



New Application of real time Remote sensing surface body water levels & discharge by Integrated GPS Receiver with 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 reservoir (Jem-Wu Dam at South Taiwan) and river 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 river clam water, disturbed water and Dam water body surface. The river 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 for high accuracy altimetry of water levels. During the development and test stage, The discharge model of dam reservoir is developed by the digital terrain elevation data and 3D spatial analysis with satellite's images in the integrated software.

Index Terms—Reflection coefficient, Object detection, water level, Stream flow