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Applicability of Virtual Reference Stations for Static and Kinematic Positioning

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Abstract

There is a possibility to generate artificial observations for a particular position by using a known Virtual Reference Station technique. It is done by transferring the observations from a physical reference station and interpolating the biases, usually using a network of reference stations.

Theoretically, the measurements can replace the physical reference receiver and both, simplify and improve the processing of static and kinematic measurements. Here, the VRS is used as a control station for static and kinematic post-processing taking advantage of the network of reference stations by interpolating ionospheric and tropospheric biases to location of measurement. However previous computational experiments showed that the generated virtual observations are strongly correlated with the observations gathered at the nearest physical reference station. The previous studies were performed at close vicinity of the physical reference station. For further investigations of these correlations, and the issue of how do they influence processing results, a field experiment was designed and performed, in which the real measurements were taken at various distances from the physical reference station. Basing on these measurements, the correlations between the reference station and VRS stations were studied. The unknown physical stations were determined and used as a comparison for VRS measurements. Also, the applicability of VRS observations for static and kinematic processing was validated. To assure independence of calculations and results, besides commercial software (GNSS Solutions and LGO) chosen Precise Point Positioning services were used.

The VRS data were obtained from the POZGEO-D service of the ASG-EUPOS network.