Te Kura Kairūri School of Surveying

Lunchtime Seminar Series

Instantaneous, dual-Frequency, multi-GNSS precise cm-level positioning using Google Pixel 4 and Samsung Galaxy S20 smartphones with an improved estimator

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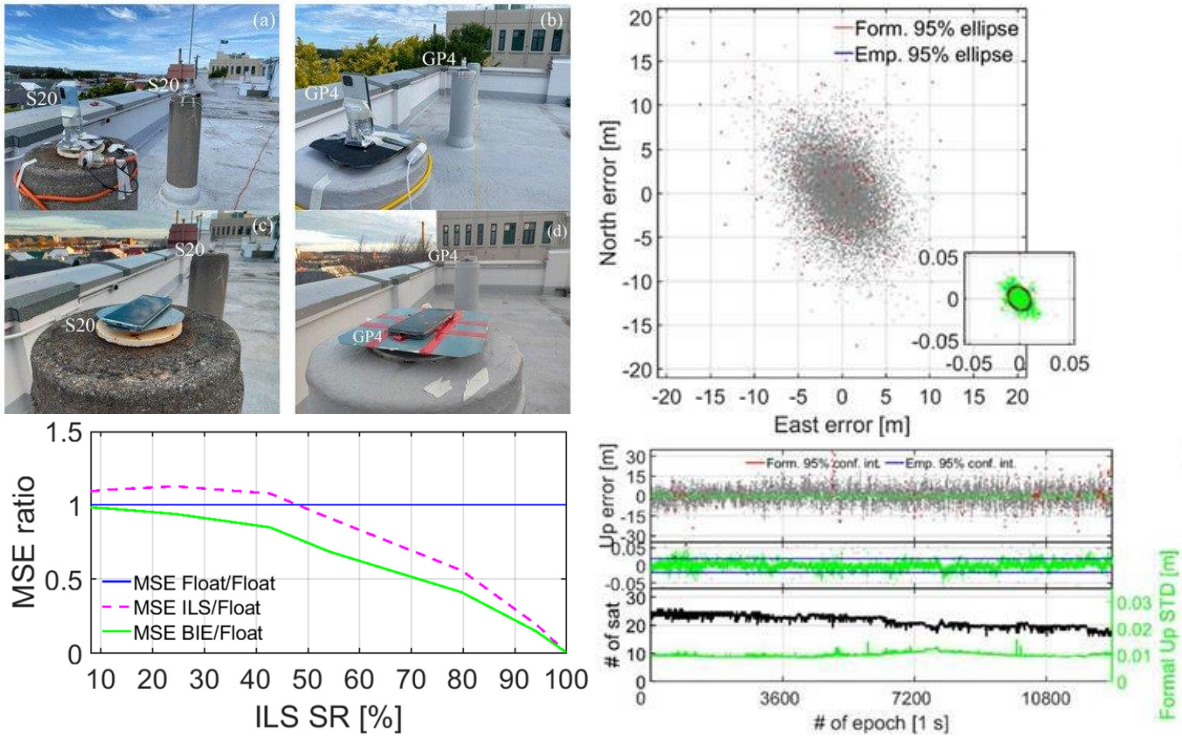

Smartphone setup (top left), RTK positioning errors (right), and improved estimator (bottom left).

The recent development of smartphone Global Navigation Satellite System (GNSS) chipsets makes instantaneous and cm level real-time kinematic (RTK) positioning possible with Android-based smartphones (see figure). In this contribution we investigate the instantaneous single-baseline RTK performance of Samsung Galaxy S20 and Google Pixel 4 (GP4) smartphones with such chipsets in Dunedin, New Zealand. The effects of locating the smartphones in an upright and lying down position were evaluated, and we show that the choice of smartphone configuration can affect the positioning performance even in a zero-baseline setup. We found that the two assessed smartphones have different antenna gain pattern and antenna sensitivity to interferences. In this contribution, we demonstrate, for the first time, a near hundred percent (98.7% to 99.9%) instantaneous RTK integer least-squares success rate for one of the smartphone models and cm level positioning precision while using short-baseline experiments with internal and external antennas, respectively. Finally, for the first time, we employ the best integer equivariant (BIE) estimator in short-baseline RTK smartphone positioning, which always gives a superior positioning performance than other commonly used estimators (integer least square and float counterparts).

Thursday 16 March 2023 (12pm – 1pm)

L1 Lecture Theatre | School of Surveying, 310 Castle Street