

depend on climatic factors, clothing, and other considerations that affect the heat loss from the individual concerned. A method for expressing dose rate in terms of body surface area (i.e., watts per square meter) rather than body mass (i.e., watts per kilogram) would permit a more reliable prediction of thermal effects across species. However, there are large uncertainties in the ability to extrapolate thermoregulatory effects in laboratory animals to those in human beings.

This technology is an adaptation of technology which has been around for many years. It is well known that microwaves can be used to heat objects. Not only is microwave technology used to cook foods, but it is also used as a directed source of heating in many industrial applications. It was even the subject of the "Pound Proposal" a few years ago in which the idea was to provide residential heating to people, not living space. Because of the apparently safe nature of body heating using microwave techniques, a variety of innovative uses of EM energy for human applications are being explored. The nonlethal application would embody a highly sophisticated microwave assembly that can be used to project microwaves in order to provide a controlled heating of persons. This controlled heating will raise the core temperature of the individuals to a predetermined level to mimic a high fever with the intent of gaining a psychological/capability edge on the enemy, while not inflicting deadly force. The concept of heating is straightforward; the challenge is to identify and produce the correct mix of frequencies and power levels needed to do the remote heating while not injuring specific organs in the individuals illuminated by the beam.

A variety of factors contribute to the attractiveness of this nonlethal technology. First, it is based on a well-known effect, heating. Every human is subject to the effects of heating; therefore, it would have a predictability rating of 100%. The time to onset can probably be engineered to between 15 and 30 minutes; however, timing is the subject of additional research to maximize heating while minimizing adverse effects of localized heating. The onset can be slow enough and/or of such frequency to be unrecognized by the person(s) being irradiated. Safety to innocents could be enhanced by the application and additional development of advanced sensor technologies. Incapacitation time could be extended to almost any desired period consistent with safety. (Given suitable R&D, temperature or other vital signs could be monitored remotely, and temperature could be maintained at a minimum effective point).

#### **Time to Onset**

The time to onset is a function of the power level being used. Carefully monitored uniform heating could probably take place in between 15 and 30 minutes. Time to onset could be reduced but with increased risk of adverse effects. Minimum time is dependent on the power level of the equipment and the efficiency of the aiming device.

#### **Duration of Effect**

Assuming that the heating is done carefully, reversal of elevated body temperature would begin as soon as the source of heat is removed.