

Emerging Applications Exploiting GNSS Receiver Networks

Mark Dumville, Michael Pattinson and William Roberts (United Kingdom)

Key words: GNSS/GPS; Positioning; GNSS Performance Monitoring; GNSS Raw Measurements; Smartphones

SUMMARY

The paper will focus on recent developments in Europe which are providing commercialisation opportunities for owners, operators and service providers of permanent GNSS networks. These opportunities focus on two new and emerging areas of business.

Firstly, new applications are requiring more knowledge of the integrity/reliability of GNSS in order to support the use of GNSS in more demanding operations. A good example of this is the use of GNSS within autonomous vehicles. In Europe, the COLOSSUS project is developing a cloud-based GNSS data processing platform for autonomous and continuous ingestion and processing of vast amounts of crowd-sourced RINEX data collected from continuously operating GNSS receiver (CORS) networks. COLOSSUS will take advantage of the availability of numerous public and private CORS networks that are routinely collecting RINEX data from multiple GNSS constellations at multiple GNSS frequencies. It will process the data and autonomously identify, isolate and attribute GNSS faults and failures into causation groupings. COLOSSUS will be able to identify common mode GNSS failures, constellation failures and single satellite failures by persistent monitoring across all GNSS constellations and all GNSS frequencies throughout different geographical scales and receiver network densities. COLOSSUS will be able to identify inter-GNSS failures and inter-GNSS dependencies within GNSS receivers by processing RINEX data from multiple GNSS receiver types.

Secondly, current GNSS positioning on your standard smartphone is, at best, to an accuracy of 5-10m dependent on your environment. However, recent developments offer the potential to generate smartphone position information which is better than 50cm accuracy. This is thanks to Google opening up a GNSS raw measurement API on the Android plus developments in smartphone technology and through the availability of GNSS networks and infrastructure. The

European FLAMINGO project shall facilitate and demonstrate the future of positioning in smartphone devices by producing a mechanism for high accuracy and reliable positioning and navigation, by exploiting the European satellite navigation Galileo system (E-GNSS) in consumer applications. The overarching objectives of FLAMINGO are to develop and deliver high accuracy positioning and navigation services for mass market uptake, to demonstrate the potential by developing and showcasing ready to market applications on smartphone devices within major European cities supporting global ambitions for Smart Cities and Communities, and to foster a new community of GNSS consumers and applications based on high accuracy positioning.

The paper will provide an introduction to both of these developments and highlight the potential opportunities for exploiting GNSS receiver networks within emerging applications.

Emerging Applications Exploiting GNSS Receiver Networks (10166)
Mark Dumville, Michael Pattinson and William Roberts (United Kingdom)

FIG Working Week 2019
Geospatial information for a smarter life and environmental resilience
Hanoi, Vietnam, April 22–26, 2019