



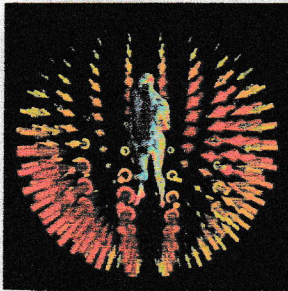
## AIRMAN SYSTEMS DIRECTORATE

### Bioeffects Division (711 HPW/RHD)

AFRL's Airman Systems Directorate is the Department of Defense (DoD) center of expertise for directed energy bioeffects research. Located at Joint Base San Antonio, TX, our research focuses on the interaction of laser and radio frequency energy with the body. Specific aims include understanding the mechanisms of action in order to exploit vulnerabilities for future directed energy weapons and protect warfighters. Our unique research facilities and team of experts enable us to investigate effects at the molecular, cellular, tissue, whole organ, and full body level resulting from laser, broadband optical sources, and high power microwave sources. Experimental discoveries help establish national and international occupational standards and support informed DoD policy decisions for fielding and use of directed energy weapons.

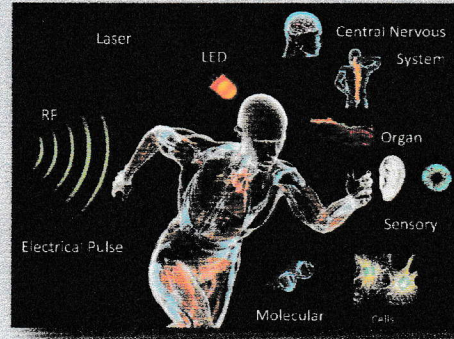
### Research Facilities

- ◆ Lasers
  - Ultraviolet, visible, near infrared
  - Ultrashort pulse, short pulse, continuous wave-long pulse, high energy surrogates
- ◆ Radio Frequency/High Power Microwave Systems
  - Direct current, radio frequency, microwave, millimeter wave, terahertz
  - Both low and high power, continuous wave & pulsed systems integrated into anechoic chambers
- ◆ High Performance Computing, Modeling & Simulation Nodes



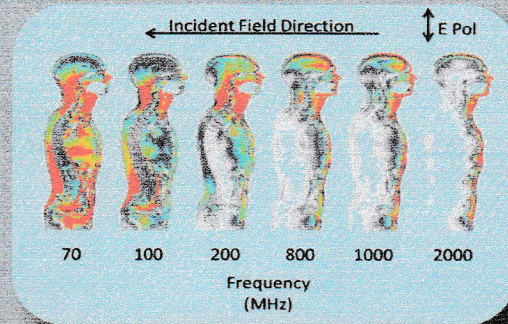
### Bioeffects & Mechanisms

- ◆ Mechanistic Response at Molecular to Organism Scales
- ◆ Neurobiological, Vision, and Behavioral Response to DE
- ◆ Supra-Threshold Response—Severity of Effects
- ◆ Discovery Science for Novel Personnel Effects



### Modeling, Simulation & Analysis

- ◆ Advanced Electromagnetic Computational Dosimetry Models
- ◆ High Performance Multi-Physics Simulations
- ◆ Physics-to-Physiology Phenomenology
- ◆ Tools for Engagement & Mission Level Simulations
- ◆ Statistical Approaches for Risk Management



### Products

- ◆ Collateral Effects/Operational Assessment Studies
- ◆ National & International Standards
- ◆ Nuclear Flash Goggles
- ◆ Modeling & Simulation Tools
- ◆ Weapon Design Specification for Laser Dazzlers, Flash Bang Grenades, Electromuscular Incapacitation Devices, Active Denial

