# New Zealand's first results for multi-GNSS single-baseline RTK positioning


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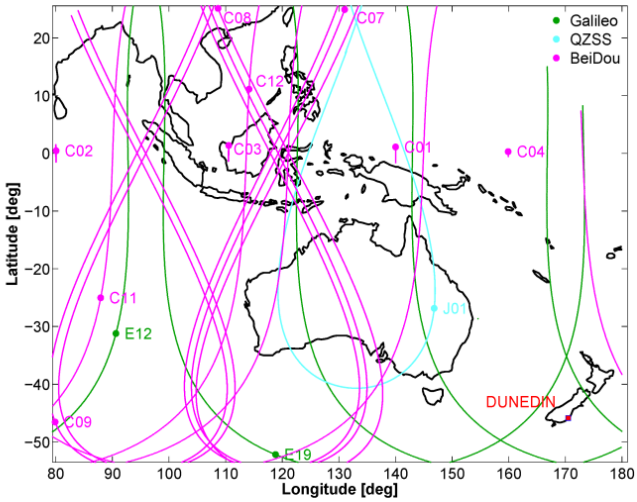
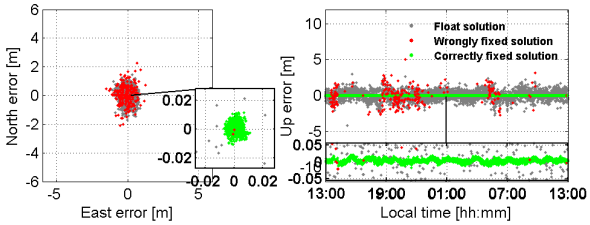
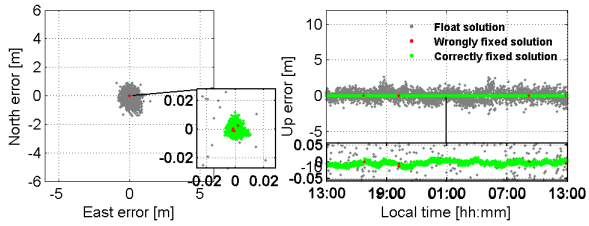



Galileo, QZSS and BDS constellation




GPS RTK in Dunedin




GPS+BDS+QZSS+Galileo RTK in Dunedin


**Abstract:** With the advent of new Global Navigation Satellite Systems (GNSSs), multi-system, multi-frequency precise real-time kinematic (RTK) positioning can potentially be possible anywhere, at any time. Some of these satellite constellations are the European Galileo and the Chinese BeiDou Navigation Satellite System (BDS), the regional constellation of Japan's Quasi-Zenith Satellite System (QZSS) and the modernized American Global Positioning System (GPS). Preliminary positioning results when combining satellites from these systems have been obtained in Australia. However, the multi-GNSS positioning performance in New Zealand has not yet been investigated. This presentation aims to give an initial overview of the single-baseline RTK positioning performance achievable in the South Island of New Zealand, a region with a good visibility of all these constellations. Comparisons will be made to the positioning performance obtained in Australia that has a better visibility of the Asia-Pacific regional systems. The between-receiver differential code and phase inter-system biases (ISBs) on the overlapping frequencies will be analyzed and used as a-priori corrections on an independent baseline, in order to maximize the redundancy of the multi-GNSS RTK functional model. It will be shown that if the ISBs are neglected there can be a serious effect on the ambiguity resolution performance and thus the positioning results. It will also be illustrated that by combining all four-systems the RTK positioning results will be significantly improved in comparison to using GPS as a stand-alone system, which has the potential to further advance applications which require high precision positioning for GNSS users in New Zealand.


School of Surveying
Te Kura Kairūri

**12:00 noon, Thursday, 26 March 2015**

**L1 Lecture Theatre**

**School of Surveying**

**310 Castle Street**

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