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 agile phased array antennas.

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:

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TRL in = 2         TRL out = 4         Submitted: 7 January 2006