

The Down-Looking Type of Radio-Occultation Airborne GPS Receiver

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The GNSS Radio-Occultation (RO) method based on the measurement of the phase delay of the GNSS signal through the atmosphere is well known. As one application of this technique, there is the Down-Looking type of the GNSS RO method. It observes the signal of the GNSS, which is sinking in the horizon from a high mountain like Mt. Fuji or from an aircraft.

From the GNSS receiver point of view, it is necessary to track extremely low elevation-angle satellite, which is usually not used for position-fix calculation because of its big measurement error. Therefore, the GNSS receiver must be specialized for this purpose. Electric Navigation Research Institute (ENRI) and Furuno Electric Co., Ltd. (FURUNO) developed specialized Down-Looking GPS receiver for atmospheric research.

The receiver consists of two receiving block. One is dual frequency receiver block for correcting the ionospheric delay. The other is single frequency Down-Looking receiver block. The operation of the both blocks is synchronized by Rubidium clock.

The feature of the receiver is as follows:

- 1) Two antenna RF input, one is for usual position-fix, the other is for radio-occultation measurement by tracking the signal of user specified satellite.
- 2) Improved tracking capability for extremely low elevation-angle satellite.
- 3) High speed measurement data output, up to 100 Hz for observation data, and 1000 Hz for I-Q data

The detail feature and the performance of the receiver will be presented in this paper.