How a Well-functioning Cadastre Can Help Greece to Emerge from the Crisis

Acropolis, Athens.

Last year *GIM International* took the opportunity to interview the general director of the Greek Cadastre, Akis Markatos. Earlier in 2014, work had started on the completion of the cadastral registration in Greece. More than 60 percent of the territory still had to be surveyed, and the project was destined to be completed by 2020. The IT infrastructure had been set up, new laws passed, 28 survey projects tendered, and a new board and management were in place at the National Cadastre and Mapping Agency. Now, one year later, not much seems to have changed and there are still many challenges to overcome. The interview from June 2014, which is still relevant today, illustrates just how important a well-functioning cadastre is in helping the Greek government to find a way out of the debt crisis.

http://bit.ly/1gsLEoC

Grand Prize for Boston's Snow Story

Esri revealed the winners of its Storytelling with Maps Contest on 20 June 2015 at the Esri User Conference in San Diego, USA, highlighting grand prize winner Joyce John's Snow Journal story map for the city of Boston. John's story map incorporated data-rich maps, videos, photos and text to craft an engaging story of how the city dealt with historic amounts of snow in Boston earlier this year.

http://bit.ly/1gsMoKFff

Boston, February 2015.

ITRF

Nowadays, we are living in an interconnected world with road and sewerage networks, oil and gas pipeline networks, power lines and drainage canals. Not all these networks are visible and geodetic reference systems belong to these invisible networks. Billions of people use these systems every day, quite unknowingly, for positioning and navigation purposes.

In the era of industrialisation it took decades to establish nationwide reference systems. For example, the creation of the famous Great Arc forming the geometric backbone of the Indian subcontinent took 50 years. This undertaking was led by George Everest as surveyor-general of India during the period 1830 to 1843. Indeed, Mount Everest, the highest mountain on Earth, was named after the surveyor to honour his efforts in determining the height of the peak. Today, the creation of a reference frame with centimetre accuracy takes a matter of months rather than decades, thanks to GNSS. For many centuries the surveyor was limited to attaching his measurements to a local or – at best – a national frame. Even to this day no unified and accurate geodetic frames are available in some developing countries. For example, Burkina Faso now has nine continuously operating reference stations (CORS) covering the whole nation, but up until recently the country had to make do with multiple frames: one established in 1950 by IGN France covering French-speaking West Africa, one made in 1958 in and around the capital Ouagadougo, one set up in 1960 by the US army and one based on Doppler measurements created in 1979. Since 1997, a first-order network of 55 GNSS points has covered the entire nation. When so many systems are used at the same time the value of modern GIS and surveying technologies becomes scant. Launching CORS is a first step towards unified frames.

Since the turn of the millennium the amount of geodata has grown at a compound rate of 20% annually. Nowadays, 15 times more geodata is available than 15 years back and its use by diverse managers and planners is supported by Global or National Spatial Data Infrastructures and open geodata. Nearly all modern geodata acquisition tools, including mobile GIS, Lidar, mobile mappers, aerial photogrammetry and unmanned airborne systems, use INS and GNSS linked to a CORS for positioning the sensors. GNSS positions are given in the worldwide standard WGS84. Civil engineers, dike builders and water boards do not need heights above a mathematical surface, which is an artificial construct, but 'physical' heights above sea level, or better geoid, to prevent water from running the wrong way in a network of drainage canals. Added to this, the increasing cross-border use of geodata requires inter-regional reference frames.

The International Terrestrial Reference System (ITRS) is the most accurate global frame and today nearly all countries have adopted ITRF. Plate tectonics cause movement of land masses, meaning that Africa and South America, for example, are drifting away from each other and Europe is colliding with Africa and Asia. The mutual position of reference points therefore deforms in the course of time – the coordinates are time dependent and need revision once in a while. It is not enough to know that a frame is connected to ITRF. Its epoch also has to be known as well as the seven parameters (scale, 3 translations and 3 rotations) of the 3D similarity transformation to link the various frames. ITRF ensures compatibility of a variety of cross-border geodata. GNSS users benefit a great deal when the transfer from the WGS84 outputs to ITRF is carried out by the device itself. Once the 7 parameters are known, a little piece of software embedded in the system suffices to conduct the transformation automatically. The scripting of such software can be done by the users themselves or by the vendors of GNSS receivers and GIS software. Many users will prefer the latter.