

The future: What will it look like for geospatial professionals?

—by Ilse Genovese

Last December I took part in the New Jersey Geospatial Forum in Trenton. I was there on the invitation of Peter Borbas, then chair of the New Jersey Society of Professional Land Surveyors' GIS / LIS Committee which has for years played an active role as NJSPLS' representative in the Forum. Both the Forum and the meeting of NJSPLS' GIS /LIS Committee after it were an opportunity to consider the expanding horizon of the "geospatial" world.

More often than not, changes to an established status quo announce themselves quietly, as part of seeking greater efficiencies, greater participation, or more profit through innovation. The geospatial world is no different from other fields; it is experiencing an expanded technological capacity which is changing the way surveyors and GIS professionals work.

Listening to the officials speaking at the New Jersey Geospatial Forum, one could not but notice the push and pull between the need for better geographic data at the state level and the technology that is being employed to provide better surveying and mapping services to all the sectors dependent on accurate spatial data.

The 2010 census, not surprisingly, featured, in some shape and form in a number of presentations, drawing attention to the imminent arrival of New Jersey's data—via the Census Bureau's web site—which are pegged to the block level.

The data collected by the decadal censuses expand our knowledge about our country and our people. They are the facts which power the socio-economic and political aspects of a democracy such as ours. Information gathered about our country is available on Census Bureau's American Factfinder web site which is being re-engineered to expand its usefulness to everyone from scientists, to bureaucrats, to private business, to journalists, to the public.

As a low-lying, coastal state, New Jersey has worked to improve its capacity for analyzing and

mitigating losses from natural climatic events such as floods and hurricane winds. But it also has a strong interest in obviating risk caused by hazard from economic activity. By virtue of its location on the Atlantic coast, New Jersey is the transfer point to shipping containers for certain hazardous material brought by rail from other parts of the country.

It should not therefore come as a surprise that New Jersey is invested in training its geospatial professionals in risk mitigation. Training in FEMA's HAZUS software program is being given across the Hudson River, in New York, and New Jersey plans to send its professionals to benefit from this training opportunity.

HAZUS-MH, the most recent incarnation of FEMA's HAZUS tool, combines current scientific and engineering knowledge with the latest geographic information systems (GIS) technology and is thus one of the new capabilities geospatial professionals in New Jersey and the state government are interested in developing further.

Another idea taking hold in New Jersey is widespread uptake of FGDC-compliant GIS mapping standards. Currently produced GIS maps are adopted on the "as is basis," with a caveat that the metadata "need to be provided." **Standardization of GIS mapping is an area where the surveying community could easily establish itself as a stakeholder.** A workshop on metadata which would bring together surveyors and GIS professionals was given at New Jersey Surveyors' Conference this February.

Efficient and open management of geospatial resources is necessary to extrapolate the work of geospatial professionals to new areas of application. In public forums as well as in professional gatherings and congressional hearings, the voices advocating more meaningful sharing of geospatial data, services, and applications have been instrumental in the development, at the federal level, of Geospatial One Stop, Geospatial Line of Business, and other resource management platforms.

The Geospatial Platform [www.GeoPlatform.gov] highlighted at the New Jersey Geospatial Forum differs from the previous platforms in that it is a managed network of partners who have come together with the express purpose of exploiting geospatial Internet services in the sharing of geospatial data, applications, and services.

The GeoPlatform.gov could be held up as an example of a new GIS modality. Spearheading

this new modality are advances in the technology used to acquire spatial data and advances in computing.

But, if the geospatial profession is moving into a new paradigm, the way all geospatial professionals do business will change too, and with it their future. Colleges, professional organizations, businesses, and government, all need to give thought to the new ways of providing geospatial data and services.

At the New Jersey Geospatial Forum it was none other than the owner of the best known private GIS software company in the U.S., Jack Dangermond, who weighed in on this “new GIS modality.”

HOW WE GOT TO GIS

To understand what’s just over the horizon, Dangermond took us back a few decades when CAD (computer-automated drawing) burst on the scene.

The static CAD maps were, in those days, the new modality of mapping. They were the “new modality” because they were computer-drawn, based on data collected by surveyors. Then came computational geography (better known as GIS) which added a new—spatial—dimension to solutions, from layers of data stored in databases.

Geographic information systems incorporate spatial science into many fields: environment conservation, urban development, economic planning, natural resource exploration, wireless communication, location-based services, and many more. In the past decade or so, GIS has ventured into certain applications of land management.

Good land management is the bedrock of society and its economy. **GIS is doing a good job in monitoring ecological conditions on land, but it needs to do a better job in providing accurate parcel (and other assets’) information. The idea of creating a national cadastre deserves a fresh look by both surveyors and GIS professionals.**

National discourse is also examining the role of GIS in human health, transportation planning, delivery route planning, inventory management, agriculture ... A new area is government accountability. On www.recovery.gov, the public can track government spending of tax payers’ money—where the funds are being spent and where they ought to be spent.

Government accountability is the next chapter in an open democracy. Maps help people visual-

ize what’s happening in their neighborhoods, their counties, and their states. Because of ubiquitous mapping of events, decision, and outcome, people can be more involved in government.

Geographic information presented in the form of maps thus has a role to play in community thinking and actions—e.g., in outcome measurement in schools, in crime prevention, in locating a new hospital, or planning a new development.

Integration of geographic information from multiple sources on the web is the domain of IT companies such as Google Earth. The magic that Google Earth delivers when a person asks, “show me my home,” has very prosaic roots—in GIS language which has imbued information technology with a spatial dimension.

In this new spatial IT paradigm, it’s not enough to measure but to analyze and integrate geographic information and analytics into meaningful visualizations which can inform decision-making by private citizens as well as their government.

CONVERGING FORCES

We have fast computers and even faster computer networks. We seek high web – cellphone connectedness which enables “pervasive computing.” We are moving toward the next big step of our times—“Geo on the web.” We use crowd-sourcing and cloud geo-databases to define relationships in time and 3D. Enhanced by Open Source access, these converging forces have the potential to make geospatial data available to scientists, educators, officials, and the citizenry to an unprecedented degree. Society will benefit from better leveraged sharing of geographic data.

EMERGING WEB-BASED GIS

Web-based geographic information (WGI) brings us into the era of geo-services powered by apps built on distributed, dynamically networked geo-platforms. Gov2.0 is an example of such a platform.

The notion behind web-based GIS is that if there are enough good geospatial data and services provided by government, others will be able to leverage them to build new services. Clearly, this is an area where the involvement of the private sector will be crucial.

Empowered by mobile GIS and open web access, private citizens, too, will become spatially

more involved. The “citizen cartographers” who have contributed geographic data and metadata to Ushahidi Haiti and Chile have demonstrated that web-based GIS mapping can be extremely useful in situations where timely local information is needed to save life and property.

The rise of mashups, which Ushahidi and other web-based GIS mapping platforms basically are, reflects another phenomenon of our times—the move of social media into the spatial world, helping to beget volunteerism in cartography.

Consider requests by local TV channels for photos of unusual climatic events. Consider reports on traffic flow during peak hours, or the WeatherBug icon above your email box letting you know what the temperature will be in your location on the day you access your e-mail. Consider the map you just pulled up on your iPod telling you which restaurants are in the vicinity of your hotel. Consider also the role of Google, Facebook Twitter, and other geocoded, real-time media in last year’s protest in Iran and the current upheaval in Egypt.

Web-based geographic information provided in real time is a new type of geographic data. We need to learn how to use it, how to combine it with data from other “authors” to make it valuable. We also need to learn how to share it better. We need to create a sharing ecosystem which would support web, desktop, and device apps using data stored in “the cloud.”

The future for the geospatial world is being mapped now. It’s a future dramatically different from when CAD and GIS were invented. It’s a future which recognizes that there is at least one generation which is comfortable with the Internet and other technology. This generation is technologically very adaptable and eager to incorporate geospatial information into many parts of their lives. But they want geospatial data that is easily accessible and delivered on their terms.

As this generation gains more control in society, we are likely to see demands from consumers, clients, and the citizenry at large for geospatial services that can leverage both social and economic capital for the benefit of all.

Another kind of GIS professional will be needed to develop and provide the next generation of geospatial services that are expected. It will be a professional who will need to adapt to meet the demand for geospatial data and services that solve real world problems.

This will require software and hardware that is open and modular and data that is easily accessible but secure. If the current developments are anything to go by, geospatial data will become more abundant and cheaper, and they should be of higher quality. **The geospatial professional will thus be concerned with interoperability, standardization, metadata, and meticulous inclusion of “ground truth” in GIS, i.e., accurate parcel data and the element of time from surveys and re-surveys of boundaries.**

The new modality of GIS is just round the corner; it behoves us to carefully examine not only the technological advances heralding it but, importantly, what these advance will mean for the broader “geospatial profession.”

An across-the-board consequence of the new GIS modality is that the boundaries between different types of geospatial professionals will be blurred.

Professional organizations need to reflect this impending multi-disciplinary nature of their members and clients. They need to encourage a more robust dialogue between professionals on divisive issues, such as why state plane coordinates and measurements on the ground may not match in GIS. They need to become more involved with the new generation of geospatial professionals and their education.

The Internet, which propelled a different kind of mapping, is breaking down geographic limitations in education via distant learning. Coupled with involvement by professionals in local colleges, online courses will enable students to pursue education that really interests them rather than being limited to education locally available.

The march toward a new modality in the geospatial world has begun and will continue far into the future. Esri’s Dangermond planted some thoughts about this new modality at the New Jersey Geospatial Forum in December. The time has come to get on board with this reality and carve a stake in that future. For, at some point, geospatial data will no longer be the product of skilled professionals, but a “commodity” much like clean water or sugar, while the need for more accurate geospatial data and better geospatial services accelerates. Herein lies the big challenge before all geospatial professionals: start rethinking the ways our craft and profession fit into that future, so that the data and services we produce continue to be of the highest integrity and of the greatest utility to our clients.