



## Editorial

>> Marc Cheves, LS

# THE American Surveyor

A FOOT IN THE PAST... AN EYE TO THE FUTURE

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# Surveyors Get the Point

For me, the 6th annual ESRI Surveying and Engineering Summit represented a sea-change. While earlier meetings I attended were designed to attract surveyors into the world of GIS, the trend has taken hold and surveyors everywhere are busy incorporating GIS into their work flows. I like the way Arizona surveyor **Rudy Strickland** says it: "Surveyors get the point."

The two-day program (a prelude to the main ESRI User Conference) was packed with so many presentations that it was hard to choose between them. Opening remarks were given by **Brent Jones, PE, LS**, the Survey/Engineering Industry Manager for ESRI. He commented on the real costs of construction: 75 percent of life cycle costs are in the operation of a facility, whereas only 25 percent are in design and construction. ESRI is addressing this by focusing heavily on position-enabled, standards-based locations for objects in the GIS, a theme repeated throughout the Summit.

Keynote speaker **Air Force Col. David Madden**, GPS Wing Commander, spoke of coming improvements to the constellation, including mounting laser reflectors on the satellites to allow further refinements of the orbits, and links between the satellites to further improve the timing element. Madden also mentioned that some of the old signals will eventually be turned off because of power considerations or conflicts with new signals. One of the challenges for the Air Force will be in maintaining backward compatibility. Another is funding for new satellites. The oldest Block II satellites are more than 16 years old. While the cost of a GPS satellite runs between \$60-70 million, it is the cost of the launch vehicle (at \$200 million) that overshadows the budget. In comparison, Madden pointed out that the cost of one Air Force communications satellite is more than \$1 billion. Madden didn't fail to mention some of the stupid things that civilians have done using GPS (like driving off abandoned bridges or turning onto train tracks) and reminded the audience that common sense is still a requirement.



Brent Jones, PE, LS



Col. David Madden, USAF

ESRI employees **Ray Carnes** and **Don Keuhne** spotlighted new features in ArcGIS Mobile and ArcPad. ESRI software now includes the ability to hyperlink any document to the GIS. That way, if the document changes, the latest version will always be available. Adobe's new GeoPDF will bring a host of new functionality, including the ability to port CAD drawings and GIS information into the PDF. Users will be able to measure and annotate within the PDF and creators can control user access to the PDF. A cool example of this is orthophotographs: users will be able to deliver orthos inside a PDF (small file size) without having to deliver the actual ortho (huge file size). Also demonstrated was ESRI's extensive capability of publishing maps in a browser. A great deal of control exists for the data

owner. For example, most as-builts have a variety of people working on them. An inspector for an agency might have one level of access, whereas a surveyor might have another, higher level of access. The inspector could mark-up but not change, and a surveyor could change. Finally, ESRI is well-poised to take advantage of the increase in the availability of free or low-cost aerial and satellite data. For \$500 a year, a user can access high-rez Microsoft Virtual Earth imagery.

**Tim McCormick, PE**, who heads up the Hazard Engineering and Geospatial Service Group for **Dewberry** here in the DC area, gave a great presentation on the state-of-the-art for flood mapping and more. He chronicled the history of the oft-times low-accuracy FIRMs we surveyors have all grown to know (and not love), and discussed the D(digital)FIRMs that are replacing them. To transition, in FY04 **FEMA** started a \$1 billion effort to move to higher-rez topographic information and improved data standards. The DFIRMs are downloadable from the Internet, and the result has been lower costs and speedier map production. Beginning in FY09, FEMA is starting **Risk Map**, which will focus on the identification, assessment, communication and mitigation of such things as levees, coastal areas, unmapped communities, and communities where the flood plains have significantly changed. McCormick, who manages 120 people, said Dewberry long ago saw the need for GIS technology and gave as an example *transects*, the cross-sections that start offshore and extend past the first line of dunes along a coastline. Before, transects were pulled every mile, and it might take 10–15 hours of effort for each one. Now, with a button-push, they can be taken at any interval, and 10–20 per hour can be processed. The benefit allows engineers to focus on quality control and value-added services. McCormick also mentioned the challenges of dealing with huge amounts—20 terrabytes—of data.

ESRI Chief Scientist **Dr. David Maguire** began a fascinating presentation on the current state of geospatial technology by taking a look backward at the “hype versus acceptability” behind many technologies. He said while Google Earth and Virtual Earth are still “ascending,” the spatial data infrastructure is descending and location-based services have not lived up to the hype. Interestingly, however, he described the following as technologies that *have* lived up to their hype and are now accepted: online mapping, GPS,



Tim McCormick, PE



David Maguire, ESRI

machine control, digital photogrammetry and digital map production. Although Maguire agrees with predictions of “faster, smaller, cheaper and more bandwidth,” he believes the desktop will remain for such things as data compilation and editing, spatial analysis and modeling, and cartography.

Maguire emphasized that we are moving toward real-time everything, and that GIS is moving to the field. “We’re rapidly approaching a multi-user, multi-format, multi-platform shared database foundation for information systems,” he said. He quoted **Scott McNealy** from **Sun Microsystems**: “The network is the computer.” That is, with the Internet, the machines—we call them computers today—are connected to other machines across the network. Maguire pointed out that land development drives GIS, and GIS simply integrates information.

This brings me to the second most impressive thing about the Summit: the lengths to which ESRI has gone to incorporate surveying and positioning into its databases. To close out Day One, a panel discussion was held, titled “Machine Control—Where and What Are the Geospatial Professional’s Boundaries?”

What does machine control have to do with GIS, you ask? Thanks in large part to **Jack Dangermond** himself, ESRI has steadily and consistently insisted that surveyors play a vital role in GIS. I interviewed Jack several years ago and was struck by the genuine connection he has with surveyors. ESRI has done much in the way of attracting surveyors into GIS. It has added many engineering design tools inside its software. Thanks to close cooperation between ESRI and NGS, ESRI’s software has strong geodesy tools and cleverly-written code to allow surveyors to bring all their precision and accuracy to the table. As an example, users can control the quality of GPS data the GIS will accept.

GIS people get it. They understand that the underlying fabric of GIS must be survey-grade for the GIS to have real functionality. Additionally, powerful tools that have been built into the software allow surveyors to bring boundary information into a GIS, thereby incrementally improving the GIS and preserving their data. **Anthony Vanozzi**, an LS from Connecticut, gave a presentation on just how this process works and it was clear that a surveyor’s judgment is still called into play. Granted, it took a lot of steps, but once completed, the information is there for future use, and more important, for selling value-added services to a client. One such value-add is the ability to auto-generate contours for a boundary survey, something that can be sold to a client even though it may not have been part of the boundary survey scope.

State survey societies, take note! A subject that repeatedly came up, and not just from surveyors, but from GIS and NGS people as well, is the need for surveyors to certify data. In the machine control panel, **Bruce Carlson** said that in Kentucky only engineers can certify 3D models. This is a major threat to surveyors, and all of the state survey organizations need to work with their legislators to beat this idea down.

All in all, the Summit is well worth the cost of attendance. I used to tell our readers that if they wanted to find out where the future of surveying and GIS was heading, they’d be wise to attend. Today, if you don’t want to be left out, attendance is practically mandatory. Add to it the fact that San Diego in the summer, with light ocean breezes and daytime temperatures in the 70s, is a welcome relief from the hot, humid and hazy days of summer elsewhere in the country. 