GNSS CORS and Network-RTK service in Korea

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ABSTRACT

NGII in Korea operates 60 GNSS observation stations in 40km intervals about 100,000 square kilometers nationwide from 1995, and provides network RTK service free of charge. NGII provides VRS and FKP services based on GNSMART of Geo++ and PIVOT of Trimble, and is mainly used in construction and civil surveying. VRS was used about 1 million people a year in 2016. Network RTK users are increasing by 30% each year, and FKP and MAC services are being prepared for this increasing trend in recent years. FKP will support smart car, drone and other low price GNSS devices. In addition, to expand the GNSS application, various services such as Network-RTK and DGPS services and SSR messages for PPP-RTK are planned to be provided.

GNSS CORS in Korea

Since 1995, NGII has been operating GNSS CORS nationwide (about 100,000 km²). Starting with the SUWN station registered at the IGS, 60 stations are in operation at all times and are installed at an average distance of 40 km. And received GPS, GLONASS, Galileo (partial), and Beidou (partial) satellite signals. CORS combines Trimble and Leica equipment and is upgrading receivers sequentially for full-GNSS operating. GNSS CORS is mainly used for satellite survey support, and NGII services such as network RTK service, online data processing service (OPUS), RINEX and raw measurements download. Especially, it is applied to scientific research fields such as meteorological applications, geophysical researches, and space weather researches based on data observed using national networks, and recently it has been utilized in natural disasters such as earthquakes, typhoons, and heavy rain. Especially, as the application to new technologies related to spatial information such as unmanned vehicles, drone, and precision agriculture is expanded, the importance of CORS is gradually increasing.
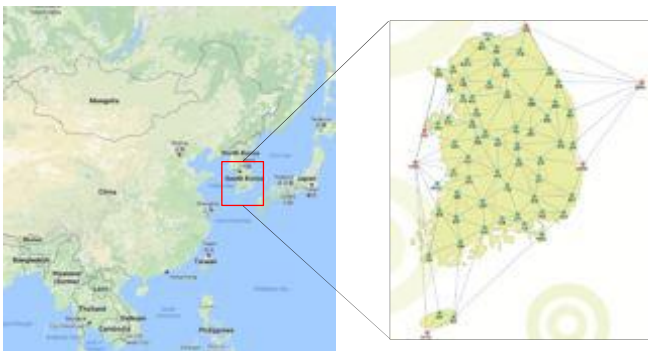
CORS

BINEX & RTCM Service

In addition to NGII CORS for surveying services in Korea, there are CORS for use in each research field such as weather, astronomy, and geology. NGII develops and provides services based on NTRIP, which integrates data from observation stations at eight agency in Korea. The service provides 170 CORS information in real time using the Internet, and the user can receive RTCM 2.X, 3.X and BINEX. The service is provided free of charge, and the CORS data can be received in real time using the NTRIP-Client without registering a separate ID or PW.

TCP/IP — TCP/IP

170 CORS · **Ntrip-Caster** · **Ntrip-Client**
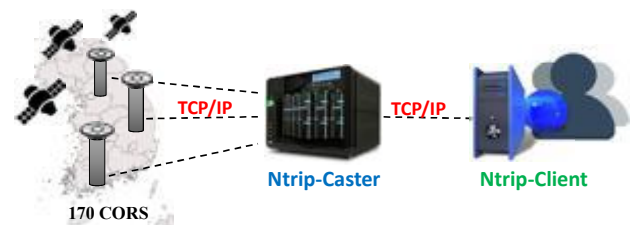
Network-RTK Service

VRS and FKP, Each service uses Trimble´s Trimble Pivot Platform (TPP) and Geo ++´s GNSmart. There are about 15,000 users registered in the network RTK service and more than 1 million users in 2016. Users are increasing by 5% or more every year. NGII is making efforts to improve service diversity and stability to improve network RTK user satisfaction. In particular, we are promoting a gradual upgrade of the entire CORS and are working on a network RTK service that includes Beidou. NGII is planning PPP-RTK service using SSR message in the future and currently provides decimeter level SSR message using Ntrip-Caster of GNSMART.

Future Plan

NGII is gradually upgrading the infrastructure for full multi-GNSS service and will be expanded to network RTK service using FKP and MAC together with VRS. In addition, the RTCM-SSR is under preparation and will be available in 2019 to provide PPP-RTK services nationwide using SSR.