

Method and system for correcting errors in satellite positioning systems and computer program products thereof

An innovative approach to improve the performance of tablet and smartphone embedded GNSS positioning services. Partners to develop the system and/or to establish commercial agreements along with technical cooperation are sought.

The Challenge

Positioning performance in mass-market GNSS receivers embedded in mobile devices cannot be compared to that in professional GNSS receivers. Nowadays, one of the main limiting factors for that is the inability to access the raw GNSS data. This problem impedes to properly correct any predominant source of range error (specially ionosphere) affecting the user position.

This could be overcome by the use of more accurate corrections, such as from newer ionospheric GNSS models that are fed with big data and with more powerful computation strategies. In particular, the broadcast ionospheric model is too simple and typically corrects only the 50-70% of the ionospheric delay, with a remaining ionospheric error which can reach the level of few tens of meters, compromising seriously the objective of a positioning error at few meters level, specially for GNSS users at mid-low or low latitudes, and a further potential reduction up to the level of few decimeters at mid latitudes.

The Technology

In order to allow correction of errors affecting positioning performance (mainly ionospheric term), a work-around can be directly worked in the position and clock domains. This is not straight-forward but could be done considering a Central Processing Facility (CPF) with the appropriate SW. The user would send the approximate device location and then, corrections would be calculated for that location and its surrounding region for different potential positions, different near future epochs and different sets of satellites in view. All information could be sent back to the user so that an improved position could be derived. Preliminary modelling has demonstrated a 30-50% improvement in position accuracy (specially at low latitude regions, where there are huge ionospheric gradients). Such a system could, therefore, have rapid market penetration in regions where no Satellite Based Augmentation Systems (SBAS) is given. This error reduction would apply to single and multi-constellation GPS and GLONASS mass-market chipsets, such as those found in current smartphones and can be extended to future multi-constellation mass-market (i.e. single frequency) GNSS chipsets using Beidou and Galileo.

Innovative advantages

- Improvement of the positioning of any tablet or smartphone without major investment by correcting the main sources of error (mainly the ionosphere)
- Allow providing positioning integrity to the user.
- Enable applications based on additional parameters apart from final position and time provided by the current embedded GNSS receivers.

Current stage of development

First tests on the concept have been carried out. Further development necessary.

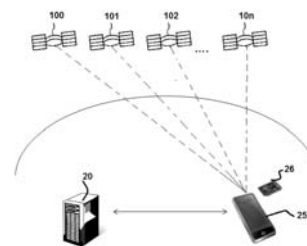
Applications and Target Market

- Precise Location-based services (LBS)
- Mobile applications related to Smart Cities, Transport sector, Surveying, Precise agriculture and farming requiring an enhanced positioning performance and/or integrity.
- Smartphone and Tablet users world-wide, mainly in the tropical regions, requiring an enhanced positioning performance.
- Professionals that need access to more detailed positioning information at API level.

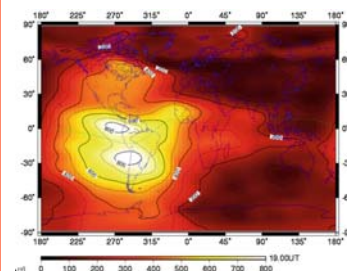
Reference number

EPI4160669.9

Central Processing Facility to compute error corrections



Global Ionospheric Maps



Histogram of world population (in the year 2000) as a function of latitude



Business Opportunity

Technology available for licensing with technical cooperation

Patent Status

PCT application

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