

## ADAPTATIVE ANTENNA ASSEMBLY FOR IMPROVING PRECISION OF A GNSS RECEIVER IN A PERTURBATED ENVIRONMENT

### Technological advantages

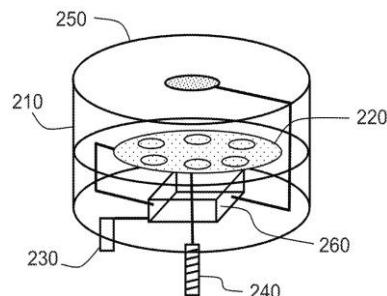
- Enhanced radio-navigation especially in complex environments.
- Size and number of RF elements may be adapted according to the target precision.
- Simple to implement on any GNSS receiver :
  - No modification on the receiver.

### Invention synthesis

The invention deals with enhancing GNSS positioning using an antenna assembly with a radiation pattern tailored to the environment.

When satellites are not in direct line of sight (LOS), the navigation system precision is degraded. The PVT (position, velocity, time) measurements derived from at least 4 pseudo-ranges may be perturbed. While some perturbations can be corrected for, it is complex and costly to mitigate errors due to multi reflections and when satellites are not in direct LOS.

The invention presents an antenna with several RF antenna elements and a driving circuit to define a radiation pattern. The radiation pattern is adapted (phase shifter) to favor open sky (transparent to electromagnetic radiations). The sensor may be optical (fish-eye camera), or a thermal camera, or a radar / lidar. No modifications on an existing receiver is required to use the adaptative antenna but a feedback loop from the PVT measurement may be used to enhance the radiation pattern.



Schematic view according to this invention

- (210) Radome
- (220) Antenna elements
- (230) DC input
- (240) RF output
- (250) Sensors
- (260) Antenna control unit

### Commercial benefits

- Enhanced positioning and navigation in degraded environments.
- Can be adapted to any sort of GNSS receivers from consumer to professional markets.
- No need to modify the receiver unit.

### Potential applications

- High-end or consumer applications : helicopters, drones, road navigation, mobile devices...

*Patented invention - under license.*