

GNSS in Surveying: State of the Art and Future Perspectives in the Framework of Galileo

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SUMMARY

High Precision GNSS is today commonly used in Cadastral Application and Mapping. The State of the art of High Precision GNSS involves the implementation and maintenance of Local and Regional Network of GNSS Reference Receivers, with inter-distances in the order of 70 Km (Network RTK-Real Time Kinematics, techniques). Such Networks are commonly managed by Land Administration or Geodetic Authorities. They are also used for Geodetic Reference Systems Realization and can be considered as part of a the Spatial Data Infrastructure. Relevant implementation and maintenance costs, are sometimes a blocking factor for the development of High Precision techniques. New techniques (e.g. PPP-RTK, Precise Point Positioning RTK) are promising global and regional solutions, with the need of very sparse monitoring network of receivers (with inter-distances of hundred/thousand km). Furthermore, the availability of multiple GNSS constellations are going to provide higher availability in urban areas and reducing the initial time to convergence to cm level position (currently in the order of tenths of seconds for Local solution and tenths of minutes for PPP) through multiple frequencies signals.

Galileo is introducing new services that can be an enabler for the affordable development of such techniques.

Most of the applications with a relevant spatial and geographical content are today requiring more and more High Precision positioning and reliability. Automatic driving is one of the most relevant examples. High resolution and high precision cartography are therefore needed. This will activate the economy of scale needed for the provisioning of High Precision Service at a large scale.

An Augmentation with different level of High Precision Services is achievable thanks to multi-constellation and

multi-frequencies.

An analysis of current techniques and future perspectives of High Precision GNSS positioning will be presented in this work. The use of Galileo Commercial Services will be the main objective of this analysis.

Therefore, an initial technical and Cost Benefit Analysis will be carried out in order to define a suitable model for the application of innovative High Precision techniques in GNSS Cadastral Surveying in the view of Galileo.