A reduced size controlled reception pattern antenna (R-CRPA) for GPS receivers is presented. The antenna is conformal and consists of six wedge-shaped spiral elements. It is 4.25” in diameter, and is approximately 0.6” thick. Thus, the antenna is only one third in linear dimension as compared to a GAS-1 CRPA and can fit in FRPA-3 footprint. This right-handed polarized antenna provides continuous coverage from 1150 MHz to 1600 MHz, and can thus be used to receive signals from any GNSS satellite. With a fixed set of weights, the antenna can be used effectively to receive signals from anywhere in the upper hemisphere with good gain and axial ratio. Of importance is the fact that the proposed aperture exhibits very stable carrier phase and group delay with respect to the aspect angle. We have prototyped the antenna and measured its radiation pattern and return loss in an anechoic chamber.

In this report, the simulated performance of the R-CRPA in the presence of multiple wideband signals is also discussed when the antenna is mounted on an infinite ground plane or an F-18 aircraft. The R-CRPA is assumed to be working with a 7-tap STAP-based AE (antenna electronics). The STAP weights are adapted for simply null steering or beam forming/null steering. A new constraint vector for beam forming/null steering is proposed. The new constraint vector leads to good SINR as well as minimizes the antenna induced code phase and carrier phase biases. Simulated nulling performance of the R-CRPA mounted on the F-18 aircraft is compared with the simulated nulling performance of a GAS-1 CRPA mounted on the F-18 aircraft. Again, the AE is 7-tap STAP.