TDD (Time Division Duplex) mobile base stations need to have times synchronized with GPS (Global Positioning System) satellite signals in 1 µs or less. Some mobile base stations require accurate time information from the GPS via networks, because GPS antennas cannot be installed in the same location. NTT has developed a time synchronization access system that solves these problems.

**Features**

- GPS antenna installation costs are drastically reduced by estimating GPS satellite signal detection characteristics via simulation by using the image data of GPS antenna surroundings taken with an all-direction camera.
- The effect of multipath signals with reflective and diffractive waves that degrade the precision of time synchronization is avoided by using proprietary synchronization techniques with dynamic selection of visible GPS satellite signals. Cost-effective and highly-precise time synchronization can be achieved.
- Operation with a software tool that is used on tablet devices assists in selecting the GPS antenna’s location.

**Application Scenarios**

- Time synchronization for mobile base stations.
- Highly-precise time synchronization with GPS antennas installed inside office buildings.
- Applications requiring time synchronization such as high frequency trading (HFT), smart grids, and grid computing.
- Traffic, ITS (intelligent transportation systems), land surveys, and automated navigation.
- Positional evaluation of antenna locations of general satellites such as broadcast satellites.
- Promotion of various services in which positioning, navigation, and time synchronization by navigation satellite systems are used toward realizing a G-space society in the IoT era.

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* PTP: Precision Time Protocol; protocol for delivering high-precision time information in packet networks (IEEE1588v2)
* GM: Grand Master; equipment for distributing time signals synchronized with GPS
* OLT: Optical Line Terminal
* ONU: Optical Network Unit
* G-space society: a society that highly utilizes geographical spatial information with geographic information systems and navigation satellite systems