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Fall 2006 Department Spotlight Minnesota/North Dakota Collaborative GIS Project

by Randy Knippel - GIS Manager, Office of GIS

The Federal Geographic Data Committee awarded a $75,000 grant to a collaborative represented by Dakota County, Richland County (North Dakota), the State of North Dakota, and the Metropolitan Mosquito Control District of Minnesota. Several other counties, as well as city, regional and state agencies, will also be participating to varying degrees. MetroGIS and the Governor's Council on Geographic Information also support the project, whose goal is to improve the ability of local government agencies to deliver enhanced public access to GIS data through web applications.

The Dakota County Office of GIS's involvement in the project will include developing software requirements, as well as software design and testing. The project will provide the public with greater access to GIS data from multiple agencies without the need for learning new programs. Also, the costs of developing specific web-based GIS applications will diminish by leveraging the power of an open-source software model and by taking advantage of the collaborative commitments of multiple jurisdictions and agencies.

The project is due to be completed in June, 2007; however, an initial prototype is due to be released later this fall. The main objective of the project is to create an initial release of a product that will continue to be enhanced by multiple agencies and individuals. More information is available on the project website at: http://www.geomoose.org/moose/.

Fall 2006 Desktop GIS Pictometry Change Analyst

by Joe Sapletal, GISP

Those who are familiar with the Pictometry desktop application Electronic Field Study (EFS) may not know that there is an add-on that Assessing Services has at their disposal called Change Analysis. Change Analysis allows for the viewing of two separate year's images side by side to analyze for change. You can use just orthos, just obliques or a combination of both image types to do your investigating.
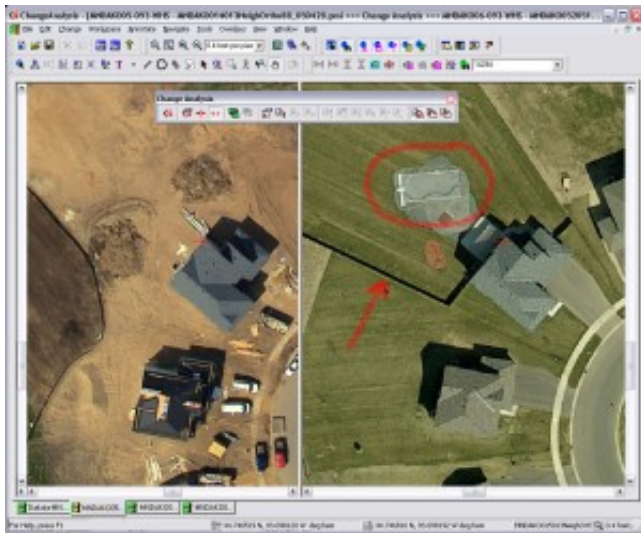
The images can be displayed side by side to visually examine an area. In the example at the left, in the left photo we see two homes that were in the late stages of construction in the spring of 2005. In the photo on the right, from spring, 2006, we see that the north-most property now has a swimming pool and a fence.

It wouldn't be the most efficient use of time to scan from one image to the next throughout the county looking for such changes. What would be more efficient would be to have some existing data that would help you find those properties that have changed recently. Fortunately, we have such data available, in the form of building permits. Building permits can be loaded into Change Analysis as change candidates. These change candidates can be in either a .dbf file or in a shape (.shp) file. Once the permit files are loaded into Change Analysis, users can step from permit to permit, assigning attribute values to the permit such as "Changed", "Constructed", "Demolished", "No Change", or "Undecided". Users can also leave comments as necessary using the Change Analysis toolbar.

In addition to Change Analysis, there is at least one other service out there that can be used to compare images. Hitachi provides a service through Pictometry that uses building polygons and feature recognition to produce a change candidates file for the user to examine. The difference between the two services is that the Hitachi service essentially does all of the comparing for you.

If the data you used in Change Analysis is a shapefile, you can then also map that data with your GIS software. The maps could then be used to examine growth, or to plan a series of site visits to an area of interest.

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## Fall 2006 GIS 101 Save Gas with GIS!
by Matt McGuire

As the price of gas continues to go up, it is important for County employees to organize their work to minimize the number of miles traveled. GIS can help by providing maps showing where your customers, clients, and suppliers are, giving you a picture of how they are distributed geographically. You can then organize your work and that of your work unit to decrease miles traveled and increase efficiency.

For example, if you have a list of clients you need to visit saved in an Excel spreadsheet, it may look like this:

1	Dorothy D. Schaefer	13756 Fordham Ct	Apple Valley	MN	55124
2	Christopher K. Taylor	8173 159th St	Apple Valley	MN	55124
3	Cynthia J. Matthews	13286 Ferris Ave	Apple Valley	MN	55124
4	Mary M. Cohen	15776 Hannover Path	Apple Valley	MN	55124
5	Jack C. Schmidt	1728 Crossridge Way	Rosemount	MN	55068
6	Angela A. Borders	7253 Upper 136th St	Apple Valley	MN	55124

You might be tempted to visit these clients in the list order. However, a free web based map, like Yahoo Maps (Beta) can easily map these addresses, revealing clusters of clients in different parts of Apple Valley:
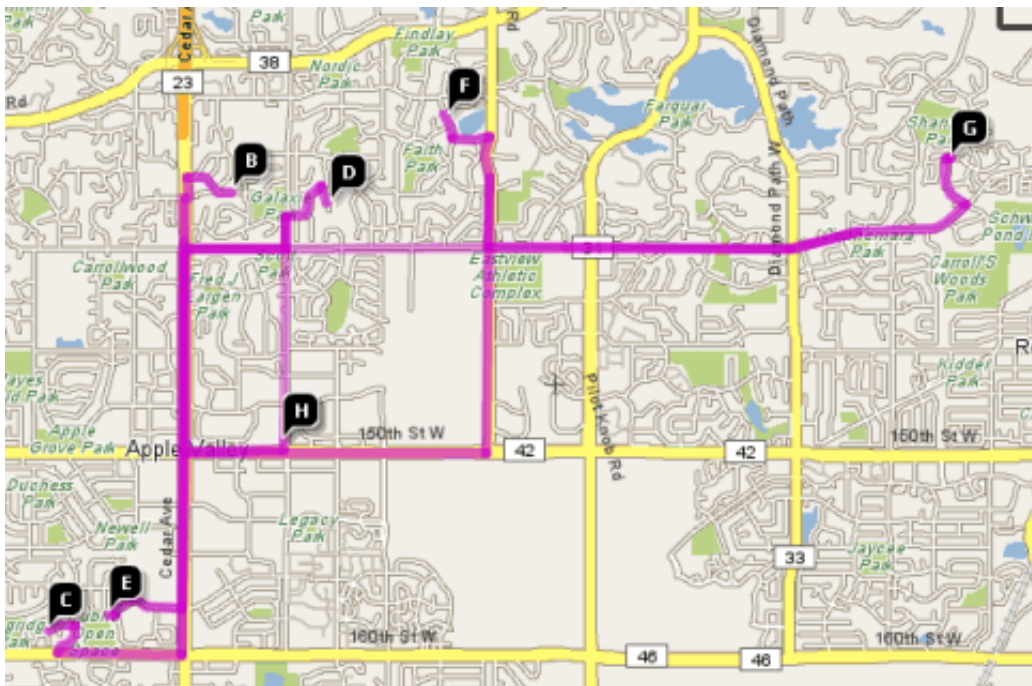
Just by looking at the map, I can reorder my list (you can even change the order directly in Yahoo Maps):

4	Mary M. Cohen	15776 Hannover Path	Apple Valley	MN	55124
2	Christopher K. Taylor	8173 159th St	Apple Valley	MN	55124
6	Angela A. Borders	7253 Upper 136th St	Apple Valley	MN	55124
1	Dorothy D. Schaefer	13756 Fordham Ct	Apple Valley	MN	55124
3	Cynthia J. Matthews	13286 Ferris Ave	Apple Valley	MN	55124
5	Jack C. Schmidt	1728 Crossridge way	Rosemount	MN	55068

Starting from the Western Service Center and following the route in the order of the first list makes the trip 27 miles and 56 minutes, while the second list is only 16 miles and 36 minutes. Including vehicle and staff costs, this amounts to approximately a $14 savings.

The more astute observers of the Dakota County addressing system, or those who know Apple Valley really well, might be able to create an optimal route from the list only. But anyone looking at the map can quickly visualize a much more efficient route than the list order.

For a larger scale problem, GIS provides tools to do more complex analysis in the areas of spatial analysis and routing for decision support. For example, GIS has tools to aid in distributing the workload for dispersed clients.
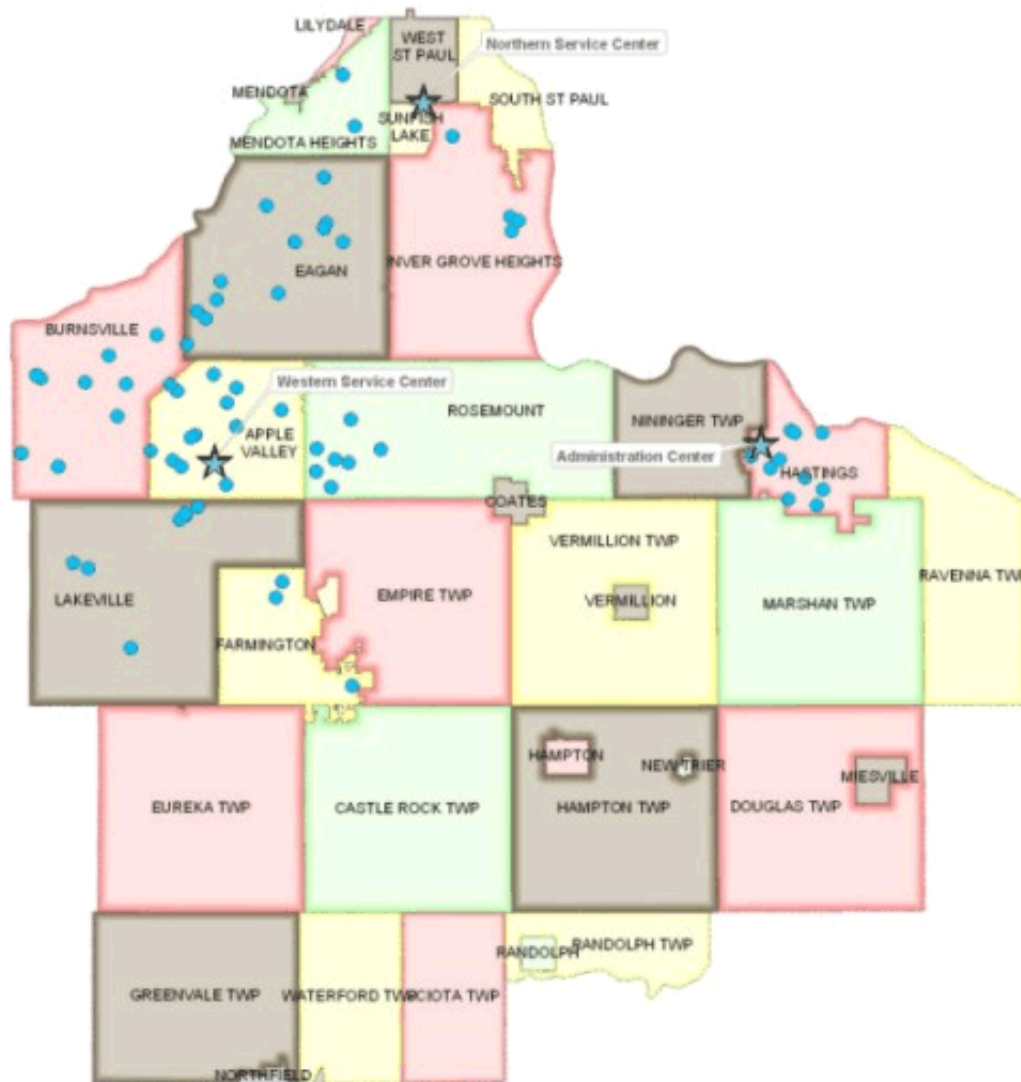
The cluster of clients located around in Hastings would be apparent even from a list. However, other clusters around the county might be more difficult to pick out without the help of a GIS. GIS can add the ability to distribute

workload by geography more efficiently. This can be done both within workgroups and between different work groups with an overlapping client base.

Fall 2006 Tech Talk 2006 ESRI User Conference Wrap-up

by Mary Hagerman and Todd Lusk

Despite the high cost of travel and increased airport security, a trip to San Diego for the annual ESRI User Conference is well worth the investment. The conference is a valuable training opportunity for GIS professionals. There are, of course, opportunities to network with colleagues from across the globe and learn what other GIS shops are doing. And there are the usual conference paper sessions. But, most importantly, there are nearly 400 technical workshops led by ESRI staff, as well as an exhibit area that provides hands-on opportunities with support staff on hand. It's a great way to learn about ESRI's vision for the future and to get a jump on what's coming down the pipe.

The technical workshops are very focused sessions that get right down to the nitty-gritty. They are on topics such as "ArcIMS: Creating .NET Web Applications"; "ArcGIS Server: Creating and Using Web Services"; and "Geoprocessing with ArcGIS Server". These workshops are actually mini training sessions, led not by instructors or sales reps, but by members of the development team. Imagine, the people who can actually answer your questions are right up there in the front of the room! The demos are live, not canned, and sometimes even fail at first try, proving that not even ESRI staff are immune to software bugs.

Between sessions or over lunch, take a stroll through the exhibit hall. This area full of vendors, business partners, fellow GIS users, and ESRI displays has got to encompass several acres. There are miles and miles of booths vying for your attention with freebies, giveaways and chocolate. But look past the carnival fare and you will find scores of people either doing neat things with GIS or else providing products and services to help others do neat things. The center of the hall is devoted to ESRI, where each product gets its own 'island', populated with staff, literature, and workstations for trying things out first-hand. There is also a number of 'Demonstration Theaters', like the juicer guy at the fair, where they do live demos throughout the day. And bring your questions, because if the people at the product islands can't help you, there are Information, Customer Service, and Tech Support islands as well.

According to the folks at ESRI, the big news these days is the upcoming release of ArcGIS 9.2. ESRI claims that it's the biggest release since 8.0. The focus of the release seems to be on server-based GIS. From the promises made during the plenary sessions, backed up with demos in the technical workshops, 9.2 appears to be well worth upgrading to. Of course we'll have to wait until this fall to get our hands on it. It doesn't make sense to document all that is new in 9.2 here, as ESRI has already done that on their web site and elsewhere (see link below), but here are some of the highlights.

Some very cool new additions featured with the release of ArcMap 9.2 are the advanced cartographic capabilities. These enhancements will allow GIS users to change the way data is symbolized without actually changing the underlying data. For example, say there is a frontage road running along a highway. On a small-scale map that frontage road might overlap the highway symbology. The advanced cartographic capabilities of 9.2 will allow users to "move" the frontage road line without actually changing the underlying line data. The change in the line is only represented in the symbology, not in the data. Other tools such as the ability to automatically rotate polygons to sit parallel or perpendicular to line features will be added as well. More control over the ways line features get symbolized will also be available.

ESRI's answer to Google Earth and Microsoft's Virtual Earth comes in the form of ArcGIS Explorer 9.2. ArcGIS Explorer is a free, downloadable GIS client that provides 2D and 3D mapping capabilities. Several globe surfaces are available from ESRI for use in ArcGIS Explorer, and users can add their own data. ArcGIS Explorer also serves as a client for ArcIMS services, ArcGIS Server services, ArcWeb services, WMS services, and KML.

Although ArcGIS Server has been around awhile, it has been completely redone for the 9.2 release. ArcGIS Server is now a complete, out-of-the-box web-based GIS. You can create and publish services and web applications without any programming at all. For developers who want to program, ArcGIS Server's application development framework (ADF) is new too. ArcGIS Server developers have a choice of ADFs - .NET or Java. ArcGIS Server also got a new, scalable product organization and pricing model at 9.2. This is big news because it allows you to get into ArcGIS Server without spending a fortune. In fact, for customers on maintenance for ArcIMS, the standard edition of ArcGIS Server is included.
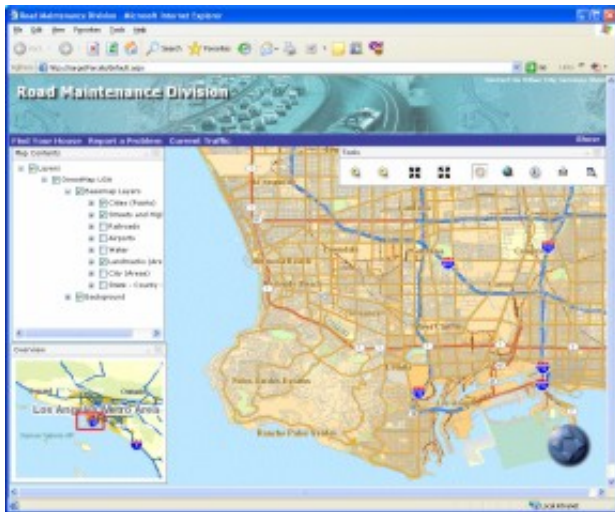
ArcIMS got a major facelift for 9.2. There were enhancements to the spatial server, but the real news is an all-new web client and a new ADF. The web client and ADF are the same as those for ArcGIS Server. This means your ArcIMS applications now support multiple services: ArcIMS, ArcGIS Server, ArcWeb services, and WMS.

Another interesting product in the ArcGIS family is Image Server. This is a server-based application for efficiently serving up raster data. Image Server will perform several server-side tasks on raster data "on-the-fly". The application can be loaded with raw aerial imagery shots and elevation data and the photos can be orthorectified "on-the-fly". That could eliminate the need to buy orthophoto products from vendors. The data can be served directly to ArcGIS or set up as a web mapping service to provide the data over the web.

There were several changes to ArcSDE and the geodatabase for 9.2 as well. Many of the changes had to do with making it generally easier to use and administer, much of it right in ArcCatalog. The most exciting new features, however, are probably the introduction of the file geodatabase and geodatabase archiving. The file geodatabase is a new geodatabase format that is stored right in the file system as a directory. It is similar to a personal geodatabase in capabilities, but the size limitations have been removed, performance is up to 10 times faster, and storage can be 50-75% smaller. Geodatabase archiving allows for the creation of temporal bookmarks and includes capabilities for querying dates.

Overall, it seems ESRI is making a serious attempt to increase the quality, not just the quantity, of features in their products. They seem to be focusing on making 9.2 a better product. One developer commented, "We hear you! You'd much rather have quality over quantity." They have also increased efficiency and fixed a number of bugs for the ArcGIS 9.2 release.

For a complete list of what's to come at 9.2, check out ESRI's website at http://www.esri.com