

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Space Communications and Navigation Global Technical Session (8-GTS.3)

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PRELIMINARY DESIGN-CONCEPT OF MULTI REGIONAL SATELLITE FOR INCREASING
ACCURACY IN GNSS (PRECISE POINT POSITIONING)

Abstract

The use of GNSS is ever increasing for such various applications as science, weather monitoring, precise military and civil position or mass market applications. Its impact in the economic and technological development is evident in its numerous applications. The use of GNSS for safety of life applications or as a means of navigations for drones or automatic vehicles calls for higher performances, especially in accuracy and integrity.

As the non-GPS navigation systems develop, the international cooperation between providers becomes more relevant as a way to increase the accuracy, continuity, availability and integrity of the overall GNSS service. The interaction between GNSS systems to improve the performances at user level could be classified in two main categories: augmentation systems (as in WAAS or EGNOS) which interacts at a system level and Interoperability (as in the combined use of GPS and Galileo), which interacts at user level.

Increasing the number of systems through interoperability reduces the impact of perturbations such as ionospheric effects, signal scattering, tropospheric delay, etc. Augmentation systems can reduce satellite orbit and clock error as well as most of the errors mentioned before. Certain regional systems are certified to be used in SoL applications, enhanced capabilities like this one can only be achieved by GNSS with the assistance of a regional system.

This paper aims at analyzing the existing regional GNSS and estimate the impact they have over their coverage regions. Such an analysis will help set some guideline for trade-offs in future potential regional systems.