Evaluation of network RTK performance and elements of certification—
A Southern Ontario case study

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Over the past decade, network RTK technology has become popular as an efficient method of precise, real-time positioning. Its relatively low-cost and single receiver ease-of-use has allowed it to mostly replace static relative GPS and single baseline RTK in urban areas where such networks are economically viable (e.g., cadastral and construction survey). The Ministry of Transportation of Ontario (MTO) and York University have investigated the performance of commercial network RTK services in Southern Ontario, where performance is defined by a set of developed metrics. It was found that the user horizontal solution had an overall precision of ~2.5 cm (95%), though there were cases of solution biases, drifts and gaps. A follow-up study is developing criteria and pathways for the certification of such commercial network RTK services, focusing on: reference station integration, reference station maintenance, and user solution monitoring. A set of recommendations for network certification is in preparation.

Introduction

Network RTK (Real-Time Kinematic) refers to GPS and now GNSS (Global Navigation Satellite Systems) technology, where a network of continuously operating reference stations (CORS) provides raw measurements and error corrections to a user’s geodetic-quality GPS / GNSS receiver, allowing for few centimetre-level horizontal positioning in real-time. Such networks are viable in areas with high concentrations of economic activities. In Southern Ontario, network RTK services have been established, maintained and operated by a number of private companies with limited government involvement. Unlike many provincial / state or federal governments in other countries, neither Ontario nor Canada maintains a CORS at a density necessary for network RTK.

This situation and limited existing studies led the Ministry of Transportation of Ontario (MTO) to work with York University in order to evaluate the performance of network RTK in Southern Ontario for use in its surveys and for use by the broader surveying community. This work has been followed by a second partnership to study approaches to certify such commercial network RTK services for government and public use. The results and ongoing work from these studies in presented here.