

How Can Advances in GNSS and Geodesy Benefit the Geomatics Industry?



A keynote address at the XXV FIG Congress (Kuala Lumpur, Malaysia, 16-21 June) by Chris Rizos, IAG president, on 'Opportunities & Challenges for the Surveying Industry in a Multi-system GNSS World', identified five mega-trends influenced by developments in geodesy: the decades-long revolution unleashed by GPS; the forthcoming era of multi-constellation GNSS; the evolution of precise positioning from niche to mass markets; the importance of global geodetic reference frames; and the acceptance that geodesy is indeed an Earth observation science.

Taking these as starting points enables articulation of a uniquely geodetic perspective on the challenges and opportunities for the geomatics discipline – with consequences for the future of geomatics education, innovation and product development, evolution of practices

and service provision, and the promotion of geomatic skill sets.

Become GNSS experts

The GNSS future will be more complex than the relatively simple GPS world. The range of techniques is expanding, with Precise Point Positioning (PPP) services now offered on a commercial basis. Advances in PPP will challenge the current GNSS-RTK differential positioning paradigm. As the world transitions from GPS to multi-constellation GNSS, much of what we know about GPS procedures and capabilities must be relearned. Meanwhile, GNSS receiver technology will evolve in different ways. For example, there will also be low-cost, dual-frequency hardware based on interoperable GNSS signals – perhaps even smartphones with decimetre-accuracy PPP capabilities. Because precise positioning (PP) will no longer be the preserve of the geomatics-educated elite, the industry could differentiate itself by becoming the most-expert group of GNSS users.

Be ready to address new precise positioning applications

Surveyors have traditionally used GPS/GNSS for static point coordination. They must be able to execute kinematic PP tasks, for example in support of mobile mapping, and for new indoor and outdoor PP applications. Technologies to be mastered include inertial navigation systems (INS), Wi-Fi, terrestrial ranging and vision-based systems. Advanced Intelligent Transport System (ITS) applications will require PP technologies be adapted for mass-market users. The geomatics industry should prepare to take advantage of developments in PP technologies, methodologies and services to address such new (and challenging) ubiquitous, reliable and precise positioning applications.

Become mapping experts

The range and capability of mapping systems is developing rapidly. A variety of imaging and scanning systems, deployed on ground, aerial and satellite platforms, is revolutionising mobile mapping. In particular low-cost systems based on consumer products, such as video-game controllers, smartphones, handheld lasers, portable radar and hobby robotics systems, will bring mapping capability to everyone. The demand for underground utility mapping will rise. Hence the geomatics industry needs to master a variety of mapping systems, and use different imagery sources, to address above- and below-ground mapping applications.

Become coordinate and datum experts

Surveyors have unique skills in coordinate manipulation. Expertise in the use of local, national and global datums, transformations involving 4D coordinates and the appropriate use of different height systems should be nurtured. For example, geomatics professionals should be advocates of the adoption of ITRF-based national datums. They must be comfortable with a dynamic, deforming world and reinvent themselves as 'coordinate experts' who manage high-fidelity geospatial data.

The above-mentioned advances in geodesy and GNSS are likely to lead to many exciting opportunities for the geospatial disciplines in the near future.