

LETHAL IN DISGUISE 2

How Crowd-Control Weapons Impact
Health and Human Rights

Acoustic Weapons



ACOUSTIC WEAPONS

PROTESTERS PLUG THEIR EARS SEPTEMBER 24, 2009 AS POLICE USE A SONIC WEAPON AGAINST AN UNPERMITTED PROTEST MARCH THAT BEGAN AT ARSENAL PARK IN LAWRENCEVILLE DURING THE G-20 SUMMIT. MICHEAL HENNINGER | © PITTSBURGH POST GAZETTE, 2016, ALL RIGHTS RESERVED.

Weapon profile

Acoustic or sonic weapons (also known as long-range acoustic devices, sound cannons, hailing devices, sonic bullets, and noise bazookas) are devices that deliver very loud sounds over long distances. They can be designed to deliver painful audible or inaudible sound waves or to act more like very loud voice amplifiers to deliver voice messages or other sounds.

This technology has been used for crowd-control purposes since the early 1990s. It was originally developed by the LRAD (Long Range Acoustic Device) Corporation.²²⁴

Several other companies, including Hyperspike, now sell the weapons as well.²²⁵ According to the LRAD Corporation, these weapons are sold to police departments in more than 100 countries.²²⁶

The LRAD brand weapon has a range of 8,900 metres for intelligible speech and a maximum output of 162 decibels (dB) at one metre and can cause pain (110 – 130 dB) at 20 metres.²²⁷

A different form of acoustic weapon emits very high-pitched sounds that are audible and painful to younger people (teenagers and those in their 20s), while leaving older people (30s and older) unaffected.²²⁸ This ultrasonic

224 LRAD, "LRAD Corporation - PRODUCT OVERVIEW," accessed May 2, 2015, <http://www.lradx.com/site/content/view/15/110/>.

225 HyperSpike, "Civil and Defense," accessed March 3, 2023, <https://www.ultra-hyperspike.com/solutions/civil-and-defense/>.

226 Genasys, "LRAD The Global Leader in Acousting Hailing," accessed March 3, 2023, <https://genasys.com/>.

227 LRAD, "LRAD Corporation - PRODUCT OVERVIEW."

228 MST, "Mosquito Device Anti Loitering," *Moving Sound Technologies*, accessed May 2, 2015, <http://www.movingsoundtech.com/>.

device, sometimes branded “the Mosquito,” is used in several countries, primarily in private security settings, despite ongoing litigation against its use. It has been used as a deterrent device by the British police to disperse underage crowds with a shrill

sound and by civilians for personal use since 2008. As the marketing of these devices is unregulated, their use has the potential to expand rapidly.²²⁹

Sound origin	Sound level in decibels (dB)
Normal conversation	60 dB
Lawnmower	90 dB
Threshold of pain	110 – 130 dB, depending on tolerance
Sound cannon (continuous capability)	150 – 162 dB at 5 metres, 80 dB at 500 metres
Jet craft take-off	160 dB at 25 metres
Eardrum rupture	160 – 185 dB

Figure 12: Examples of sound levels.

Note: Adapted from “The National Institute for Occupational Safety and Health” (NIOSH): <http://www.cdc.gov/niosh/topics/noise/>²³⁰

Since the 1990s, the U.S. military and private companies have also researched ultra- or infra-sonic devices that could theoretically cause tinnitus (ringing in the ears), pain, and cognitive and/or behaviour changes at either very high or very low frequencies that might not be heard by the human ear. While there are some reports of symptoms, sometimes called “Havana syndrome,” from such devices, there is no documented evidence that these weapons exist or have ever been used.

Health effects

Sound cannons are used to emit painful, loud sounds that have the potential to cause significant harm to the eardrums and delicate organs of the ears and/or cause permanent hearing loss. The use of earplugs or firmly blocking the ears with hands can decrease the sound by 20–30 dB, but this may not be enough to avoid significant injury. Manufacturer guidelines indicate that sound cannons should only be used at a minimum distance of 10–20 metres.²³¹ There is a significant risk of injury to law enforcement officers, particularly those operating the

229 S Bungey, “London Anti-Riot Gear Gets High-Tech to Combat Youths,” *Daily Beast*, August 14, 2011, <https://www.thedailybeast.com/london-anti-riot-gear-gets-high-tech-to-combat-youths>.

230 “Noise and Hearing Loss Prevention,” *The National Institute for Occupational Safety and Health (NIOSH)*, December 5, 2014, <http://www.cdc.gov/niosh/topics/noise/>.

231 LRAD, “Memorandum: LRAD Corporation’s Position Statement on Product Classification” (LRAD Corporation, April 29, 2014), https://www.uscommunities.org/fileadmin/hb/usc/Suppliers/Safeware_Mallory/LRAD_Position_Statement_121814.pdf.

devices, who are advised to wear ear protection. In addition to auditory effects, acoustic weapons may also injure or rupture internal membranes of the middle and inner ear and, at close range, can damage other organs such as the lungs.

There is little medical literature regarding the effects of acoustic weapons on people. Some literature notes that acoustic weapons were first developed by the military and that any early evaluations of their health effects were biased and, in some cases, produced indeterminate findings. The weapons are indiscriminate, causing harm or pain to protesters, bystanders, and law enforcement, despite the narrow beam in which sound is concentrated. Abuse or lack of operator knowledge about the health effects can

easily lead to incorrect use of the weapon and exacerbate injuries. Serious questions remain about the safety and efficacy of acoustic weapons in crowd-control contexts.

What has changed?

Since 2016, there has been a rapid expansion in the manufacture and sale of LRAD and other acoustic weapons. Sonic weapons have been widely deployed in countries such as Australia,²³² Hong Kong,²³³ New Zealand,²³⁴ and the United States,²³⁵ prompting warnings from professional associations such as Audiology Australia²³⁶ and the American Speech-Language-Hearing Association.²³⁷

232 RMIT ABC Fact Check, "'Sonic weapons' were used by police in Canberra's protests, but only to broadcast messages rather than do harm," Australian Broadcasting Corporation News, 17 February 2022, <https://www.abc.net.au/news/2022-02-18/coronacheck-sonic-weapons-lrad-police-canberra-protests/100839612/>.

233 Danny Mok, "Hong Kong protests: police use controversial anti-riot sound device for first time, rejecting claims it is harmful," *South China Morning Post*, 17 November 2019, <https://www.scmp.com/news/hong-kong/society/article/3038133/hong-kong-protests-police-use-controversial-anti-riot-sound>.

234 Oscar Francis, "Revealed: Police used sound cannons against Parliament protesters," *Otago Daily Times*, 28 June 2022, <https://www.nzherald.co.nz/nz/revealed-police-used-sound-cannons-against-parliament-protesters/PIBFZEHRIEADS7SK4Y4SWM464/>.

235 Genasys Inc., "Genasys™ Inc. LRAD® Systems Deployed by First Responders and Law Enforcement for Critical Crowd Communications," *GlobeNewswire*, 04 June 2020, <https://www.globenewswire.com/news-release/2020/06/04/2043685/0/en/Genasys-Inc-LRAD-Systems-Deployed-by-First-Responders-and-Law-Enforcement-for-Critical-Crowd-Communications.html>.

236 Audiology Australia, "Position Statement: Hearing Health and the Use of Long-Range Acoustic Devices," *Audiology Australia*, November 2020, <https://audiology.asn.au/Tenant/C0000013/AudA%20Position%20Statement%20-%20Hearing%20Health%20and%20the%20Use%20of%20Long-Range%20Acoustic%20Devices.pdf>.

237 The American Speech-Language-Hearing Association, "Long Range Acoustic Devices for Crowd Control Can Cause Serious Hearing Loss and Harm: Protestors Need Ear Protection and to be Aware of the Dangers (Full Statement)," *asha.org*, 11 June 2020, <https://www.asha.org/news/2020/long-range-acoustic-devices-for-crowd-control-can-cause-serious-hearing-loss-and-harm/>.

Case study

Court limits LRAD use by New York Police Department

United States

After sustaining significant physical injuries as a result of the New York Police Department's (NYPD) use of a Long Range Acoustic Device (LRAD) sound cannon, protestors and journalists brought a lawsuit in March 2016 against the City of New York, challenging the NYPD's excessive use of force in violation of constitutional rights. The U.S. Court of Appeals for the 2nd Circuit ruled that purposely using LRAD in a manner capable of causing serious injury to non-violent protesters is a violation of the U.S. Constitution's Fourteenth Amendment prohibition against excessive force.²³⁸ In June 2018, the court ruled that the device was an instrument of force designed for "incapacitating and painful effects" and that "the problem posed by protesters in the street did not justify the use of force, much less force capable of causing serious injury, such as hearing loss."²³⁹

Subsequently, the NYPD agreed to a legal settlement that included policy changes to the NYPD's use of LRADs.²⁴⁰ Under the April 2021 settlement agreement, police officers are prohibited from using the painfully loud and high-pitched "deterrent" or "alert" tone, though they may make voice announcements

on the devices. The agreement also requires the department to change its training materials on the devices and states that while police supervisors and department lawyers may authorise the use of LRADs, officers "must make reasonable efforts to maintain minimum safe distances between the LRAD and all persons within its cone of sound."

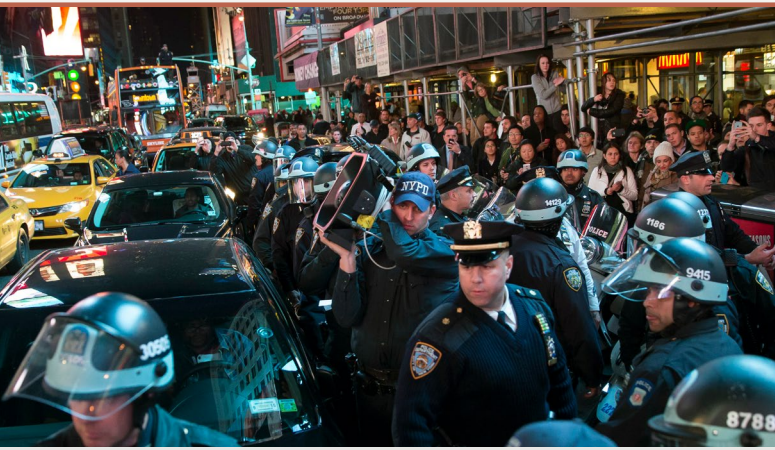
The protestors who brought the lawsuit had attended racial justice demonstrations in New York City in December 2014 in their capacity as photojournalists, observers, filmmakers, or active protestors objecting to a grand jury decision not to indict the NYPD officer who killed Eric Garner. In the early morning hours of 5 December 2014, NYPD officers employed a type of LRAD called 100X to disperse nonviolent protesters. This acoustic weapon can "project messages up to 600 metres away, produce a maximum continuous output of 136 dB at one metre away, and has the capacity to overcome 88 dBs of background noise at 250 metres."²⁴¹ NYPD officers indiscriminately employed the device's deterrent tone between 15 and 20 times over a span of three minutes. At various points, NYPD officers angled and

238 *Edrei v Bratton*, No. 17-2065 (2d Cir. 2018); available at <https://law.justia.com/cases/federal/appellate-courts/ca2/17-2065/17-2065-2018-06-13.html>.

239 *Id.*

240 Colin Moynihan, "N.Y.P.D. to Limit Use of 'Sound Cannon' on Crowds After Protestors' Lawsuit," *The New York Times*, April 19, 2021, <https://www.nytimes.com/2021/04/19/nyregion/nypd-sound-cannon-protests.html>.

241 *Edrei v City of N.Y.*, 254 F. Supp. 3d 565 (S.D.N.Y. 2017).



A POLICE OFFICER HOLDS A LONG RANGE ACOUSTIC DEVICE (LRAD), OR SOUND CANNON, AS THEY BLOCK PROTESTORS ON A MARCH THROUGH TIMES SQUARE DURING A PROTEST AGAINST A GRAND JURY'S DECISION ON MONDAY NOT TO INDICT FERGUSON POLICE OFFICER DARREN WILSON IN THE SHOOTING OF MICHAEL BROWN, TUESDAY, NOV. 25, 2014, IN NEW YORK. THE GRAND JURY'S DECISION HAS INFLAMED RACIAL TENSIONS ACROSS THE U.S.
AP PHOTO | JOHN MINCHILLO

fired the device fewer than 10 feet away from protestors.²⁴²

Due to their exposure to LRAD's ear-splitting sound, the plaintiffs suffered from physical injuries, such as "migraines, sinus pain, dizziness, facial pressure, ringing in ears, and sensitivity to noise."²⁴³ One was diagnosed with tinnitus in both ears following the NYPD's use of the LRAD, while another was diagnosed with hearing loss due to nerve damage. Another plaintiff testified that he was told by his doctor that "the pressure of the extreme level of the noise from the LRAD had pushed a bone in his ear inwards, impacting and damaging a nerve in his ear."²⁴⁴ Several of the plaintiffs named in the lawsuit say they

are now afraid to attend protests, which, for some, has negatively impacted their professional opportunities as journalists.²⁴⁵

In 2020, the company that manufactures LRADs, Genasys Inc., reported that law enforcement agencies and police departments in more than 100 countries,²⁴⁶ including 500 U.S. cities used the devices.²⁴⁷ With the policy changes resulting from the April 2021 settlement agreement, the NYPD became one of the first large U.S. police departments to ban the use of LRADs' shrill "deterrent" or "alert" tone.

242 *Id.*

243 *Id.*

244 See above n 234; Alex Pasternack, "Piercing sound can be excessive police force, federal court rules," Fast Company, June 14, 2018, <https://www.fastcompany.com/40585221/piercing-sound-can-be-excessive-police-force-federal-court-rules>.

245 *Id.*

246 LRAD, "LRAD Products," accessed March 9, 2023, "Case Study Law Enforcement," accessed March 3, 2023, [genasys.com/lrad-products/](https://www.genasys.com/lrad-products/)

247 Colin Moynihan, "N.Y.P.D. to Limit Use of 'Sound Cannon' on Crowds After Protestors' Lawsuit," The New York Times, April 19, 2021, <https://www.nytimes.com/2021/04/19/nyregion/nypd-sound-cannon-protests.html>.