

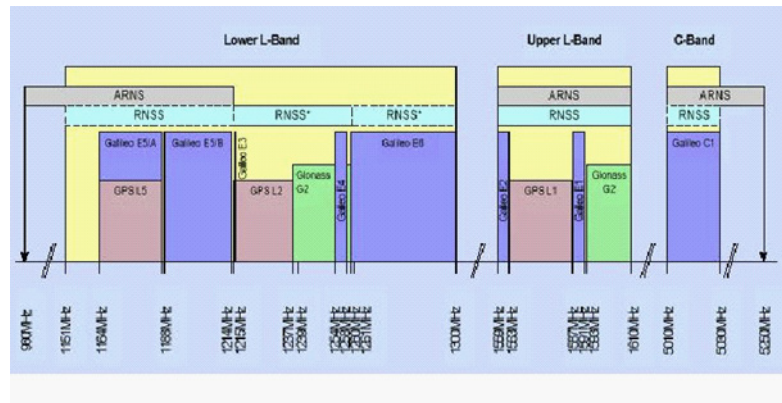


# MULTI-FREQUENCY NAVIGATION AND PRECISE POSITIONING DEVICE

*Innovative method of exploiting signal diversity to improve the performance of ground position estimation.*

## Technological advantages

- One advantage of this approach is that the device according to the invention only directly tracks the first carrier phase.
- The number of phase jumps by unit of time is significantly reduced compared to the individual tracking of carriers of each frequency, which results in high robustness of the beat phase measurement.
- The first and second radio navigation signals are chosen from the Galileo E1, E5 and E6 signals or from the GPS L5, L2C and L1 signals or GLONASS L3, G2 and G1 signals.



*The proposed patent aims to optimise the performance of a GNSS reception algorithm using the phase measurements of signals on several frequencies.*

## Invention overview

Positioning device (for example based on GNSS) making use of the frequency diversity of transmitted signals to improve position estimation performance in terms of accuracy and robustness. Redundancy between the measurements on the different frequencies is used to simultaneously process the signals received (the signal on one frequency helping process another frequency) or by applying a Kalman filter using all the measurements from the signal processing on the different frequencies.

## Potential applications

### Precision agriculture

- Calculation of surface areas and plots, assisted or automated steering of vehicles

### Transport

- Driverless vehicles, fleet management, fuel consumption and CO2 emission optimisation, driver risk management, route management and dispatch optimisation

## Commercial advantages

- Better performance (robustness and accuracy) in urban environments
- Suited to the new specifications required in the civilian sector
- Technique used upstream of existing precise positioning techniques (PPP and RTK algorithms) to increase robustness

TRL : 3

*Patented invention, available under license*