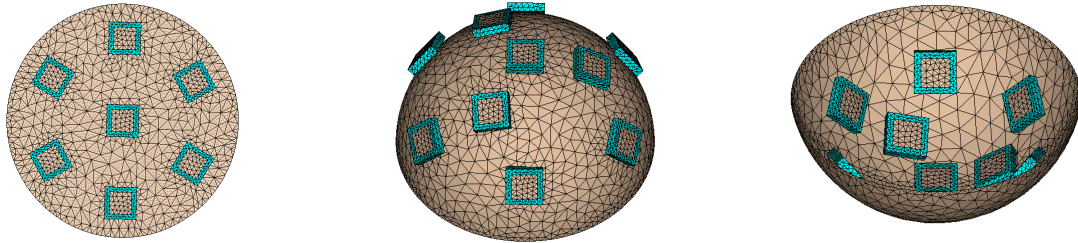


## Non-Planar Antenna Arrays for GPS Receivers

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State-of-the-art Controlled Reception Pattern Antennas (CRPAs) for GPS receivers are planar antenna arrays. Because of the planar nature of these antennas, resolution in an elevation plane is somewhat limited in that if the antenna is mounted in a horizontal plane, then the nulls along the interfering signals extend significantly in the elevation plane. This is especially true for low elevation interfering signals. This can lead to the loss of low elevation GPS satellites, which is undesired for a good PVT solution. One way to increase the resolution in the elevation plane is to use non-planar CRPAs with GPS receivers. Under this project, we have investigated the AJ performance of non-planar CRPAs when used with GPS receivers. Under Phase I of this research effort, we demonstrated that non-planar should have convex surface for performance improvement (as compared to planar antennas). Also, one can add more elements to convex non-planar antennas for further improvement in performance. Under Phase II, we performed an in-depth study of convex non-planar antenna arrays for GPS receivers. Based on this study, a 2" high and a 6" high non-planar antenna were designed. Both antenna arrays have twelve elements that are optimally distributed. Under a Phase II option, we build a 6" high, 7-element non-planar antenna. The performance of the antenna was verified by measurements in an anechoic chamber.

### Further Reading:

I.J. Gupta, J.A. Ulrey, C.J. Reddy and C.B. Ravipati, "Non-planar controlled reception pattern antennas for GPS receivers," *Proceedings of Institute of Navigation's GNSS 2006*, Fort Worth, TX, September 2006.

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