

Millimeter Wave Stun-Gun (Man-Portable Active Denial System)

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[Active Denial System \(ADS\)](#) works by directing electromagnetic radiation at a frequency of 95 GHz (i.e. millimeter waves) toward a target or subject. This frequency means the radiation is in the microwave region of the electromagnetic spectrum. In comparison, a standard microwave oven cooks food with about 2.4 GHz waves, so the ADS radiation is more energetic, but much less prone to penetrate skin (the US military says the effect "penetrates the skin to a depth of less than 1/64 of an inch"). A focused beam can be directed at targets from a range of one kilometer.

The energy in the waves turns to heat upon contact with the skin and immediately heats water molecules in the skin to around 55 C (130 degrees Fahrenheit), causing an intensely painful burning sensation.



US Defense officials hope to use the ADS to stop insurgents and rioters, without having to resort to lethal force. The leader of the US Joint Non-Lethal Weapons Directorate currently administering the program says the system falls somewhere "between bullets and a bullhorn", with the device being designed to force people to back down without the complications of killing them or innocent bystanders.

The U.S. Marine Corps and police are both working on portable versions, i.e. trying to develop a man-portable gun based on the same technology. This is very difficult task as the millimeter-wave sources used, namely "gyrotrons" (high-powered electron tubes which emit millimeter wave beams), could be hardly made portable.

Researchers at the College of Judea & Samaria (CJS) have recently developed the unique know-how allowing them to develop portable versions of ADS (Millimeter-Wave Stun Gun), based on new research to manufacture small-scale portable gyrotrons.

The development of the 95 GHz portable gyrotron to be used as the basis for a Stun-Gun prototype would cost approximately \$250,000 (U.S.), with the program running 12 months in length. A more detailed summary about the project is available upon request.



Millimeter-wave stun-gun prototype under construction in the CJS lab