

Interoperability

GNSS technology has changed vastly since the launch onto the market of the first GPS receivers in 1982. Since then, their insides have evolved from heavy electrical circuits tracking one signal at a time into today's light-weight boards based on chip technology and connected to an antenna which can be held in the palm of one's hand. These multi-channel, multi-frequency and multi-constellation receivers are able to wirelessly communicate with ground-based and satellite augmentation systems (GBAS and SBAS) to allow for decimetre positioning using differential GNSS (DGNSS) and centimetre-level precision using Real Time Kinematic (RTK) or Network RTK. By 2020, four GNSS constellations with a fully global coverage will be available to civilians: Europe's Galileo and China's BeiDou (Compass) in addition to the US's GPS and Russian Glonass, which are both complete and fully operational now. The over 120 satellites of the four constellations will transmit at least two signals each. Hence, in less than 10 years' time, several hundreds of GNSS signals will be receivable at any outdoor location on Earth.

The four systems are sometimes seen as competitors. However, industry is keen to develop GNSS receivers capable of using all types of signal to improve reliability and precision anywhere, including in urban canyons, under canopy and even indoors – although the latter remains a major issue. From now until 2020, users of GNSS services will thus have access ever more satellites which will broadcast increasingly robust signals. Interoperability would greatly improve the precision, reliability and availability of GNSS services, particularly in urban areas which often have a restricted line of sight to the sky.

Agencies from various nations operate these satellites and associated services. The governments of these agencies may be involved in economic rivalry or political quarrels and they will ultimately determine whether GNSS interoperability is a viable prospect or will turn out to be a mirage. Will the US, Russia, Europe and China indeed have the will to co-operate, enabling full interoperability? The founding of the International Committee on GNSS (ICG), which held its first meeting in Vienna, Austria, in 2006, marked a major step towards co-ordination and alliance. ICG acts under the umbrella of the United Nations and aims to encourage universal access to navigation satellite systems, stimulating the integration of these services into infrastructures. To enable industry to design and develop interoperable GNSS receivers, open publication and dissemination of signal and system features are essential. Let's hope politicians will realise that global navigation requires plotting a global course, following a reliable compass and hoisting the sails together.

<https://www.gim-international.com/content/article/interoperability>
