Category: **Engineering and Computer Science**

**Gunshot Detection Device**

Infra-sound array system for use in determining gun shots

**Problem Statement**

According to the Federal Bureau of Investigation’s “Active Shooter Incidents in the United States in 2023” report, in that year alone there were 48 active shooter incidents, resulting in 105 deaths and 139 woundings. This number of active shooter incidents is up 60% since 2019. In active shooter incidents, knowing where shots are being fired from is critical to informing police and first responder’s strategies, and ultimately to saving lives. The invention described here is an inexpensive, portable infrasound acoustic goniometer with the low-profile appearance of a smoke detector. It can determine the direction of gunshots or other events of interest and deliver that information directly police or emergency responders.

**Technology Overview**

The infrasound or acoustic goniometer may be used to determine the direction-of-arrival of certain events of interest, such as gunshots or avalanches. These events may emit a spectrum of frequencies. The goniometer can be configured to filter out other ambient frequencies to focus on just these frequencies of interest. By focusing on just these frequencies, ambient noise such as voices or other everyday events can be filtered out, allowing the goniometer to focus specifically on the unique frequencies that are emitted by the events of interest. This gunshot detection array has a similar form factor to a smoke detector. The system consists of detectors that can be installed on ceiling (like smoke detectors) with a human-machine-interface (HMI) software monitoring the status of the system. The purpose is to monitor for gunshots. The first responders need information quickly when an active shooter event occurs. By automating the process of detecting a shooter, first responders can receive critical location information quickly to assist with response protocol.

**Applications:**

First responders, hospitals, schools, residences, places of commerce, etc.

**Benefits:**

A system that could quickly detect and give the location of a shooter in these large buildings could help responders put together a response plan quicker resulting in lives saved. This would eliminate the need to sweep an entire building or different wings of a building. The goal of this system is to create a network of gunshot detectors installed in all of a building’s floors, wings, offices, etc. which can send the detection information to a central receiver (installed at a main office with the ability to contact emergency responders quickly or automatically) and upload the location information for responder use. The information can also be shared through a smartphone app.

* An inexpensive, portable goniometer.
* Easily and quickly deployed in a variety of environments.
* If the system is made small enough, the device could be mounted on top of police

cars or other vehicles to provide the emergency personnel with information regarding the direction from which gunshots are being fired.



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Patent Issued

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Phase of Development

TRL:3-4

Working Prototype

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