



# Developing A Community-Based Gunshot Alert System

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# Statement of Belief

Individuals affected by gunfire should have access to technologies to help protect themselves and their community and to foster general peace of mind. These technologies should not be prohibitively expensive or available only to corporations, businesses, or governmental agencies.

# Project Overview

## Motivation

- Increase availability of safety and security technologies to the individual
- Similar goals as doorbell cameras and community bulletins:



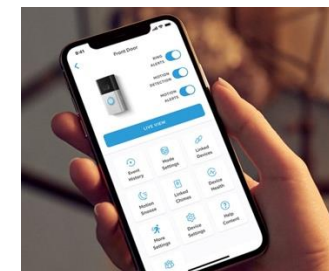
- Problems addressed by making doorbell-based camera security:



Small

\$50-100

Affordable



Directly Accessible

# Project Overview

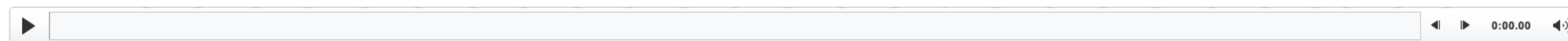
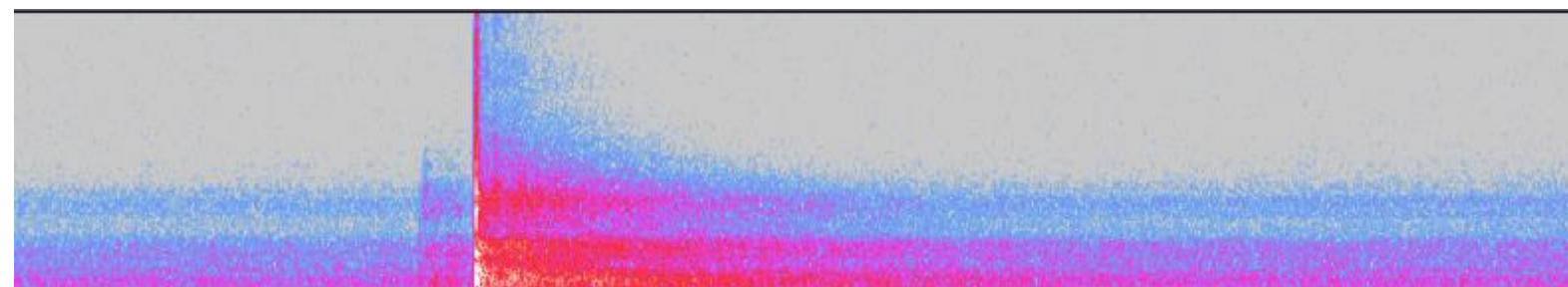
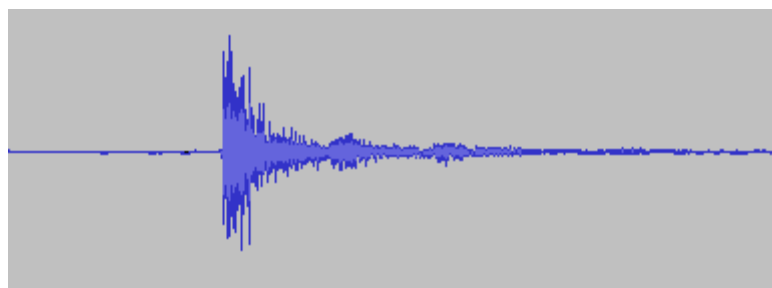
## Motivation

- Police must act with minimal imprecise information and little corroborating evidence

### Technology Can Aid In

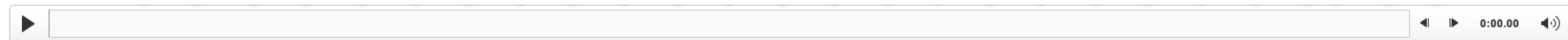
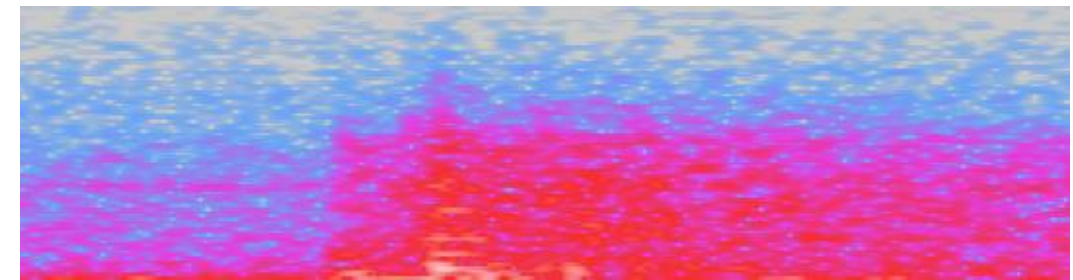
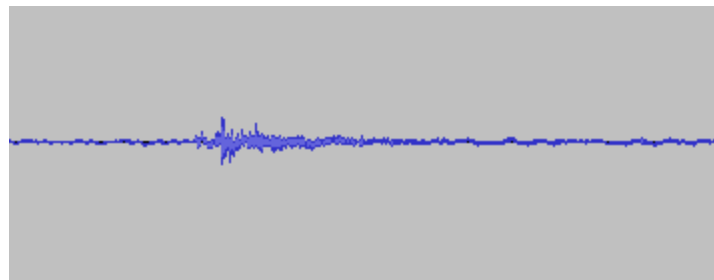
Detection of actual shots  
Counting the number of shots  
Shot localization  
Verifying called-in shots  
Assessment of threat urgency  
Improving response times

Goal is not to **replace**, but to **augment**



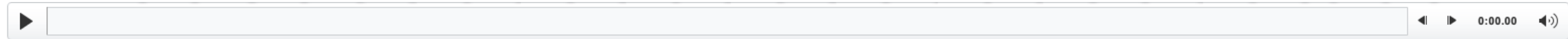
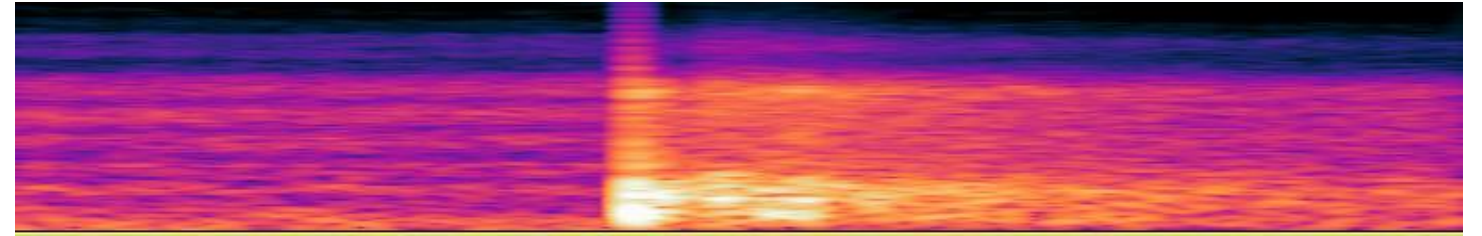
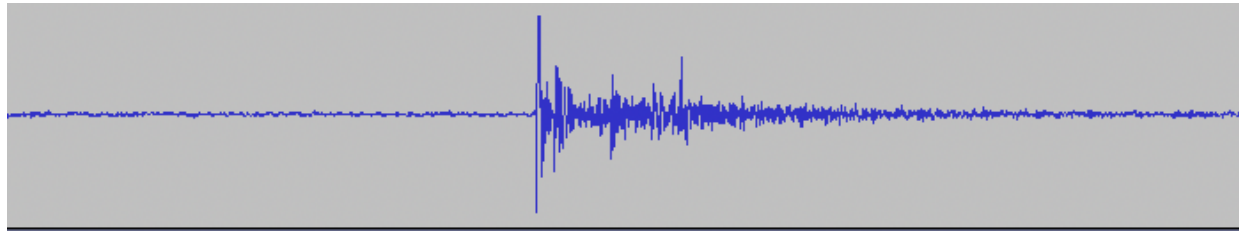
# Loud, Clear Gunshot with No Background Noise

HIGH AMPLITUDE, SHARP ONSET, MULTI-FREQUENCY



# Soft, Clear Gunshot with No Background Noise

LOW AMPLITUDE, AMBIGUOUS/FUZZY ONSET, NO HIGH FREQUENCY CONTENT



# Car Backfiring

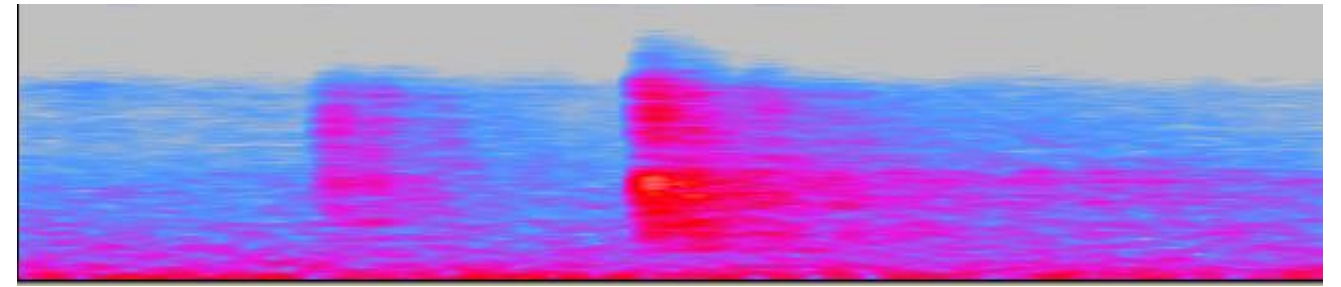
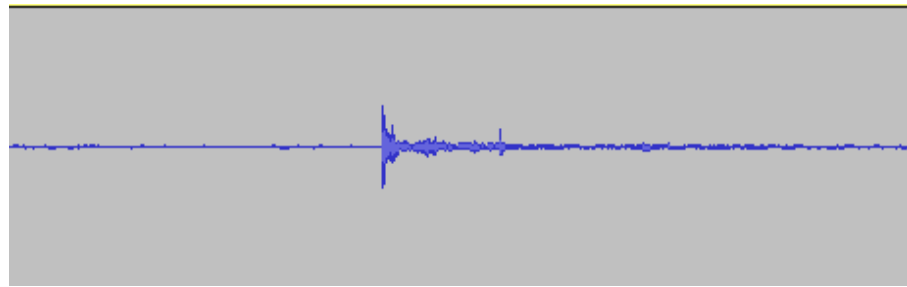
HIGH AMPLITUDE, SHARP ONSET, MULTI-FREQUENCY



# Soft, Reverbed Gunshot with No Background Noise

NEAR-ZERO AMPLITUDE, NO CLEAR ONSET, PRIMARILY LOW FREQUENCIES





# Skateboarding Jump

MEDIUM AMPLITUDE, SHARP ONSET, MISSING LOWER FREQUENCIES

# Project Overview

## System Concept

- Community-centered system where residents are involved in the sensing task and receive notifications directly
- Network of small, wall-powered acoustic sensors
  - Residents plug into an outlet on front porch or exterior of home
  - Connects to resident's wireless network
  - Detects sounds and signatures related to gunfire
  - Locates the source of the gunfire and transmits related information
- Data shared with the community and/or law enforcement via email, text, or web app
  - Voluntary nature of the system promotes a community-centered effort
  - Exact method of relaying data is an open question to address today
  - How this information will be used is another question for today

# *What types of sounds does the system <sup>NOT</sup> listen for?*

- **NO** conversations are recorded
- System is **only** activated for loud, sudden events
- No way to log into a unit and “eavesdrop”
- Audio **only** leaves device upon gunshot detection
- Evidence clips are 3 seconds long
- Identifying information tying an evidence clip to a particular residence is not reported

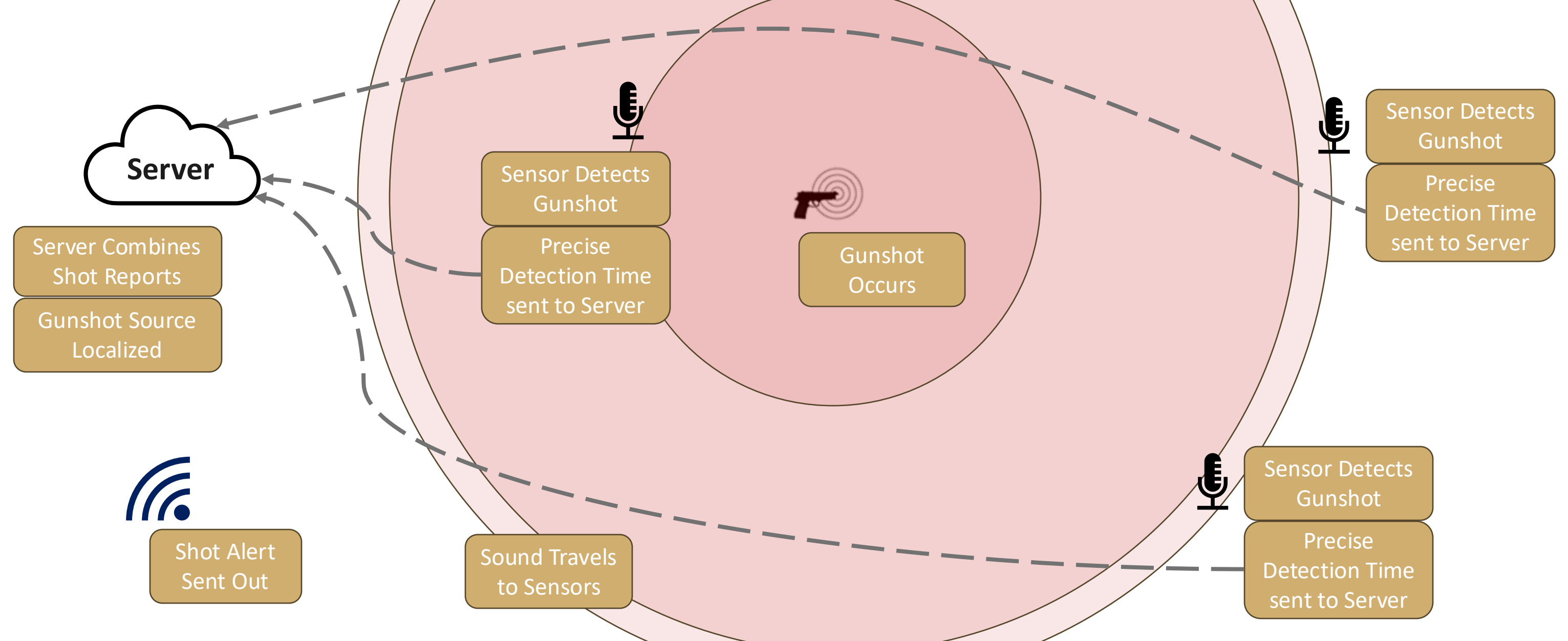


# *What types of sounds does the system listen for?*

Type of Sound	# of Clips
Airplane	3869
Backfire	52
Basketball	654
Bird Chirp	2718
Car Door	105
Car Horn	3740
Chainsaw	3075
Church Bell	3017
Clapping	17778
Coughing	1042
Crickets	2572

Type of Sound	# of Clips
Crow	1138
Dog	11557
Knocking	21234
Drill	20625
Engine	18897
Grooves	335
Explosion	157
Fireworks	813
Glass Break	934
Gun Noise	2245
Gunshot	11935

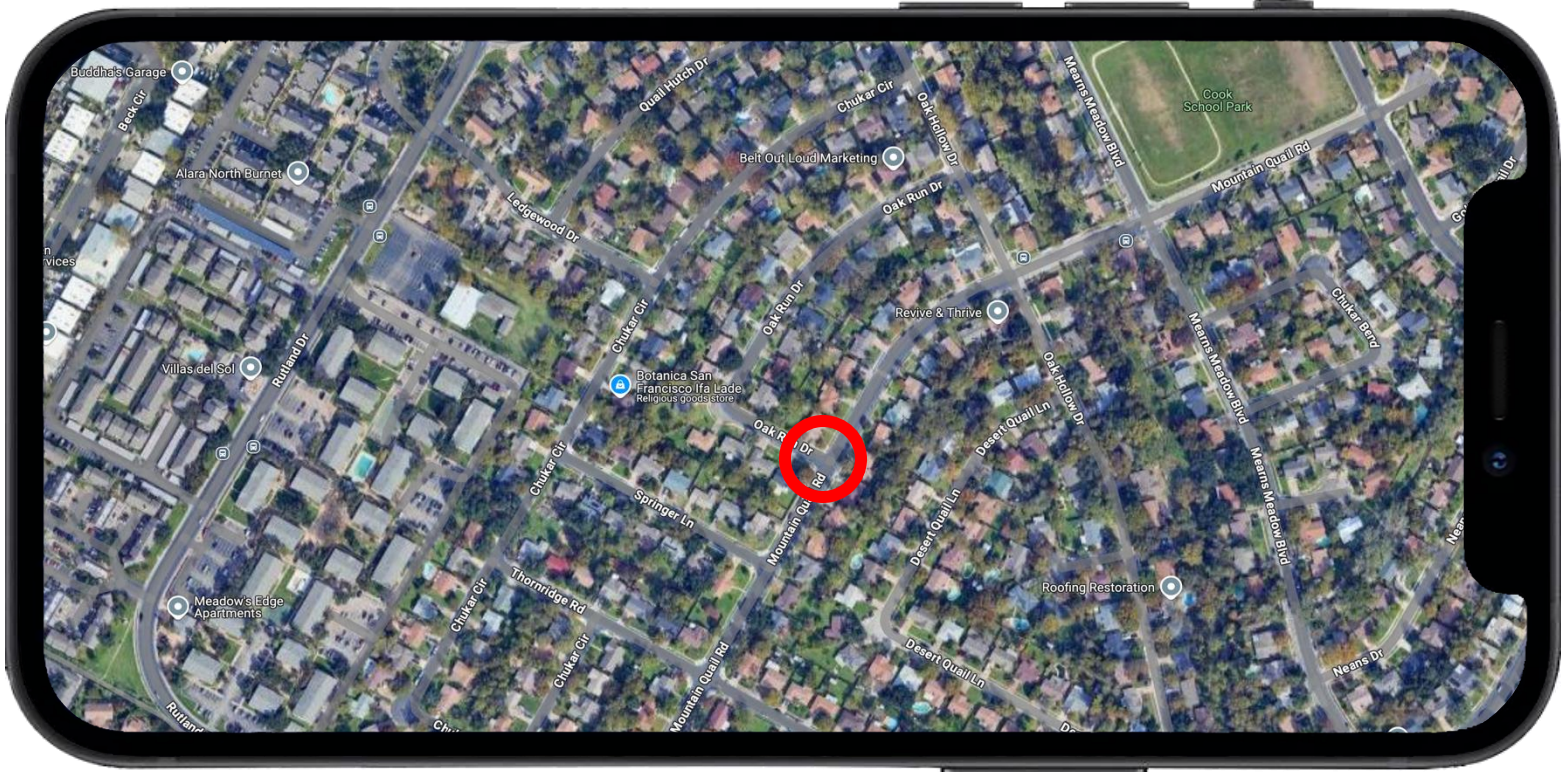
Type of Sound	# of Clips
Hammering	2248
Hand Saw	966
Helicopter	447
Jackhammer	12772
Metal Clang	3254
Siren	8844
Skateboarding	12998
Thunder	238
Train	2196
Vehicle Exhaust	118
Wind	1020



*What happens when a shot is detected?*



Gunshot Alert:  
*Potential  
Information  
Available*



Gunshot Alert Details

Incident ID:	123456
Alert Time:	2024-11-22 08:23:34 AM
Event Classification:	Gunshot
Event Confidence:	97%
Alert Clip:	<div>▶ 0:00 / 0:02 🔊 ⋮</div>

# What Do We Hope to Learn Today?

- What are the community's needs and concerns related to gun violence?
- What are the police department's needs and concerns related to gun violence?
- How can the proposed community-based gunshot locator system address both the community's and the police department's needs and concerns?

Send Panel Questions to: [qa@naca-austin.org](mailto:qa@naca-austin.org)



# Community Feedback

*How will this information be used?*

- **Rapid Response:**

- Community receives immediate alerts upon gunshot detection with an approximate block-specific location
- Allows for more precise reporting from the community and faster response times from law enforcement

- **Evidence Collection:**

- Audio clips can be used in criminal investigations to corroborate witness statements, identify suspects, and reconstruct events leading up to a shooting

- **Crime Analysis:**

- Pattern analysis by law enforcement agencies can identify hotspots, identify potential suspects or groups involved in criminal activity, and allocate resources more effectively

- **Community Policing:**

- Through information sharing about gunshot incidents, law enforcement can foster trust and collaboration with the community, leading to increased public safety

- **Personal Safety and Peace of Mind:**

- Residents can self-verify suspected gunshots and take immediate action to protect themselves



# Community Feedback

## Gunshot Alert Presentation Options

- **Direct access** of gunfire information by individuals...
  - ...through a mobile app with push alerts
  - ...via email or text message
  - ...through a dedicated web portal
- **Indirect access**, such as through integration with existing platforms:



- **Community-based access**, such as routing alerts and data to known trusted players in the community to decide how best to proceed with that information

# Questions and Discussion

Follow-Up Survey:



[tinyurl.com/naca-survey](https://tinyurl.com/naca-survey)