MULTIPATH MANAGEMENT FOR GLOBAL NAVIGATION SATELLITE SYSTEMS

Technological advantages

Innovative :
- Use of collaborative receivers to compare and correct multipath errors.
- Corrections can be shared back.

Efficient :
- Only requires a link between at least two GNSS receivers.
- Use of data servers / cloud to share the information, create correction maps.

Invention synthesis

The invention presents a set-up with collaborative GNSS receivers to enhance the positioning accuracy on a receiver in a complex environment.

GNSS receivers calculate the position, velocity, time from satellites GNSS carrier signals using pseudo-ranges between the receiver and the satellites. While errors from atmospheric perturbations, orbit variations or clock accuracy, satellites dispersion can be mitigated, errors due to multiple path reflections, temporary loss in line of sight are difficult to correct or require complex and costly techniques.

The invention proposes the use of a complementary GNSS receiver to determine the position, carrier code and phase. This information is transmitted to a first receiver subjected to multipath issues, it determines its position with its own position as well as an estimated multipath comparing code and phase between receivers. This correction can then be sent back or propagated into a network (server, cloud).

Potential applications

- Positioning in tough conditions (dense cities).
- Cars, convoys, trains, UAV, …
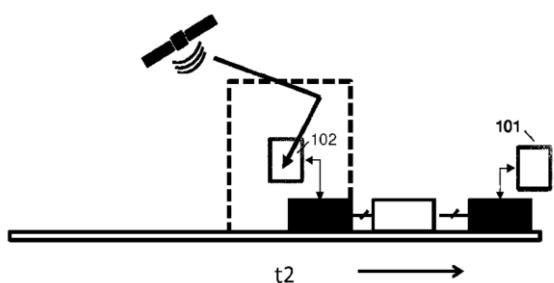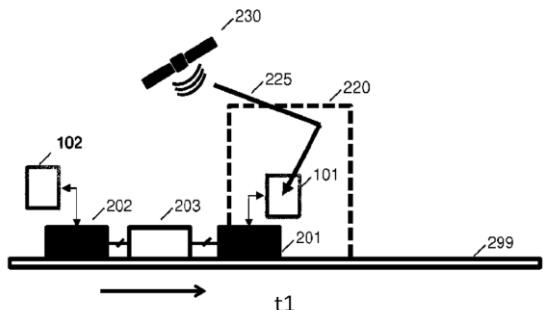
Schematic view for the invention applied to rail transportation

(101,102) First and second receivers
(201,202,203) Wagons
(220) Masking (/ perturbation) building
(225) GNSS signal being reflected
(230) Satellite source

Commercial benefits

- Improvement in GNSS receiver accuracy / reliability in complex environments for cars, trains, uav's, convoys...
- Data sharing within a network.
- Limited additional costs, easy to deploy.
- Compatible with all GNSS constellations.

Patented invention - under license.

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