OPEN LOOP GPS SOFTWARE RECEIVER: POSSIBILITIES FOR OCCULTATIONS AND REFLECTIONS

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We have developed a GPS open loop software receiver, initially prepared to study reflections off the sea surface from several static and moving platforms. The sea roughness, larger than the L1 wavelength, leads to the appearance of strong multipath in the reflection, with occasional fading. This is a very interesting workbench for the study of fading and multipath, since we have the same signal transmitted through both a clean channel and another with strong multipath.

These conditions have certain similarities with the propagation distortion in the low troposphere during an occultation. The sea reflection case is particularly interesting as an extreme situation where large Doppler spreads are present, and certain symmetry properties, such as the problem being 1-dimensional or static during the measurement time scales, cannot be assumed.

We present our results of the analysis of about one hour of reflection data, showing that open loop analysis can lead to the measurement of statistical properties of the multipath channel. These statistical observables are also useful geophysical data and can be extracted even if other techniques such as signal backpropagation are unsuitable.

They appear to be useful parameters for the analysis of phenomena like turbulence or inhomogeneity scales of the channel.