Development of Centimeter Level Positioning Mobile Based Application

Charnon Poolsin*, Nattakit Sa-ngiam**, Nikorn Sutthisangiam*

*Department of Computer and Information Science,
King Mongkut's University of Technology North Bangkok, Bangkok, Thailand
**Hydro Informatics Institute, Bangkok, Thailand
charnon2002@hotmail.com, nattakit@haii.or.th, nikorns@gmail.com

Abstract—In recent years, Google announced the availability of GNSS (Global Navigation Satellite System) raw measurements from Android 7. This was the first time that developers could access carrier, code measurements and decoded navigation messages from the smartphone. Therefore, these reasons could lead to increased GNSS performance as it opens the door to more advanced GNSS processing techniques that have been restricted to professional GNSS receivers. This paper is the development of an android application for collecting raw measurements from GNSS in standard RINEX files and using The Canadian Spatial Reference System Precise Point Positioning (CSRS-PPP) service to assess the accuracy of coordinates. The results demonstrate that the length of the observing sessions significantly affects the position determination accuracy. The accuracy of the coordinate of a longer observing session can provide more accuracy of the coordinate. The result of the 60-minute GPS + GLONASS observation period can archived the horizontal error of 2.4 cm at 66.7% confidence level.

Keyword—GNSS, PPP, Precise point positioning, RINEX, Raw measurements, Google location API, Android Smartphone.

Charnon Poolsin received his Bachelor degree in Electrical Engineering, Faculty of Engineering, King Mongkut's Institute of Technology North Bangkok, Bangkok, Thailand in 2003. He is studying in Master degree in Department of Computer and Information Science, Faculty of Applied Science, King Mongkut's University of Technology North Bangkok, Bangkok, Thailand.

Nattakit Sa-ngiam received his Bachelor degree of Science in Geo-informatics, Faculty of Humanities and Social Science Burapha University. Master of science in Geoinformatics. He is associate researcher at Hydro Informatics Institute (HII) from 2012 to the present.

Nikorn Sutthisangiam received his Bachelor degree in Electrical Engineering, Faculty of Engineering, King Monkut's Institute of Technology North Bangkok, Master of Science in Communications Engineering and Doctoral degree in Electrical Engineering from The Sirindhorn International Thai-German Graduate School of Engineering (TGGS), King Monkut's Institute of Technology North-Bangkok in 2003, 2006 and 2014, respectively. He is holding a lecturer at Department of Computer and Information Science, Faculty of Applied Science, King Mongkut's University of Technology North Bangkok, Bangkok, Thailand. His current research interests include wireless communication and embedded system.