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# SURVEYING IS GALILEO-READY

NOW GALILEO HAS MOVED OUT OF TESTING, USERS AROUND THE WORLD ARE BEING GUIDED USING THE INFORMATION PROVIDED BY ITS GLOBAL SATELLITE CONSTELLATION. BUT WHAT DOES THIS MEAN FOR THE GEODETIC COMMUNITY, ASKS NICK LENSKE

Galileo is the EU's GNSS and the Declaration of Initial Services – a combined effort of the European Commission, the European GNSS Agency (GSA) and the European Space Agency (ESA) – is the first step towards reaching full operational capability. The GSA has been delegated the responsibility for Galileo service provision by the commission, which means it has the core task of ensuring a return on investment from Galileo through across-the-board services and applications for end-users.

“The GSA is now putting into practice all that it has been preparing for,” says GSA executive director Carlo des Dorides. “The centre of gravity for the Galileo programme is now the user, meaning European citizens, businesses and entrepreneurs can benefit from the many innovative opportunities created by European GNSS.”

This is particularly true for the mapping and surveying sector. Along with the Public Regulated Service (PRS) and Search and Rescue Service (SaR), one of the first services offered by Galileo is its Open Service. More so, Galileo Initial Services are fully interoperable with GPS – a combination that provides users with considerable improvements, including stronger performance and service levels.

“With Galileo satellites working together with GPS, there are more satellites in the sky, meaning more accurate positioning – of particular importance to surveyors operating in challenging environments such as cities or tree canopies,” explains des Dorides.

## An efficient tool

For some GIS and mapping applications, metre-level accuracy is sufficient. “For several years now, EGNOS [European Geostationary

Navigation Overlay Service] has been contributing to the growing use of GNSS in real-time mapping by providing free, metre-level accuracy that is widely available,” says des Dorides. “It eliminates the need for complex and costly equipment and software, as well as the need to invest in additional ground infrastructure.”

However, GNSS is often used in solutions requiring centimetre-level accuracy. Sub-decimetre level accuracy can only be achieved using augmentation services, such as real-time kinematic (RTK) and precise point positioning (PPP) – and now Galileo Open Service. This free service offers either single (E1) or dual frequency (E1/E5), which further improves augmentation services including RTK and PPP.

The resulting benefits to surveyors are many, especially in multi-constellation environments. For example, using Open Service, surveyors enjoy easier mitigation of multipath errors, higher signal-to-noise ratio, increased availability, continuity and reliability, and better operation in harsh environments.

Thanks to the planned Navigation Message Authentication, the Galileo Open Service also provides enhanced protection against spoofing attacks.

In addition, there is Galileo's Commercial Service, which has an even higher level of authentication, as well as a High Accuracy (CS-HA) service. A dedicated PPP-based service, CS-HA is planned to deliver corrections around the world directly using Galileo satellites and without the need for an additional communication channel. This will support many high-accuracy applications across all segments. Along this line, CS-HA offers triple frequency with faster convergence time for surveying applications and with an accuracy comparable to RTK.



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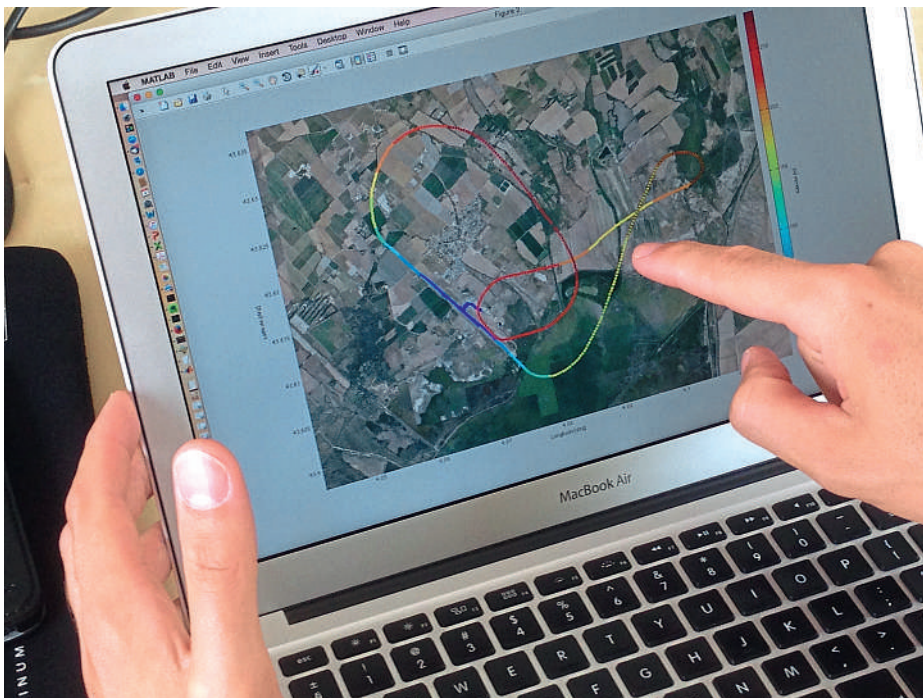
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### Galileo readiness

Of course, all these benefits can only be used if the geodetic community is 'Galileo ready'. According to a recent GSA survey of the sector, 77% of responding reference networks indicated that they have enough information to integrate Galileo into their systems, while 41% say they are already fully prepared to use Galileo signals. In total, 78% of reference networks have plans to upgrade to Galileo this year.

According to the GSA, most Galileo-enabled chipsets and receivers are currently found in the automotive, consumer, agriculture and surveying sectors. In the high-precision market, all the leading receiver developers, including Trimble, Leica Geosystems, Javad, Topcon, Septentrio and NovAtel, have integrated Galileo into their products.

To prepare for the launch of Galileo Initial Services, various national user communities have been organising workshops and seminars to inform their members about how they can benefit from Galileo. Late last year, the Swedish Board of Radio Navigation (RNN) held a seminar entitled 'How can Galileo contribute to more cost-effective production applications in the PNT field?' More than 60 chipset and receiver manufacturers, government authorities and end-users gathered to discuss the efforts and requirements for implementing Galileo into GNSS-equipment and RTK platforms, testing and needs, Sweden's GNSS infrastructure, and how Galileo enhances positioning, navigation and timing (PNT) services in Sweden.

"The GSA is excited to continue its close cooperation with chipset and

receiver manufacturers and national user communities in the coming years as we further optimise Galileo performance and maximise user benefits," concludes des Dorides. He notes that the GSA is heavily involved in several funding initiatives, most notably the Horizon 2020 framework programme for research and innovation.

Of particular interest is the current Galileo-3-2017: EGNSS professional applications (IA) call, which focuses on maximising European GNSS differentiators in such professional segments as mapping and surveying. Another funding opportunity of interest is the Fundamental Elements programme, which provides funding for innovative solutions focused on receivers.

### Use Galileo today

To use Galileo, all you need is a Galileo-enabled device. To find out if your GNSS device is Galileo compatible, simply visit useGalileo ([www.useGalileo.eu](http://www.useGalileo.eu)), where you can easily browse the list of currently available Galileo products and devices, and search for devices based on user segments. Although the GSA is constantly updating this database, if you don't see your device listed, please check your product's datasheet (usually available via the dealer or manufacturer website) or talk with your device dealer. Currently, there is no accreditation or labelling scheme available.

For those with high-precision applications using RTK or PPP corrections, you will need to check whether your augmentation service provider has already included Galileo in its service. A full list of augmentation providers supporting Galileo can also be found on useGalileo.

No specific training is required to use Galileo. In fact, if you are already working with GNSS, nothing about the way you work will change. However, if you are interested in strengthening your GNSS skills, the e-Knot project ([www.eknotproject.eu](http://www.eknotproject.eu)) provides GNSS training to industry employees, research centres and institutions.

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### FURTHER INFORMATION

For more information on how to take advantage of the funding opportunities mentioned in this article, along with many others, please visit the GSA's website: [www.gsa.europa.eu](http://www.gsa.europa.eu)