

Abstract

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Investigation of the Benefits of Combined GPS/GLONASS for High Sensitivity Receiver

High Sensitivity (HS) GNSS receivers have flourished in the last decade. A variety of advances in signal processing techniques and technologies have led to a thousandfold decrease in the minimum useable signal power, permitting use of GNSS, in particular GPS, in numerous environments where it was previously impossible. Despite these recent advances, the issue of availability remains: in many scenarios there are simply too few satellites available with detectable signals to compute a position solution. Of course one way to improve this situation is to increase satellites availability. It is well known that GLONASS has been undergoing an accelerated revitalization program of late, such that there are currently 20 active GLONASS satellites on orbit. The combined use of GPS and GLONASS in a high sensitivity receiver is a logical one, providing a near two-thirds increase in the number of satellites available for use. This paper investigates the benefits of adding GLONASS capability to the GSNRx™ software receiver in high sensitivity (HS) mode. The analysis focuses on the issues of availability and accuracy, both of pseudorange measurements and navigation solutions. The impact of the system time offset is also taken into consideration. The analysis is based on the collection of synchronous data from an outdoor, reference antenna with a clear view of the sky, and an indoor rover antenna. Raw IF samples are captured and processed post-mission to observe with a very fine level of detail the signals deep indoors.