



Multi-GNSS precise single-epoch positioning

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An instantaneous (single-epoch) long-range RTK positioning using data from multiple Global Navigation Satellite Systems (GNSS) is currently being implemented and tested in the GINPOS software, developed at the University of Warmia and Mazury in Olsztyn. The instantaneous ambiguity resolution has several advantages; it is resistant to negative effects of cycle slips, receiver loss of lock, power and communications outages and there is no need for re-initialization immediately following loss-of-lock. The use of several GNSS systems in instantaneous kinematic positioning significantly increases the distance over which carrier-phase ambiguities can be recovered to their integer values. It also improves the reliability and integrity of the ambiguity resolution. In this work, satellite data from GPS and Galileo systems were processed. Since currently there are just two Galileo In-Orbit Validation (IOV) satellites on orbit, Spirent multi-GNSS hardware simulator was used to obtain Galileo and GPS signals from full constellations. The observations were obtained for several locations allowing to form baselines reaching up to 100 km. The results based on the processing of the simulated data show that even though single-epoch precise positioning is possible with any single system, combining data for both systems increases positioning availability and reliability.