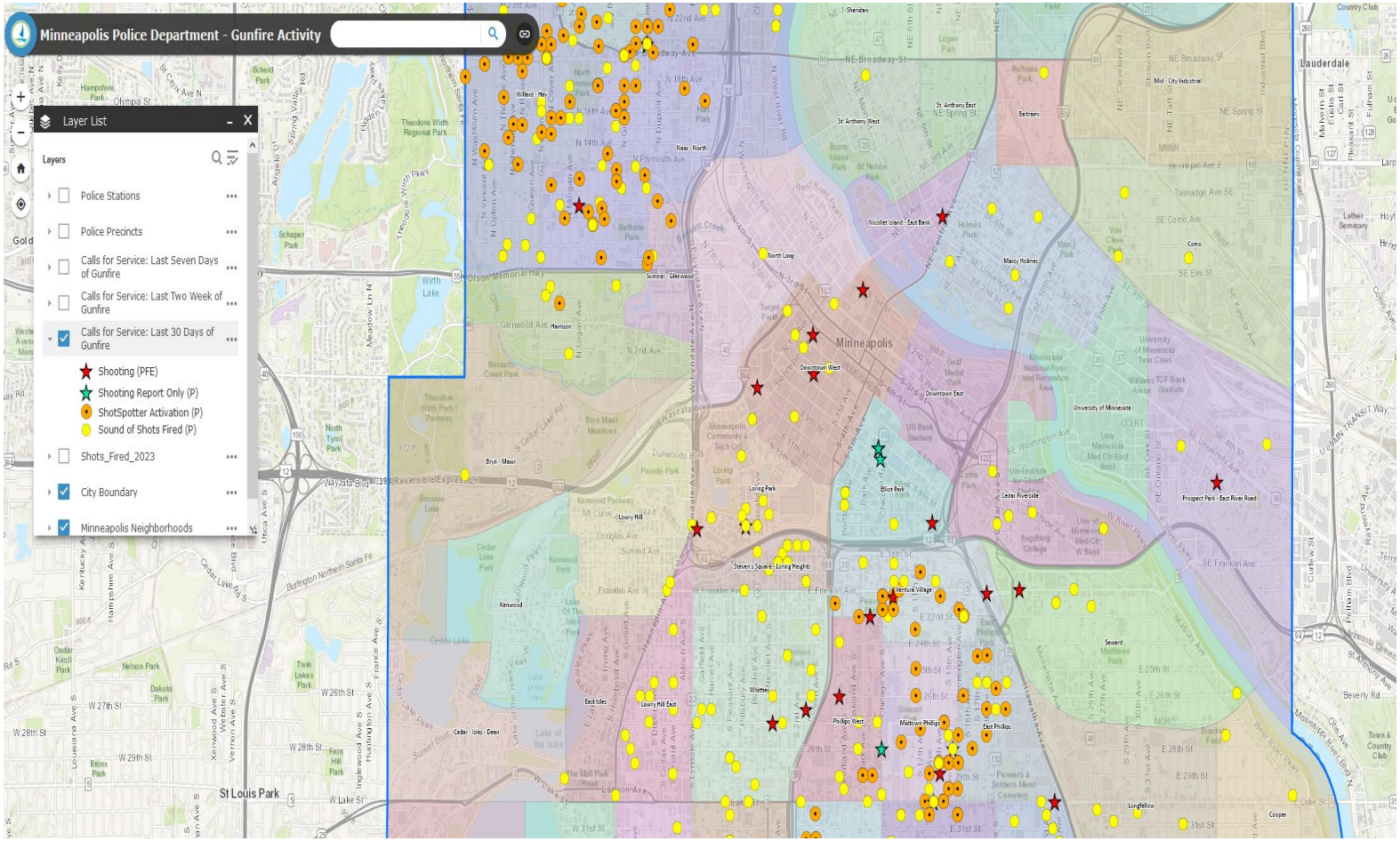
Example Dashboard



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Is Gunshot Detection Good for My City?

- That is a question that has to be answered locally.
  - How serious is your gun violence/gunfire problem?
  - Does the agency have the resources to properly respond and investigate?
  - Can you leverage other technology such as license plate readers (LPR) or closed-circuit television systems?
- Expect:
  - 200-400% increase in shots fired calls.
  - Each response, when done well, will take 30+ minutes.
  - Additional casings/projectiles (20-30% of alerts).

Implementing Gunshot Detection in Winston-Salem

Captain Amy Gauldin

Winston-Salem Police Department

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Winston-Salem, NC at a Glance

- Population: ~240,000 residents
- Geographic Size: ~133 sq. miles
- Sworn: 540 officers
- Professional Staff: 148

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Winston-Salem Police Department (WSPD) Implementation of Gunshot Detection Technology

- Data driven, precision policing.
- Three square mile coverage area.
- Coverage area determined by data associated with shootings and discharging firearms calls for service.
- System went live on August 19, 2021.
- Coordinated response with Communications and Real Time Crime Center.

Recommendations for Effective Implementation & Use of Gunshot Detection Technology

- Identify funding.
- Develop sound policy.
- Determine coverage area.
- Community engagement.
- Establish how results will be evaluated.

Steps to Successful Implementation

- Select coverage area based on most recent data.
- Identify best practices. Visit other sites that utilize the technology.
- Agency-wide training.
- Draft comprehensive policy:
  - Data tracking.
  - Report writing.
  - Response procedures.
  - Follow-up.
  - Success stories.
  - Transparency and education including elected officials and community members.

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Initial Response to Gunshot Detection Alerts

- Number of officers dispatched.
- Response type (priority level).
- CAD nature code should not change.
- Respond to precise location of alert.
- Conduct thorough canvas for victims and/or suspects.
  - Provide medical aid/request EMS.
- Conduct thorough search for evidence.
- Canvass for witnesses.
- Complete Incident Report.

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Investigative Best Practices

- Collect all gunshot data that occurred that may be associated with the incident.
- Listen to audio files.
- Review gunfire alerts for other areas around the same time that may indicate retaliatory gunfire/ongoing nature of incidents.
- Utilize all other resources (real-time crime center, LPR's, cameras, home video of neighboring residents).
- Ensure evidence is appropriately marked, stored and packaged.
- Enter evidence into National Integrated Ballistics Network (NIBIN).

Implementation Challenges

- Selection of coverage area.
- Privacy concerns.
- Data tracking.
- Buy-in from internal & external partners.
- Understanding the data.
- Report writing.

Impact of Gunshot Technology in Winston-Salem

Improved response to gunfire

- The response to Gunshot detection alert calls is significantly quicker than those called in by residents.
- Gunshot detection alert calls received significantly more investigative time, which likely indicates improved evidence recovery.
- Fewer than one in five (19.2%) of alerts also received a call from residents.

Actionable results:

- 43.3% alerts produced distinct evidence of gunfire.
- Shell casings were recovered in 36.8% of the incidents.
- Firearms were recovered in 3.7% of alerts.
- 2.3% of alerts with complete data resulted in at least one arrest.

Reduction in violent gun crimes:

- 24% reduction in assaults and homicides.

Cost-Benefits:

- Estimate suggests that Gunshot detection technology may save the Winston-Salem community between $8,425,000-$8,779,000 annually.
- This indicates a $26 return for each dollar spent.

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Gunshot Detection Evidence in the Courtroom

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Types of Evidence

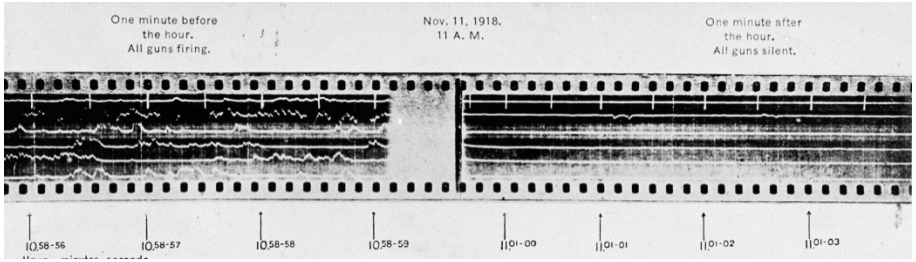
- Investigative.
- Forensic:
  - Location.
  - Rounds Fired.
  - Timing.
- Audio.

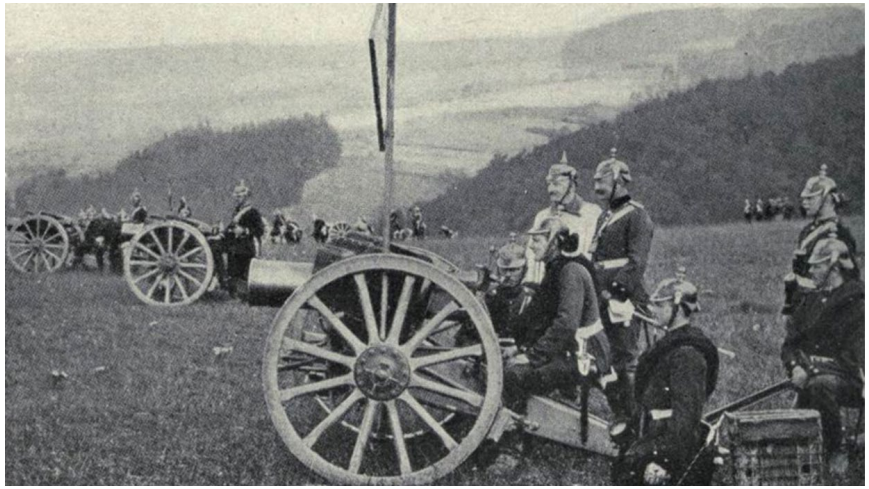
Using the Evidence

- Initiate investigations.
- Reasonable suspicion.
- Probable cause (search warrants & arrests).
- Establish timeline.
- Sync with video.
- Knowledge.
- Corroboration.
- Detention & sentencing.
- Defense.

Issues

- Discovery.
- Admitting Evidence.
- Stipulations.
- Creating a Record.
- *Frye & Daubert.*





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Questions?

Wrap Up

- Slides and a recording of the webinar will be available at:
  - https://www.smart-policing.com/events/gunshot-detection-implementation-practices-navigating-potential-controversies-and-impact
- Evaluation link after the event.
- Follow-up with slides for all that registered.

Thank you!

- SPI TTA Team -

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