

GIM INTERNATIONAL INTERVIEWS CHRIS RIZOS

Modern Geodesy: Formula 1 Geospatial



Chris Rizos, new president of the International Association of Geodesy (IAG), is advocating â€[¬]modern geodesy' and a stronger, more visible role for the IAG. GIM International met Rizos in an early June Cape Town, where he was addressing a crowd of South African surveyors at AfricaGeo, just two weeks after starting his journey to one of the most northern countries of the continent, Marrakech, Morocco, to join the FIG Working Week.

How important is it for you to be in Africa?

It's very important. Geodesy is much more a global enterprise than, for instance, photogrammetric or SDI activities. The latter are all anchored to one place, or one nation, whereas geodesy is not just about supporting national surveying and mapping, but also concerned with the physics of the earth, oceans, atmosphere and cryosphere, across all scales. The impact of geodesy and its sensitivity to geophysical phenomena is therefore much wider. Africa is one of the large areas where we need more geodetic infrastructures to complement the many satellite systems used in geodesy. Africa will directly benefit from investment in infrastructure in permanent GNSS reference stations, but it's also important to point out that the whole world will benefit from geodesy products and services generated from these infrastructures. That's why the IAG wants to draw attention to how such African geodetic infrastructure is linked back to national agendas in other places as well.

You promote 'not being old-fashioned' about geodetic data. What do you mean by that?

I'll give you an example that shows why it is important to be open about geodetic data such as GNSS measurements, DEMS, gravity data etc. If you look at disaster response, or even tsunami prediction, we need rapid, good-quality data that can be used to measure the size of the seismic displacement of permanent GNSS receivers. In Japan they have a wonderful permanent GNSS infrastructure and they knew within minutes the displacements caused by the recent earthquake - an example of real-time geodesy! They were therefore able to determine the coordinate changes and draw immediate conclusions. This gave Japan good situational awareness, leading to appropriate decision making on the spot.

This is one example, and during a disaster it's almost logical that government is open about the structural implications. Do you feel it's important to open up in other situations as well?

If data is locked up it's of no value to the scientific community. There are also situations where real-time data is not necessary because what is important is long time-series of data in order to monitor changes in geometric or gravimetric parameters over time. Sea-level rise and identification of areas suffering from a higher rise than others is an example of such a need. These changes are only detectable by linking data from geodetic infrastructures all over the world.

Our readers may be least familiar with IAG compared to all other the geo-information societies like ISPRS, FIG and ICA, and even GSDI. How come?

I think that it is because in standard surveying/geomatics education geodesy subjects have a reputation for being the most esoteric and mathematically difficult. Geodesy has always been seen as existing on the fringes of photogrammetry, remote sensing, GPS, GIS and cadastral surveying: too scientific for the day-to-day professional. Many practitioners still see geodesy as rather unrelated to what they do.

Do you see it as task for IAG or for you personally to change this perception of geodesy and the IAG?

My role as president is to make it somewhat more accessible, to show that we are a not a breakaway discipline but an integral part of the geo-information industry; or, to put it differently, becoming more relevant through the increasing use of GPS and GNSS, than perhaps we were in the past. The networks of GNSS reference stations are no longer just of importance to geoscientists, but are contributing to SDIs and integral to national positioning infrastructure. Our contribution is now better understood by the practitioners than it was. It is often not appreciated that surveyors are very well represented throughout all levels of the IAG, and especially in its services. There is no fear that geodesy will be hijacked by geoscientists.

What, in your view, is 'modern geodesy'?

Modern geodesy is no longer the stereotype of what many people learned at university, where they talked about geopotential theory and gravity field modelling, national and global reference frames, space techniques, astronomy and celestial reference frames. Modern geodesy is about 4D mapping in place of 3D; it's about continuous mapping of the solid earth and oceans, it's about increasing spatial resolution and accuracy, and increasing reliance on infrastructure and services. Geodesy will continue in its function of supporting mapping and SDI, but its accuracy capabilities take it well beyond what is required for the geo-information industry.

IAG is working on delivering a major service to the community in the Global Geodetic Observing System (GGOS). What is this?

GGOS is intended - although we're still developing the architecture and operational principles -to be a continuous synoptic, high-accuracy Earth Observation System that detects those 'fingerprints' of global change which find geometric or gravimetric expression. It integrates the outputs of the fifteen services of the IAG, such as the Permanent Service for Mean Sea Level (PSMSL), the International GNSS Service (IGS), the International Earth Rotation and Reference Systems Service (IERS), the International Gravity Field Service (IGFS), and others. In GGOS we bring these together to produce high-quality, timely, reliable, 'high-level' products for science and the community. Examples include the definition and implementation procedures for a World High System, monitoring of spatial variations in Sea Level Rise, and surface deformation monitoring in support of Geohazard studies, to name a few.

What is required to achieve this?

We want to improve the accuracy, resolution, reliability and timeliness of geodetic products in order to satisfy the requirements of 'millimetre-geodesy', so as to monitor the faint 'Earth System' dynamic effects. This will require a significant upgrade of all geodetic infrastructure, both on the ground and in space. It will require global collaboration - opening up data - and continuous long-term observations. New analysis centres will generate these high-level products. In short, GGOS wants to become an integrated system with a single authoritative portal delivering these products to users: a 'one-stop-shop', but built on the infrastructures of the current IAG services.

Where do you see IAG standing in four years from now, by the end of your presidency?

I hope there will be greater realisation by the sister geo-information societies, as well as geoscientists in general, of the central role that modern geodesy plays. The measure of my success might therefore be this education process. We need to take 'outreach' more seriously. I am going to attend FIG, ISPRS, GSDI and ICA conferences to explain what we do at the IAG and what will be the contribution of the Global Geodetic Observation System through this decade. My biggest challenge internally within the Association is to see progress in the development of GGOS products. At this moment we are still struggling with terms of reference and questions concerning how all the components fit together. Our biggest challenge is to get everybody sharing a single vision - 'Draft Vision': Advancing our understanding of the dynamic Earth System by quantifying our planet's changes in space and time. By the end of my presidential term I want GGOS to be consolidated, have sustainable global infrastructure, and be better known than it is now.

What is your message to our readers?

Basically, that geodesy is continuing to develop the tools and methodologies to measure in four dimensions with higher accuracy and higher spatial and temporal resolution. GNSS is a critical technology, and GNSS Geodesy should be viewed the same way F1 racing is in relation to the family car, with the IGS as the leading expert service. It is really up to the other geospatial disciplines to take advantage of such technologies and knowledge. Geodesy is really a service; the IAG provides existing services and we are developing new ones using GGOS. Geodesy matters, now more than ever.

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