



Remote sensing stream flow & soil detection by using Reflected GPS observations

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Abstract—In the paper, a new application and development of a highly integrated GPS receiver with reflected GPS signals for Ground Object Detection and stream flow will be described. Several application considerations have been analyzed in order to successfully acquire and track weak, reflected GPS signals from ground surface. First of all, both RHCP and LHCP antennas are employed so that direct and reflected signals can be acquired simultaneously. The direction of arrival of the signals may be along the reflected signal path or even along the line-of-sight of a particular satellite. Unlike most existing GPS reflection experiment, the goal of the study is to exploit the carrier phase, reflectivity of L1/L2 SNR components of the reflected signals and direct signals for stream clam water, disturbed water, dry soil, wet soil, grass, tree, bare soil and concrete road object detection with surface. The stream flow modeling is predicted by using Doppler shifts due to surface reflection as a moving surface. An integer ambiguity resolution algorithm has also been implemented. During the development and test stage, the digital terrain elevation data and visual elements of satellite's images has been used and mapped with the integrated software.

Index Terms—Reflection coefficient, Object detection, Soil classification, Stream flow