Global Real-time Kinematic Precise Positioning

Positioning method and system using station-generated state-space-representation corrections

TECH ID #: 625.8

New method that generates augmentation corrections using undifferenced and uncombined PPP at a static or moving single reference station.

No need for maintenance of permanently deployed network of dense GNSS reference stations, and no computationally expensive data processing center

Enables coverage and significant improvement in scalability and flexibility for development and implementation of precise positioning

PCT application filed

Collaboration opportunities: seeking research or licensing partnership.

Background

The new real-time PPP-RTK method generates augmentation corrections using undifferenced and uncombined PPP at a single static or moving reference station, bypassing the need for a dense network of continuously operating reference stations (CORS). This approach ensures high accuracy and fast convergence for both multi-frequency and single-frequency receivers. It offers scalable operational coverage through the propagation of reference stations, allowing for the integration of additional local reference stations to enhance correction data. This method delivers performance equivalent to network RTK but avoids limitations like high transmission rates and short baseline lengths, increasing robustness and decreasing initialization times.

Field tests validate the method's performance, showing that a single reference station can provide centimeter-level positioning with instant ambiguity resolution for both dual-frequency and low-cost single-frequency GNSS receivers. Tests with propagated moving reference stations and networks of reference stations further confirm that the system offers fast initialization and precise positioning solutions both inside and outside the reference network. This flexibility opens up new possibilities for developing correction services for various mass-market applications.

Competitive Advantages

- Rapid high accuracy & fast convergence
- Low transmission data rate
- Global coverage & no need for processing center
- Ground infrastructure independence

Areas of Application

- Autonomous vehicles
- Surveying and mapping
- Precision farming techniques
- Consumer electronics

Publication and Resources

- Publication: Zhitao Lyu & Yang Gao. Volume 96, article number 40, (2022). Journal of Geodesy
- Patent Publication: WO2023108257A1
- Researcher Profile: Dr. Yang Gao
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Interested in using this technology to help your business grow? Contact us!

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