

# Mechanically Reconfigurable Antennas

**R**esearchers at the University of South Florida have devised a novel shape shifting microwave antenna that has multiple functionalities.

Multi-function microwave communication systems can require different antenna capabilities. For example, depending on the operating mode, different center frequencies, radiation patterns, polarizations and/or beam directions may be needed. Multiple Antennas are often required to satisfy the diversity of antenna performance requirements.

Our researchers have developed a novel reconfigurable microwave antenna that allows for multiple operating modes. A primary benefit of this novel antenna design is that multiple functions are included in a single design that enables reduced system size, weight, cost and complexity. Mechanical movement of certain parts of the antenna results in tunability of the antenna resonant frequency without degrading the return loss bandwidth or radiation pattern.

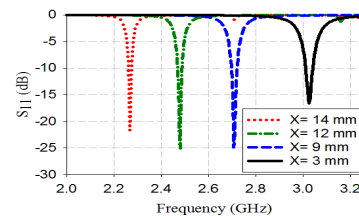
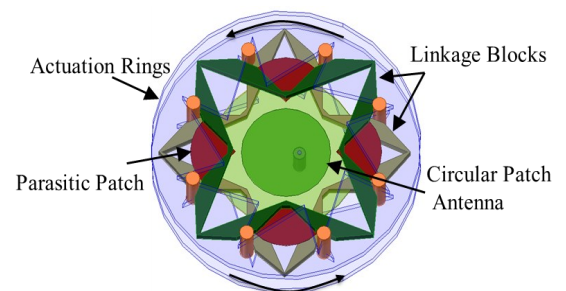
Experimental results have demonstrated tunability of the resonant frequency of > 10% with essentially constant gain and bandwidth, considerably better than what is predicted using a tunable, lossless impedance matching network. Greater than 20% tuning bandwidth has been shown for a design in which the movable elements are electrically-connected to the primary antenna element.

Reconfigurable microwave antennas are of interest in many applications, including providing secure, multi-band, and/or anti-jam capability. Virtually any antenna based, or dependent, device can benefit from this invention.

### ADVANTAGES:

- Provides secure, multiband and anti-jam capability in microwave antenna areas of interest
- Multiple functionality in a single design
- Enables reduced system size, weight, cost and complexity

### *A New Era of Reconfigurable Antennas!*



a) A CAD View of the Antenna and  
b) Simulated Reflection Coefficient for  
Different X Value