Keynote presentation

Utilising current and new Galileo Services for 3D Surveys Status of Galileo

Peter BUIST, The Netherlands

SUMMARY

Status of Galileo

Galileo has made significant progress in recent years: twenty-six Galileo satellites are in-orbit, a significant part of the supporting ground station infrastructure has been deployed, the *European Agency for the Space Programme* (EUSPA) has assumed the role of the Galileo Service Provider, various new Galileo services are being tested, and the 2nd generation of the system is already under definition.

To support Galileo's service phase, a service facility called the *Galileo Reference Centre* (GRC) was established. The centre plays an important role in the Galileo service provision as it permits EUSPA to independently monitor the performance of the services delivered to users, and serves as the door through which *European Union* (EU) *Member States* (MS) can contribute to these tasks.

New Galileo Services

Galileo has recently started testing *Open Service Navigation Message Authentication* (OS-NMA) and *High Accuracy Service* (HAS) in the signal-in-space. Galileo's OS-NMA is an authentication protocol that allows GNSS receivers to verify the authenticity of part of the Galileo information, making sure that the navigation message they receive are indeed from Galileo and have not been modified in any way.

Galileo's HAS will provide free of charge high accuracy PPP corrections in an open format for multi-constellation and frequencies through the Galileo signal (E6-B) and Internet. It will offer real-time improved user positioning performances with accuracy less than two decimetres at two service levels: one global and the other one over Europe.

Other services are also under way. These include, for example, the *Emergency Warning Service* (EWS), where the Galileo's messaging function is used to transmit, in case of an emergency, an alert to user devices. The alert will contain specific instructions to follow, which depend on the area the user is located in.

Galileo for Surveying

With Galileo's progress, new opportunities occur also for the surveying application: Galileo-only RTK with cm-level accuracy has been possible for some time (Galileo-only Cadastral boundary reconstruction of the GRC premises has been performed for the first time in July 2019) and the availability of the Galileo supported RTK solutions, benefitting from the high accuracy of its observables, will increase when more satellites become available. PPP solutions benefit, as well, in terms of convergence time, accuracy and robustness.

The authentication features of Galileo's OS-NMA may prove to fill a gap in surveying; currently no generally accepted technology exists able to authenticate the position of the surveyor. With HAS, Galileo will pioneer free high-accuracy positioning service aimed at applications including 3D surveys that require higher performance than that offered by OS.

BIOGRAPHICAL NOTES

Peter Buist is at the EUSPA, responsible for the GRC. He worked in the aerospace industry, the academia and governmental organisations in Europe and Japan, specializing in GNSS. He holds both Masters and PhD degrees from the Delft University of Technology. At the GRC, he is managing the inhouse developments, contributions from contractors and EU Member States and Norway/ Switzerland (currently 24 organisations form 14 different countries).

CONTACTS

Dr Peter Buist
European Agency for the Space Programme (EUSPA) / Galileo Reference Centre (GRC)
Zwarteweg 53
2201 AA Noordwijk
THE NETHERLANDS
E-mail: PeterJacob.BUIST@euspa.europa.eu
Website: https://www.euspa.europa.eu/galileo-reference-center-grc