



Large Area Millimeter Wave Dosimetry

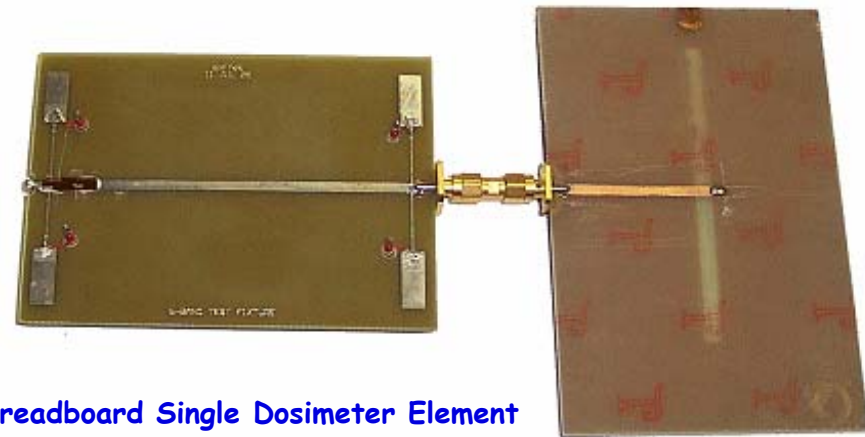


Project: FA8650-05-M-6506 PI: Dr. H. Paul Shuch, CTO, QorTek Inc. (pshuch@qortek.com)

Description and Objectives

Project will explore large-area millimeter wave dosimetric techniques to:

- Determine flux density levels at which Active Denial System (ADS) beam is both effective and non-injurious
- Calibrate emitter's electromagnetic radiation profile
- Address physiology underlying millimeter wave dosimetry and tissue heating response



Breadboard Single Dosimeter Element

Approach

Synthesis of three distinct technologies:

- Large-area microwave antenna arrays
- Thin-film thermal sensors
- DSP-based signal analysis

to facilitate large area high-sensitivity, high resolution millimeter wave flux density measurements at a distance

Partners

- Michigan Technological University
- Dr. David Nelson, Professor, Department of Biomedical Engineering

Schedule Milestones and Deliverables

Target

- | | | |
|------------|-------------------------------------------------------------------------------------|-------|
| Phase I: | Preliminary prototype design, initial component testing
(Completed, on schedule) | TRL 3 |
| Phase II: | Demonstration of 9 m ² prototype | TRL 5 |
| Phase III: | Development of system for real-time measurement in a field environment | TRL 7 |

Applications

- Testing and calibration of Active Denial Systems (94 GHz)
- Millimeter-wave radio astronomy - monitoring emission lines of interstellar:
 - HCN, 90.664 GHz
 - H₂N, 93.175 GHz
 - CS, 97.981 GHz

TRL = 3

Revised: 5 August 2005

Keywords: dosimetry, active denial, millimeter-wave, microwave, power, measurement, radiometer, antenna