



Graphic by Drew Litowitz

THE PITCH

Understanding the LRAD, the “Sound Cannon” Police Are Using at

Protests, and How to Protect Yourself From It

Usage of LRADs, which can be loud enough to induce vomiting and cause ear damage, has been documented at protests across the country.

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Just as activists have raised their voices demanding justice for George Floyd and the many killed by police violence, the police have met them with their own sound: the LRAD. These audio devices, colloquially known as “sound cannons,” can be used either as conventional public address speaker systems or to generate extremely loud high-frequency sounds specifically intended for the dispersal of crowds, which can also cause pain, disorientation, and injury to those exposed to them.

Genasys, manufacturers of the LRAD, issued a press release touting its use by police departments in seven cities during the protests of the last week, including Portland, Ore., Colorado Springs, San Jose, and Fort Lauderdale. Protesters and journalists have reported their use in cities like Chicago and

New York on social media. Below, we’ve compiled a guide to the history of the LRAD, its capabilities, and best practices for protecting yourself in the event of its use and aftercare treatment if you are exposed.

What is the LRAD?

The Long Range Acoustic Device, or LRAD, is a speaker system and sound energy weapon developed in the early 2000s for use by the U.S. military. It renders sound in directional focus and at extreme volumes, allowing the user to make sound audible over greater distances, and with more geographical precision, than an ordinary loudspeaker. According to a 2004 ABC News report, LRADs have a viewfinder and crosshairs which officers can use to specifically target the location of a sound, through a process the device’s inventor compares to using a lens to magnify a beam of light.

LRADs have a microphone for speech, inputs for playback of recordings, and a built-in “deterrent tone” based on frequencies that are especially painful to the human ear. Police might use the microphone to give orders to disperse a crowd, or the deterrent tone like an invisible firehose to force its dispersal. Both Genasys and the police departments that use the LRAD tend to talk about it in terms of its public address capabilities, and it’s true that police often use it to make announcements and give orders without engaging the deterrent tone. Still, it always carries the possibility of use as a weapon. Like the gun at a cop’s side, the presence of an LRAD at a protest is an implicit threat.

Below is a video of an LRAD’s deterrent tone being used against protesters at the G20 summit in Pittsburgh in 2009. **Make sure to turn down your speakers or headphones before playing it.**

Long Range Acoustic Device (LRAD) G20 Pittsburgh



The LRAD made one of its earliest appearances in U.S. policing at the 2004 Republican National Convention in New York City. It was later used against Black Lives Matter protesters in Ferguson and New York, and at the protests against the Dakota Access Pipeline in Standing Rock. The precise number of police departments that own LRADs is unknown. But they are relatively easy for departments to acquire under a federal program known as 1033, which gives law enforcement and other municipal agencies access to surplus military equipment.

Genasys currently produces 11 LRAD models. Each has a different maximum loudness, but all have the capacity to cause acute sound trauma at the distances common in protest. The LRAD 100x, a common model for police departments, has a maximum loudness of 137 dB at one meter, with loudness gradually decreasing as distance increases. The threshold of loudness that causes pain in healthy adults is between 120 and 140 dB, which means anyone within the first 25 feet of the LRAD could experience pain or ear damage.

Sonic injury

Unlike with other police weapons, the LRAD's mechanism of injury, and the potential injuries themselves, are invisible. Still, the impact of its sound energy *is* an impact, just like a baton or rubber bullet, but its targets are the eardrums, hair cells, and organs of Corti inside your ears. A person's distance from the sound, duration of exposure, and preexisting bodily conditions all contribute to their experience and long-term impacts of the LRAD. Children, the elderly, and those with previous injuries from sound all have heightened susceptibility to sound injury.

Short-term exposure to loud noise like the LRAD's deterrent tone may cause a sensation of stuffed or ringing ears, known as tinnitus, which can cease minutes after the exposure or last for days. Other sound injury symptoms include headaches, nausea, sweating, vertigo, and loss of balance. Signs of more serious injury include vomiting and mucus or blood from the ears. Exposure to acute loud sounds can tear eardrums and destroy hair cells in the cochlea, which causes permanent hearing loss.

Loud sounds can also cause stress and distraction, and make communication among protesters more difficult. All these factors can decrease situational awareness and create a sense of confusion and isolation, filling the mind and drowning out everything else. People are more likely to trip and fall or bump into things when distracted by loud sounds. (There's a reason why you turn down the radio when you are lost in the car.)

Protecting yourself

If you think police might be using an LRAD at a protest you're attending,

bring earplugs or safety ear muffs with the highest dB-reduction rating you can find. Foam earplugs, available at many pharmacies, are inexpensive and effective. Avoid using cotton balls. According to Kansas State University speech and hearing specialist Dr. Harry Rainbolt, they “cannot block out high frequency sound and will provide no protection from high sound levels.” Noise-cancelling headphones, which focus mostly on low-frequency sounds, likewise won’t do much to protect you.

If you see police officers nearing an LRAD, let those around you know to be prepared for the possibility that they’ll use the device. If they give a verbal command to disperse over the LRAD’s public address system, it is likely that they will use the deterrent sound afterwards. This is a good time to get your earplugs in, or at least to a nearby pocket. Look for places to shelter. Sound waves deflect off dense and rigid surfaces, so brick and concrete walls are a good bet.

If the police begin using the deterrent sound and you’re not behind shelter, imagine the sound as a beam and walk perpendicularly to the direction of that beam—that is, if the LRAD is in front of you, go left or right, rather than just backing up. You don’t need to leave the scene of the gathering to escape the brunt of the device’s sound, you merely need to get out of its narrow path.

Aftercare

After exposure, check yourself and others for the symptoms outlined above. Give calm, quiet care to your companions, which should help to restore the sense of self after the dehumanizing and frightening experience of police violence. If someone is experiencing significant symptoms of sound exposure, encourage them to leave the scene and consult with a hearing

specialist to address impacts. If you can, help them to get home safely, since they may be disoriented.

If you're exposed to loud sounds from an LRAD, avoid subsequent exposure and treat the injury as you would any other, with attention and rest. Once you're safe, write down your experience in detail, so you can describe it in the event that you need to see a doctor, or in case you wish to file a complaint against the police. The ACLU of Pennsylvania has successfully sued Pittsburgh police for LRAD sonic injury, and the New York National Lawyers Guild currently has a case open for LRAD injuries at a Black Lives Matter action in December 2014.

As with any form of violence, those victimized by sound weapons need ongoing compassion and care. Continue to check in on anyone exposed to LRAD sound, or other police violence, and not only in the following days and weeks. We as a community can help lessen the long-term effects of police violence trauma if we honestly and openly care for each other, as well as advocate for legal and political change.

Daphne Carr is a street medic, scholar, and organizer completing a dissertation on the history of police sound as weapons. Muff the Police!, her zine about sound weapons, is available to print and distribute through a Creative Commons license. Her Twitter is @policiesound.

Find resources in the fight against police brutality and systemic racism, including a list of organizations to donate to if you're able, here.