

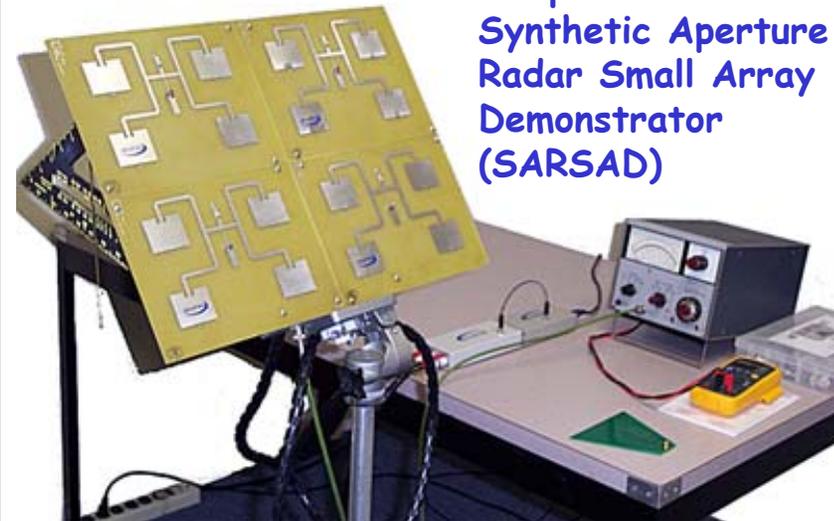
Multiband Reconfigurable Synthetic Aperture Radar Antenna



Principal Investigator: Dr. H. Paul Shuch, Chief Technology Officer, QorTek Inc.

Objectives:

- To combine advanced antenna engineering concepts with Active Tuned Dielectric Materials (ATDM) to achieve both tuning and steering by electronic means.
- To provide thin, lightweight, reconfigurable, and conformal multiband antenna arrays.
- To enhance the capability of NASA to deploy space-based Synthetic Aperture Radar (SAR) systems by designing frequency and pattern phased array antennas.



16-patch BST-tuned Synthetic Aperture Radar Small Array Demonstrator (SARSAD)

Accomplishments:

- Designed and prototyped various sixteen-patch steerable and tunable microstrip antenna arrays.
- Developed digital antenna controller hardware, software, and high-voltage interface for ATDMs.
- Explored the fabrication of pulse laser annealed Bismuth-Zinc-Niobate capacitors on Kapton.
- Fabricated low-value Barium-Strontium-Titanate interdigital variable capacitors on Alumina.
- Integrated BST capacitors as steering/tuning elements onto microstrip patch antenna substrates.
- Demonstrated limited frequency tuning and azimuth/elevation steering under computer control.
- Explored issues related to excessive dielectric losses and high-voltage breakdown of ATDMs.

Technology Development Partners:

Prof. Susan Trolier-McKinstry, Materials Research Laboratory, Pennsylvania State University
Dr. Jon-Paul Maria, Materials Science and Engineering Dep't, North Carolina State University

TRL in = 2

TRL out = 4

Submitted: 7 January 2006

