1077-G5-2112 **Joseph J. Rushanan*** (jjr@mitre.org), 202 Burlington Road, Bedford, MA 01730. *Modeling GPS Interference.*

One important aspect to satellite navigation performance, such as GPS, is the interference caused by signals in the same system. A common model for this interference is to replace the superposition of the interfering signals with a single non-repeating white noise random signal, the so-called long-code approximation. This approach fails notably in the case of interference from several GPS C/A signals on a desired GPS C/A signal. We model this C/A on C/A interference with a single time-domain equation for the output of the GPS receiver correlator. The equation takes into account the Doppler difference between the signals along with the relative difference in ranges (quantified by when potential bit transitions occur). Using 1 ms correlation sums, one can express the correlator output equation as a single Gaussian quadratic form. Standard analysis techniques can then be applied to the quadratic form to yield the distribution of outputs as a weighted sum of Chi-squared variables. We show why variations larger than those from the long-code approximation are to be expected and how often they will occur on average based on the specific satellite constellation. These predictions are validated via simulations that reproduce much of the functionality found in a GPS receiver. (Received September 21, 2011)