

SELF-ASSISTED FAST ACQUISITION AND FIRST FIX FOR A STANDALONE GNSS RECEIVER

Technological advantages

Innovative :

- Use a coarse snapshot positioning to reduce the TTFF and obtain an accurate positioning.

Efficient :

- Does not require extensive memory or computing power.
- No change in the GNSS receiver core processing.

Invention synthesis

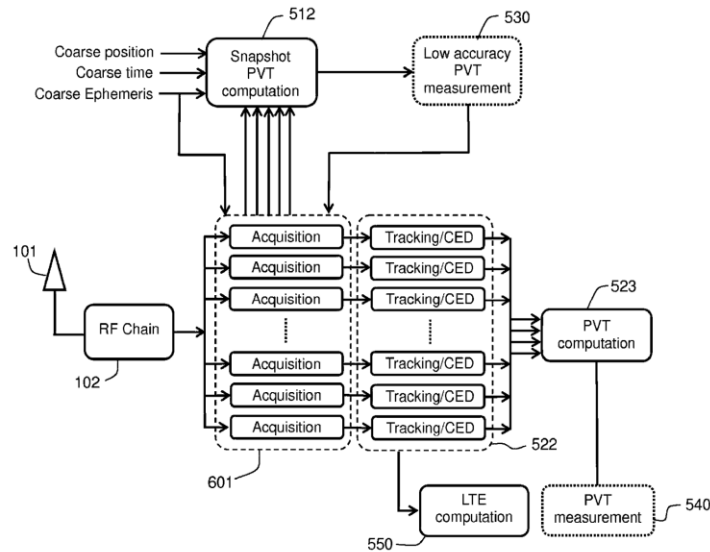
The invention deals with speeding up fine GNSS receiver positioning.

The time to first fix (TTFF) for GNSS receivers can not be lower than the time required to retrieve ephemeris data (18 sec at best). This is true for cold start, for warm and hot restarts, the previously computed location and previously acquired signals can be used to strongly decrease the TTFF. Using GNSS receivers with powerful computing engines is costly and power hungry. Using specific signals with short TTFF is complex and signal dependent. Using A-GNSS requires communication with an external network.

The invention is based on acquiring and digitalizing GNSS signals to compute code phase delay data and Doppler shifts data in grid of possible data values. From the code phase delays, coarse PVT measurements and coarse ephemerides are computed. With these values, the grid of possible data values is reduced. Using clock and ephemerides data, a fine PVT measurement can be quickly done within the reduced grid of possible data values.

Potential applications

- Stand alone GNSS receivers compatible with all GNSS constellations.



Schematic of the device structure

- (101) Antenna
- (102) Signal acquisition and digitalization
- (512) Module for snapshot PVT computation
- (523) Tracking engine
- (530) Initial coarse PVT data
- (540) Fine PVT data
- (550) Long Term Ephemeris
- (601) Acquisition engine

Commercial benefits

- Significant speed-up for TTFF especially for cold restart. Suited to isolated GNSS receivers.
- Does not require complex hardware, powerful software engine.
- Independent from GNSS signal types / constellations.

Patented invention - under license.