



James C. Lin
University of Illinois at Chicago
851 South Morgan Street, M/C 154
Chicago, IL 60607-7053 USA
E-mail: lin@uic.edu

Weaponizing the Microwave Auditory Effect and the Havana Syndrome

James C. Lin

University of Illinois at Chicago
851 S. Morgan St. (M/C 154)
Chicago, IL 60607 USA
E-mail: lin@uic.edu

Over the past four or five years, nearly 200 US personnel have reported similarly mysterious attacks while working in places such as Havana, Guangzhou, London, Moscow, Vienna, and Washington, DC. It seems that every few months if not weeks, another mysterious attack on US diplomatic and intelligence personnel is reported, some as recent as July 2021 [1-3]. The acute symptoms include headache and nausea, immediately following the hearing of loud buzzing or bursts of sounds. The illness and symptoms have been called the Havana Syndrome, after the city where cases were first reported. This refers to the range of symptoms first experienced by US State Department personnel stationed at the American embassy in Havana, Cuba.

The reported accounts from Havana and elsewhere include targeted subjects localizing the sources of sound as coming from above or behind their heads, experiencing a directional sound that ceases if one steps away, or one person would hear the sound but no one else in the same room would hear it. The process of educated elimination would thus preclude such suggested causes as flu, tropical diseases, ultrasound, psychosomatic mass hysteria, or swarming cicadas.

Assuming that the reported accounts are reliable, the microwave auditory effect provides a scientific explanation for the Havana syndrome [4, 5]. Absorption of pulsed microwaves can create an acoustic wave inside the head [6, 7, 14]. It is possible that the loud buzzing, burst of sound, or pressure waves could have been covertly delivered using a beam of high-power pulsed microwave radiation, rather than blasting the subjects with conventional sonic sources. Microwave hearing does not go through the ear: it goes directly from the brain tissue to the cochlea. Absorption of short pulses of microwave energy by brain tissues creates a rapid expansion of brain matter and launches an acoustic wave of pressure (a sound wave) that travels inside the head to the inner-ear cochlea [6, 7, 14]. The short, microsecond-wide high-power microwave pulses do not generate measurable amounts of heat in the brain tissues.

Indeed, many researchers and government people have come to believe that the microwave auditory effect – induced by a targeted beam of high peak-power pulsed microwave radiation – may be the most likely scientific explanation for the Havana syndrome. The US National Academies of Sciences, Engineering, and Medicine’s report [8], which examined the plausible causes of the described

illnesses, makes the point that “among the mechanisms the study committee considered, the most plausible mechanism to explain these cases, especially in individuals with distinct early symptoms, appears to be directed, pulsed RF (microwave) energy.” Of course, until the truth is revealed, this specific matter will remain somewhat of a mystery. Nonetheless, the administration of President Joseph Biden says it is vigorously investigating the latest reports of the mysterious illness affecting American diplomats and intelligence personnel [9].

A growing number of researchers and government members think that some form of directed-energy microwave weapon may be involved in the Havana syndrome.

If the microwave auditory effect is weaponized, at sufficiently high powers, aside from microwave pulses causing non-lethal primary auditory pathway injury, it is likely to produce lethal and/or non-lethal damage to brain tissues by the reverberating sonic-pressure shock waves. The damage would not be by microwave pulse-induced hyperthermia through excessive temperature elevation in the brain, nor by dielectric breakdown of brain, muscle, or skin tissues [10].

It is noteworthy that the US government has announced a research program to develop low-cost, low-weight, small-size, wearable, microwave-weapon-exposure detectors [11]. The announcement acknowledged that directed energy weapons, including microwave weapons, are a growing threat on the battlefield. It also suggests that the determinants of a microwave weapon’s antipersonnel effects are multifactorial and RF injuries may be situation dependent. It envisions that in addition to being generally useful for a wide variety of military operations, commercial applications include industrial, manufacturing, and medical facilities in which personnel may be inadvertently exposed to high-power microwave sources.

Indeed, research in high-power microwaves continues worldwide, including among the major military powers [12, 14].

Apparently, the US military has maintained some interest in the topic of the microwave auditory effect, and has awarded a research contract entitled “Remote Personnel Incapacitation System” through the Navy’s small business innovative research program [12, 13]. The initial goal of the project was to design and build a prototype non-lethal weapon based on the microwave auditory effect. The transient personnel incapacitation system is dubbed MEDUSA (Mob Excess Deterrent Using Silent Audio). The weapon relies on a combination of pulse parameters and pulse power to raise the auditory sensation to the “discomfort” level to deter personnel from entering a protected perimeter. While the status or outcome of this project maybe privileged, there are indications that hardware was built, and power measurements were taken to confirm the required pulse parameters enabling observation of the

microwave auditory effect, which is an expected situation that was never in doubt.

The required microwave technology is mature and in general, commercially available in many developed countries. Longer distances and higher power scenarios would require more bulky equipment and sophisticated aiming devices, but packable equipment is possible for closer-range non-lethal applications [10, 14]. This would not preclude the use of a much higher power microwave weapon located at farther distances from the intended targets to raise the auditory sensation to the “discomfort” levels. Existing hardware could also be optimized to meet some specific requirements in covert or finely targeted operations.

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[Editor's note: This column was written in August, 2021.]