



"Safety" of EMP/Microwave weapons

Some weeks ago I posed the question (not on this list) on the claimed safety of electromagnetic pulsed weapons to several US scientists. The following reply covers the issue well. Especially note the statement from "An Assessment of Nonlethal Weapons and Technology 2002".

In the old Australian Standards Australia TE-7 committee meetings (now defunct RF standard setting group), industry repeatedly referred to non-thermal effects as purely "hypothetical". We still hear that mantra from industry quarters but do they really have a choice for to admit otherwise opens a Pandora's Box for them. However it seems that the US military not only has opened that box but is rapidly developing weapons based on these "hypothetical" effects.

The Iraqi civilians and hapless military personnel dragged into uniform make very convenient guinea pigs!

Don Maisch

(excerpt)

Let me say at the outset that I have never been involved in electromagnetic weapons development, but there is considerable unclassified literature from US military labs, and some of their research work has been presented regularly at open meetings of national research societies like the Bioelectromagnetics Society, though never in the context of weapons development - that is left to the listener's imagination and intuition.

The history of development of EM weapons goes back 40 years to the time of atomic weapons testing. It was noted that atomic explosions are associated with an electromagnetic pulse (EMP) sufficiently powerful to destroy transistor junctions in equipment within kilometers of the explosion. For that reason, for many years US B-52 bombers lumbered around the skies with electronic equipment largely constructed with vacuum tubes (excuse me, "valves"!). The story is that a B-52 had as many as 2500 vacuum tubes aboard!

The US and the Russians quickly recognized the potential application of EMP as a weapon. In the state of chronic anxiety characteristic of the US, there were even proposals from industry groups that all US manufactured communications equipment should have "hardened" front-ends to protect it from EMP. The US military recognized the potential for high powered pulsed microwave beams to wreck the front-ends of equipment in reconnaissance satellites, and press reports told of military programs

to revise design and construction of this equipment at a cost exceeding \$100 million.

But we move on to an era of focusing high powered pulsed microwaves into narrow beams of very intense energy. Historically, the first EMP generators were little more than a capacitor discharge in a spark gap in a cavity resonator that radiated equally in all directions. The unclassified pictures of the capacitors show them as big as bath tubs. The spectral energy distribution in such a system is typically broad and at frequencies below the microwave range. So the unclassified literature shows some ingenious techniques to shift the major spectral component well into the microwave region. One such scheme used a corrugated surface for the cavity resonator to produce a pulse with major energy at S-band (2 GHz).

Now it became feasible to use high gain parabolic antennas to transmit the pulse. Unclassified papers in this early era considered pulse power densities of 100s Megawatts/square meter. Thus began the era of "directed energy weapons" and the US program went underground and I have seen very little in the way of openly published technical details in the last 10 years - and I don't intend to go fishing.

However, the US Air Force and Boeing have carried out extensive tests of EMP generators hung on booms under helicopters, with the aim of destroying electronic equipment. A civilian Boeing employe contracted leukemia after repeated exposures to the EMPs and successfully sued Boeing. An Air Force major helicopter pilot conducting similar tests in Montana is reported to have died of leukemia. At Los Alamos National Laboratory in New Mexico, a large bomber was set up and similarly exposed until tests were suspended because of these apparent emergent personnel hazards.

The US National Academy of Sciences is publishing a report for the Naval Science Board on nonlethal weapons. The full pre-publication draft of the report has been posted on the Web. The section dealing with microwave weaponry on P39 is at:

<http://books.nap.edu/books/0309082889/html/39.html#pagetop>

The title of the Report is "An Assessment of Nonlethal Weapons and Technology 2002".

<http://search.nap.edu/books/0309082889/html/>

On Page 39, there is the following statement:

"The heating action of RF signals is well understood and can be the basis for several additional directed-energy weapons. Leap-ahead non-lethal weapons technologies will probably be based on more subtle human/RF interactions with the signal information within the RF exposure causes an effect other than simply heating: for example, stun, seizure, startle and decreased spontaneous activity. Recent developments in the technology are leading to ultrawideband, very high peak power, and ultrashort signal capabilities, suggesting that the phase space to be explored for subtle, yet potentially effective non-lethal biophysical susceptibilities is vast. Advances will require a dedicated effort to identify useful susceptibilities."

Finally, there is a quite unrelated development of high powered millimeter wave generators to act as anti-personnel deterrents. This scheme has been developed jointly by the US Marines the Air Force. It uses a 100 kW 95 GHz generator with a parabolic antenna mounted on a Humvee (large SUV) and can be used for crowd control. It induces intense skin heating at distances up to 1 km. When first announced publicly last year, the military were lyrical about its harmlessness and were about to offer to test civilian volunteers in public displays. They claimed that the 95 GHz signal only penetrated a few millimeters into the skin. I stepped in and told United Press that it was lunatic to claim safety when skin capillaries contain 60 per cent of circulating white blood cells that are the essence of our immune system and very susceptible to microwave insults. The whole dog-and-pony show went very quiet. There have been no public demonstrations.

And so, should these exposures be regarded as safe, even if single, infrequent and noncurrent? I don't think so. We come back to those essential public health tenets, at least for civilian populations, of the precautionary principle and of prudent avoidance. The Romans said it perfectly - Res ipsi loquitur, the matter speaks for itself.

(Name suppressed)

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