A Concept Design of QZSS-Based Emergency Message Service for Post-Earthquake Disaster Management in Nepal

Akihiro SATO, Akihiko NISHINO, Dinesh MANANDHAR, Naohiko KOHTAKE
akihiro.sato@keio.jp, brilliant-crystal68@a5.keio.jp, dinesh@iis.u-tokyo.ac.jp, kohtake@sdm.keio.ac.jp

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SUMMARY
Quasi-Zenith Satellite System (QZSS) is a Japanese navigation satellite system, and its service area covers most of Asia Oceania region. This paper examines a concept design of QZSS-based emergency message service utilizing for post-earthquake emergency warning and disaster rescue in Nepal, such as the situation following devastating earthquake on 25 April 2015.
Quasi-zenith satellite (QZS) allows mobile terminals on the ground to obtain emergency messages. The emergency messages from QZS are broadcasted over a wide area, independent of terrestrial communication networks. This essential characteristic brings following beneficial features for the emergency message service.

1) QZS provides the emergency messages to mobile terminals where terrestrial communication infrastructure is not constructed.
2) QZS provides the emergency messages to mobile terminals where terrestrial communication network is damaged, destroyed, or congested caused by the disaster.

Therefore, it is expected to minimize the impact of disasters by getting emergency message from QZS in case of post-earthquake situation.
QZS provides a navigation signal to complement Global Positioning System (GPS) - L1-C/A and some augmentation signals. QZS transmits the emergency message by superimposing small capacity data on the L1-SAIF augmentation signal to terminals with a QZSS-compatible global navigation satellite system (GNSS) receiver. In recent years, cellular phones equipped with a GNSS receiver have been widely spreading. So cellular phones become a strong candidate for the terminal to receive the emergency messages from QZS. GNSS receiver also allows the terminal to obtain its location information, therefore the terminal or cellular phone is possible to display emergency information that depends on its location. We examined the use cases of QZSS-based emergency message service in case of the post-earthquake situation in Nepal.