

Development of cognitive acquisition and tracking software for GPS and MSAS

Yuki Itoh[1]; Ryuei Yamada[2]; Fujinobu Takahashi[3]

[1] Electrical and Computer, Yokohama National Univ; [2] Graduate of Engineering, Yokohama National Univ.; [3] Physics, Electrical and Computer Eng, Yokohama National Univ

<http://www.fjtakalab.ynu.ac.jp/home/xoops/>

GPS as a GNSS system now becomes very popular for the car or walker navigation. It also plays very important role to avoid the collision of the aircrafts, boat and ships. It also becomes a social request to carry a GPS receiver on all the mobile phones.

The U.S. GPS and Russian GLONASS systems are originally for the military purposes. Europe now starts the implementation of Galileo System as an independent GNSS system. It is the first non-military GNSS system for the public welfare, which will start in 2013. China also prepares new GNSS system COMPASS-M1 for official and public use for Beijing Olympics in 2008.

Japanese MSAS using a MTSAT stationary satellite has started practical use since September, 2007. Japan also starts the quasi zenith satellite system (QZSS) to compensate the GPS system.

Under these situations the development of the cognitive GNSS becomes important. The technology of software GNSS receiver becomes very important to realize cognitive GNSS receivers. Many different kinds of GNSS satellites in future will need the flexibility of software technology. We aim at developing the prototype of software multi-GNSS receiving software technology along with GPS.

We succeed in the simultaneous satellite acquisition and precise satellite delay lock tracking for GPS and MSAS at present. All possible PRN signal pattern replicas are generated by the satellite acquisition program. Correlation processing between the receive data and signal pattern replicas are done. We can know the receiving conditions of each satellite from the correlation data. Then accurate frequency and time information are determined from the following delay tracking loop program. This process is realized by the delay lock loop programs in our receiver.

The detail of the programs and results of the acquisition of the satellite and delay tracking is introduced in our report.