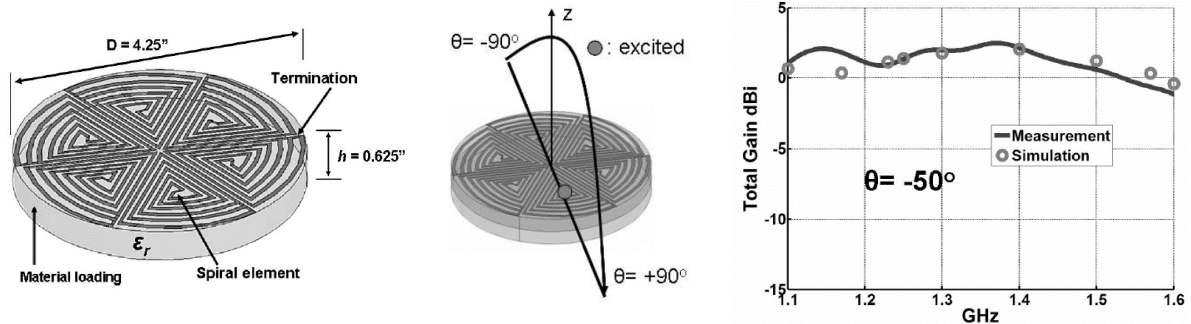


Small CRPA with Advanced Antenna Electronics for Interference Suppression in GPS Receivers

PI: Inder J. Gupta, The Ohio State University

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Under this project, we have developed a novel reduced size, controlled reception pattern antenna (R-CRPA) for GNSS receivers with excellent gain characteristics and RCP (right-hand circular polarization) performance for all GNSS frequency bands. The developed CRPA is approximately 4.25" in diameter, and 0.6" thick, making it 3 times smaller (in linear dimension) than the current GPS-1 CRPA. It consists of six antenna elements, each being a tightly wound triangular spiral shaped like a "pizza" slice. The six elements are arranged in a circular fashion to create an array that occupies a circular aperture 4.25" in diameter. Of importance is that the spiral has continuous gain of more than 0dB over the entire L frequency band, and can thus cover all navigation satellite bands. Though each individual antenna element within the spiral array does not provide complete upper hemispherical coverage, uniform upper hemispherical coverage can be readily obtained by combining the signals from the six elements. Note that the upper hemispherical coverage is obtained by fixed weights; i.e. no beam steering is carried out. Thus, the reduced size CRPA (R-CRPA) can be used with the current antenna electronics. The new R-CRPA can operate in the presence of multiple interfering signals. One can also use the new R-CRPA in beam forming / null steering mode to obtain improved performance. Under this project, we have also developed new approaches for beam forming / null steering which lead to improved C/N with small carrier phase and code phase biases.

Further Reading:

I.J. Gupta, J.L. Volakis and C.C. Chen, "A reduced size CRPA (R-CRPA) for GNSS receivers," *Proceedings of the Institute of Navigation's 2007 National Technical Meeting*, San Diego, CA, January 2007.

I.J. Gupta, et. al., "R-CRPA with advanced antenna electronics for interference suppression in GPS receivers," Technical Report 746801-1, The Ohio State University ElectroScience Laboratory, February 2008.