

Beam Steering/Nulling in GPS receivers Mounted on Rotor-Crafts

PI: Inder J. Gupta, The Ohio State University

Sponsor: Navy SBIR, (PaneraTech, Chantilly; VA is the Prime)



For precise navigation in the presence of interfering signals, one uses adaptive antenna arrays with GPS receivers. These antennas have beam steering and nulling capabilities. For optimum performance beam steering should be carried out using *in situ* array manifold of the antenna. When a GPS receiver is mounted on a rotorcraft, the *in situ* array manifold of the antenna vary with the blade position. Thus, one has to constantly update the beam steering weights and also needs to know the blade position as well as the array manifold for that blade position, which is not very desired. Under this research effort, we are investigation the performance of GPS receivers with adaptive antennas when the beam steering weights are selected independent of the blade positions; i.e. the same set of constraints is applied for all blade positions. These constraints may be obtained from the geometry of the antenna, antenna array manifolds from antenna mounted on a ground plane or the average array manifold for all positions of the rotor blades. Our investigation is based on computer simulations as well as digitized experimental data.

Further Reading:

Y.C. Chuang, A.J. O'Brien, I.J. Gupta and Y. Bayram, "Beam pointing in rotorcraft mounted GPS receivers," *Proceedings of the Institute of Navigation's 2012 International Technical Meeting*, Long Beach, CA, January 2012.