US military unveils non-lethal heat ray weapon

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Two styles of US Marine Corps trucks are seen carrying the Active Denial System, March 9th, 2012, at the US Marine Corps Base Quantico, Virginia. The non-lethal weapon projects a strong electromagnetic beam up to 1000-meters. The beam creates heat so uncomfortable the natural response is to flee

A sensation of unbearable, sudden heat seems to come out of nowhere -- this wave, a strong electromagnetic beam, is the latest non-lethal weapon unveiled by the US military this week.

"You're not gonna see it, you're not gonna hear it, you're not gonna smell it: you're gonna feel it," explained US Marine Colonel Tracy Taffola, director the Joint Non-Lethal Weapons Directorate, Marine Corps Base Quantico, at a demonstration for members of the media.

The effect is so repellant, the immediate instinct is to flee -- and quickly, as experienced by AFP at the presentation.

Taffola is quick also to point out the "Active Denial System" beam, while powerful and long-range, some 1000 meters (0.6 miles), is the military's "safest non-lethal capability" that has been developed over 15 years but never used in the field.

It was deployed briefly in Afghanistan in 2010, but never employed in an operation.

The technology has attracted safety concerns possibly because the beam is often confused with the microwaves commonly used by consumers to rapidly heat food.

A view of what the operater sees when working the Active Denial System, March 9, 2012, at the US Marine Corps Base Quantico, Virginia.

"There are a lot of misperceptions out there," lamented Taffola, saying the Pentagon was keen to make clear what the weapon is, and what it is not.

The frequency of the blast makes all the difference for actual injury as opposed to extreme discomfort, stressed Stephanie Miller, who measured the system's radio frequency bioeffects at the Air Force Research Laboratory.

The system ray is 95 gigahertz, a frequency "absorbed very superficially," said Miller.

The beam only goes 1/64th of an inch (0.4 millimeter), which "gives a

lot more safety."

"We have done over 11,000 exposures on people. In that time we've only had two injuries that required medical attention and in both cases injuries were fully recovered without complications," she said.

In contrast, microwave frequency is around one gigahertz, which moves faster and penetrates deeper -- which is how it can cook meat in an oven, said top researcher Diana Loree.

With the transmitter, a wave 100 times the power of a regular microwave oven cannot pop a bag of popcorn "because the radio frequency is not penetrating enough to heat enough to internally heat the material," she stressed.

To be used in mob dispersal, checkpoint security, perimeter security, area denial, infrastructure protection, the US military envisions a wide array of uses.

And in a bid to avert accidents, Taffola said the operator's trigger, in a truck far from the action, has an automatic shut-off after 3 seconds for safety.

"This provides the safest means and also provides the greatest range," he said.

The Pentagon has not yet decided to order any of the ADS system, but Taffola said they would be ready if asked.