ILLINOIS GIS NOTES

THE NEWSLETTER OF THE ILLINOIS GIS ASSOCIATION

Illinois' International GIS Treasure

By Jim Westervelt

Illinois-developed software released into the public domain more than a decade ago now thrives as the most important internationally maintained and used public domain geographic information system. The software is the Geographic Resource Analysis Support System, or GRASS, a full-featured suite of GIS raster and vector analysis and image processing tools. The rate of GRASS software development is now very high, delivering new image processing, vector analysis, user interface, internationalization, parallel processing, and web service support.

GRASS is a public domain GIS that is now released under the same GNU license as Linux. GNU stands for "GNUs, Not UNIX," which covers software that was developed as a complete rewrite of the original versions of UNIX developed primarily by Bell Laboratories and UC Berkley. GNU was fathered and nurtured by Richard Stallman, who believed that the world would be better served by public domain software than by corporately controlled code. The dramatic growth of Linux, really "GNU Linux," attests to the power of his dream.

GRASS was developed initially with federal funding, and its developers believed that making the software publicly available would not only best serve the United States public, but result in a far better product than could be afforded by the limited funding within the Corps of Engineers. This stone-soup approach to software development proved to be very powerful and allowed GRASS software and its development and user community to grow dramatically. Literally hundreds of people have contributed many thousands of hours of software, data, testing, and organizational time to GRASS, making it one full-bodied stone soup.

GRASS mixes over 109 raster commands, 57 vector commands, 50 display commands, and 19 image processing commands into an extremely powerful array of GIS magic. GRASS is UNIX-based and runs equally well under Linux and Cygwin. Cygwin is a UNIX environment that runs within and with your Microsoft Windows environment,

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Inside this issue...

Vol. 6, No. 2 Summer 2005

An Update on Geographic Information Technology as Part of the State of Illinois Information Technology Initiative

By Sheryl Oliver

The winter 2005 newsletter provided an update of the Illinois Technology (IT) Initiative for the state and the role of Geographic Information Technology within the IT organizational structure. Here we review a forum held during the spring ILGISA conference and provide an update on the GIS Strategic Plan together with a draft outline.

GIS Forum

A forum for GIS Professionals employed by Illinois state agencies was held to discuss the GIS Domain within the Illinois IT Governance Model and IT Rationalization Initiative. The objective of the forum was to provide an opportunity to learn about the

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The Editor's Corner

By Keith Caldwell

This year's spring conference was held once again in Springfield at the Crowne Plaza. The two-day event offered informative workshops on the first day that covered such topics as asset management, digital camera technology, addressing, and LiDAR. There were three on specific software skills development.

The second day kicked off with opening remarks by ILGISA president Ruth Anne Tobias, followed by the keynote speaker, Steve Schilling. Steve tied right in with the theme of the conference, "GIS Rocks Our World," with his fascinating insights into work being done at the Cascades Volcano Observatory, specifically Mount St. Helens. You can find out more about his work beginning on page 8 of this issue of *GIS in Illinois.*

Concurrent session tracts covered topics that included web-based application and technologies, GIS for engineering applications, GIS in emergency response, and user experiences in GIS application development and management.

ILGISA was founded by individuals interested in providing a place where GIS practitioners could come together and share experiences, create lasting networks/relationships and learn from each other. Their goal was to do this in a vendor-neutral forum where it was more valuable to work on issues and problems and learn about GIS resources than it was to focus on the specific software being used.

That spirit still carries on today. The success of each conference depends upon ILGISA membership participation, whether it's volunteering for the planning committee, becoming a session moderator, or participating in a workshop or session where you can share exciting new GIS applications, techniques, or projects you've been involved in. If you haven't already done so, please consider becoming involved in ILGISA.

In this issue of *GIS in Illinois*, you can read about the history of free open-source GIS software called GRASS. What makes this particularly interesting is not only that it's free, but also that its "birth place" was the University of Illinois at Urbana-Champaign.

New in this issue is an interesting air photo segment (see page 3). We would like to make this a regular feature, so all of you who are developers or recipients of aerial photography, feel free to submit a unique image for inclusion in the next issue.

Finally, thanks to everyone for participating in the surveys that were sent out via email. The surveys provide valuable feedback on issues that are important to the Illinois GIS community. If you are a member and haven't received an emailed survey, it may be that ILGISA doesn't have your address. To update your address or to become a member of ILGISA, contact Jenny Gray at **jlgray@niu.edu**.

Keith Caldwell is GIS Applications Supervisor with the Lake County GIS/Mapping DIvision.

New ILGISA Board Member Scott Dragoo

Scott has been the GIS Systems Analyst for Sangamon County, Illinois for the past two years. Prior to this position he was GIS Systems Manager for the City of Springfield Department of Public Utilities, and GIS Coordinator for the City of Springfield Department of Public Works for 13 years.

During his tenure at the city he founded the GIS program and created much of the data and policies still in use by all city departments. Scott has served as the chairman and vice-chairman of the Springfield Area Geographic Information System Advisory Committee. He also serves on the Illinois Geographic Information Council and is currently working toward earning a Masters Degree in Geographic Information Science through Simon Frasier University.

Outside of his primary employment, Scott has trained teachers and students in the operation of GIS software and the fundamentals of GIS. This work has included school districts from the Chicago, Peoria, Greene County, and Wabash County areas. He also provides mentoring for the GIS program at Springfield High School.

He has been an active member of the Illinois GIS Association, attending numerous conferences. He has presented several sessions at the conferences and served on the planning committee for the Spring 2002 conference. Scott views ILGISA "as an important vehicle for forming peer-to-peer relationships among Illinois GIS professionals. These relationships are one of the most valuable resources available to this group of professionals."

Interesting Aerial Photography

While doing an acceptance review of Lake County's 2004 aerial photography, GIS Analyst Bryan Luman discovered this message visible in a small field. The message is only viewable from directly above the property, which still has not sold as this newsletter goes to print. We will get a chance to check up on the status of this feature using images from the 2005 Lake County and the 2005 NAPP aerial photography projects.

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Mark Your Calendar

The **Fall 2005 *GIS in Illinois* Conference** will be held at a new location! Join us at the **Oak Brook Marriot Hotel on November 14-15, 2005**.
We are currently seeking posters, presentation proposals, and workshop proposals. Visit www.ilgisa.org for details.

Check out earth.google.com!

My son called the other day to ask if I'd seen 'Google Earth' yet. "It's really cool, Mom, like flying through space down to earth." Several people in my office also have set it up on their computers. One colleague found the building where she used to live in Rome, the bridge where she met her husband, and their favorite coffee shop. So, check it out, along with products like Microsoft's Terraserver or Virtual Earth and the National Geographics' MapMachine. Products like these are taking interest in 'place' and maps and the world around us to a new level, and allow people to be very creative in their map applications.

—*Ruth Anne Tobias*

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allowing you to run GRASS (and UNIX hand-in-hand with Windows. A CD image out of Germany can be downloaded that will allow you to simultaneously install Cygwin and GRASS onto your Windows computer and be up and running within a short time.

A Short History

Initially GRASS development occurred at the Army Corps Construction Engineering Research Laboratory (CERL), co-located with the University of Illinois at Urbana-Champaign (UIUC). UIUC students and faculty participated in the effort—especially through the Geographic Systems Laboratory co-directed through the departments of Landscape Architecture, Urban Planning, Geography, and others.

Development was originally funded in the early 1980s by environmental offices at several military installations and spread to many Army and Army National Guard offices.

and the final GRASS annual conference was held in 1995.

Without commercial support or Corps research and development funding to gather the still-developing software into new releases, GRASS development slowed and the user community dramatically declined in response. Although CERL releases stopped, CERL completed a massive effort, converting GRASS programs to support floating-point numbers in its raster and image processing systems. Embers of development also continued within a few universities and government labs, but it appeared that eventually GRASS would exist only in archives.

However, the winds of computer hardware and software evolution ushered in a breeze that flamed some of the fading, but still hot, embers. With the growth of Linux, also a free and open software development system, GRASS found the perfect home.

All GRASS software is public domain, which means that all source code is available for inspection by anyone.

GRASS was also adopted and supported by such agencies as the National Park Service, the Soil Conservation Service, and the Bureau of Land Management. Additionally, non-governmental offices, numerous universities, and commercial interests applied, supported, and contributed to GRASS. Annual national user group meetings held in locations coast to coast attracted a growing following into the early 1990s.

Under pressure from commercial GIS vendors, CERL posted its final formal release to the GRASS community and transferred responsibility for continuing the software. After a couple of years the various formal efforts ended

A spark of GRASS development rekindled efforts nearly simultaneously at Baylor University and at the University of Hanover. It was the efforts of Marcus Neteler at the University of Hanover that resulted in the flame of the current GRASS renaissance.
The center of GRASS development moved with Neteler when he took a teaching position at the University of Trento, Italy.
With the help of many supporting developers at universities across the world, he has reinvigorated GRASS research and develpment with the release of new versions.

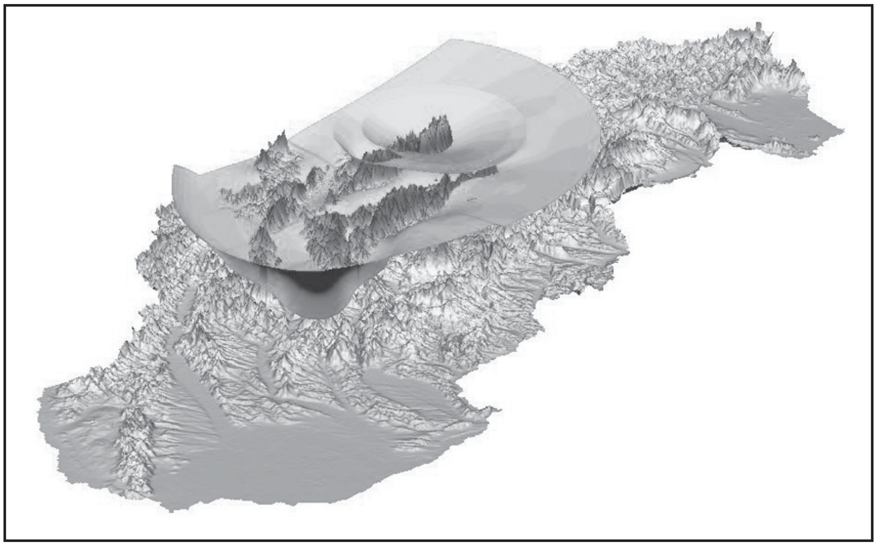
The key dates below summarize the history of GRASS development and releases:

- 1982 Fort Hood Information System (FHIS) (Vax 11/780 Minicomputer)
- 1983 Installation Geographic Information System (IGIS) (SUN-1 Microcomputer)
- 1984 GRASS (SUN-1 and Masscomp)
- 1985 GRASS 1.0; GRASSnet established [GRASShopper archive 1991-95, GRASSList archive 1991-today]
- 1986 GRASS 1.1; received URISA's "Exemplary Systems in Government Award"
- 1987 GRASS 2.0; first issue of GRASSClippings, GRASS video
- 1988 GRASS 3.0; Army R&D Achievement Award
- 1991 GRASS 4.0; released through Internet
- 1993 GRASS 4.1; Federal Lab Consortium - Award for Excellence in Technology Transfer
- 1995 GRASS 4.1.5 port to Linux: Yung-Tsung Kang, Michigan State University, 2/1996 USA-CERL no longer support GRASS announcement
- 1997 GRASS 4.2 Baylor University
- 1998 GRASS 4.2.1 Markus Neteler, Germany
- 1999 GRASS 5.0 released under GNU GPL (Baylor University and Markus Neteler)
- 2002 GRASS 5.0.0 stable released (GRASS Development team lead by Markus Neteler at ITC, Trento, Italy)
- 2003 GRASS 5.0.3 stable released
- 2005 GRASS 6.0 released

The New GRASS

This past March, Neteler et al. released GRASS 6.0, a powerful new system that captures amazing new developments that have been programmed in Europe, Asia, Australia, North America, and even Jamaica. Major new contributions include a new user interface, new image processing tools, and a completely revamped vector processing and analysis system. GRASS retains its core capability as the most powerful command-line driven raster analysis package. The new user interface provides the GIS technician with the ability to be up and running within hours. The interface has been internationalized with multiple languages available, including Vietnamese, Chinese, Japanese, and all European languages.

An optional platform-independent user interface has been released by collaborators in Trento, Italy and at the University of the West Indies in Jamaica. Called JGRASS, this will provide a modern interface designed especially for first-time and occasional users. GRASS is also becoming more web-friendly by offering map-server capabilities and the ability to run GRASS analyses as Web-based components.



This rendering shows an isosurface of a GRASS analysis overlaid on an illuminated digital elevation model.

GRASS Software Basics

GRASS is first and foremost a powerful raster GIS processing system that provides a greater variety of raster analysis capability than any other GIS. Originally developed to support landscape analysis in support of environmental and hydrologic analyses, it excels at importing and processing raster maps.

Early development of GRASS incorporated a basic vector-processing package intended primarily to accommodate paper map digitization and conversion of vector GIS data into raster maps. The vector-processing package has been completely refabricated to bring these capabilities up to 21st century standards.

Numerous vector, raster, and imagery import/export functions allow GRASS to share GIS maps with other systems. Maps are organized in a very specific manner that starts with user identification of the base folder or directory that will store GRASS data. At this level geographic locations are established, each with one or more directories called "mapsets." The base folder is equivalent to a map room that contains cabinets—one for each location. Each cabinet holds drawers, which are mapsets that are allocated to people who are developing new maps associated with an analysis.

Within the mapsets are directories that contain files that make up the various GRASS raster, vector, and imagery maps. This structure provides a reliable and consistent organization of files that makes it easy to find the GRASS maps using operating system commands.

GRASS was developed to be an extension of the powerful set of UNIX commands that users could enter at a shell command line. Seasoned users deftly combine UNIX and GRASS commands to create powerful new capabilities that allow for processing GIS data in unique and/or repetitive ways.

GRASS locations are associated with user-selected coordinate systems and projections—each location being potentially different. Each is also provided a default geographic window that defines north, south, east, and west extents as well as east-west and north-south raster resolutions.

GRASS programs then allow data in other locations and mapsets with different coordinate systems to be resampled into the active location and mapset.

GRASS Development is an International Effort

Software development continues to be accomplished through the volunteer contributions of numerous universities, federal and state agencies, and commercial entities. While the effort first primarily involved U.S. government agencies, it has expanded to a large international development community.

All GRASS software is public domain, which means that all source code is available for inspection by anyone. This makes it possible to experiment with and extend any of the GRASS programs. Indeed, many new programs are developed using existing programs as templates or starting points. Most GRASS software is written in C language, but can readily be

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extended using C++, Objective C, and other languages.

A large group of GRASS software users across the world is matched by an equally active set of GRASS developers. These developers are moved and empowered to extend existing capabilities and to develop new programs, many of which are contributed back to the GRASS community. The programs are supported so that users can submit bug reports and desired enhancements. Currently software is contributed and supported by motivated developers across the world.

Software use and development of new software occur automatically. That is, new releases attract a growing user community, and within that community, some will be motivated to extend the capabilities. However, these activities are not sufficient to ensure further releases. New versions of the software must undergo the expensive processes of compiling, testing, and documentation so that a coherent and reliable release can occur.

During the “middle ages” of GRASS, use and development continued, but the organization of new releases ceased. The current GRASS renaissance is occurring because of the motivation of Marcus Neteler and the support of his home organization. To help defray the cost of this activity, Neteler and long-time developer Helena Mitasova (at the University of North Carolina) have published the second version of *Open Source GIS: A GRASS GIS Approach*.

You don’t want GRASS if...

GRASS, though extremely powerful and free, is not for everyone. Even though it may save you tens of thousands of dollars that you might spend for commercial systems, those systems may better suit your needs. Let’s compare GRASS with ESRI software, for example.

A principal ESRI advantage is its graphical user interface, which is far superior to those offered by the GRASS community. ESRI’s primary user community deals with human-created geographical entities such as roads, building edges, properties, and boundaries—vector objects. Indeed the most familiar ESRI data format is the shapefile, which provides an efficient and simple format that allows for the visual depiction and simple analysis of data. Perhaps an equally important reason is that ESRI software runs natively primarily on a Windows platform, and nearly all of us need, for various reasons, to have Microsoft operating system-based computers. GRASS requires installation and operation of a UNIX or UNIX-derivative operating system, which can overly complicate the life of the casual user.

The broad use of ESRI ensures that there is a large set of data, a large community, and corporate support that ESRI users enjoy. There is also a clear organization that one can blame and hold accountable for software bugs and malfunctions. If you have a GIS staff and software budget of many thousands of dollars that you must spend, you may not want to consider GRASS.

You *do* want GRASS if...

The GRASS user community consists of a number of clear types of users. Obviously, GRASS is attractive to governments and organizations that do not have the budget required to use commercial GIS software.

Secondly, there are those who deal primarily with raster analysis—environmental analysts, ecologists, hydrologists, and others. Many of these make up a third category—scientists. That is, scientists who require more analysis capability, the ability to actually see the code to verify the capture of analysis algorithms, and the ability to easily augment the GIS with new analyses.

Much of the development work involves intimately integrating the GRASS GIS with other public-domain capabilities such as simulation models (e.g., hydrologic, urban growth, fire spread), statistical packages (e.g., S and R), and relational data bases (e.g., MySQL and Postgress). This third group generates much of the new software and has little interest or opportunity to independently market their code. This results in an almost pre-state-of-the-art suite of software capabilities.

While GRASS is most visible in the international community, a wide array of users within the U.S. persist. Software download records show many hundreds of sites across North America with the software.

You can begin your search for GRASS documentation, source code, ready-to-run binaries, user communities, and conference opportunities at GRASS Central: **http://grass.itc.it**. This site points to dozens of mirror sites from which GRASS can be downloaded for a variety of platforms.

Windows users are encouraged to locate and install the CYGWIN / GRASS Install CD Disk Image that will allow for initial experimentation within your Windows environment.

This powerful Illinois gift to the nation and the world is available to all. The third international GRASS conference is scheduled for the summer of 2006 in Switzerland. Perhaps you will want to consider helping to host or sponsor the 2008 event here at its birthplace. GRASS is again for real and you can proudly make it your GIS.

If you determine that GRASS is for you, begin planning to attend the next international conference in Switzerland and help bring the 2008 GRASS conference to Illinois!

Jim Westervelt is with the US Army Corp of Engineers Research Laboratory in Champaign, Illinois.

ILGISA Student Awards

Awards are given to undergraduate students of any major who have included GIS in their course of study and have demonstrated exemplary proficiency and understanding of GIS, potential contribution to the GIS community, and general success in school. The 2004 awards went to Anthony Pleasant, Dan Millen, Ben Kinney, (pictured from left to right) and Joseph DeFrates(not pictured).

Anthony Pleasant received his ILGISA award for outstanding and exemplary work with the Coles County Regional Planning and Development Commission in Charleston, Illinois. He is a student at Eastern Illinois University, where he is pursuing his Bachelor's of Science degree in Geography with plans to graduate May 2006, a year early.

Anthony began his internship at Coles County in May 2004 and quickly became proficient with ESRI's ArcInfo, Trimble's GeoXT GPS unit, and many other software / hardware combinations. He has consistently demonstrated ability to work on his own to complete very difficult assignments. Projects he has worked on include the Marshall Comprehensive Plan, Coles County Comprehensive Plan, Arthur Comprehensive Plan, and Coles County general mapping.

Daniel Millen received his ILGISA award for academic excellence and experience with GIS and GIS-related activities. At the time of the award ceremony, Daniel was a senior at Western Illinois University pursuing a Bachelor's of Science degree in Geography with a GIS minor.

One of his noteworthy advanced-level independent projects combined a site suitability analysis with a cost / distance analysis to best locate proposed bike and hiking trails in McDonough County. His solution was superior to designs presented by professionals hired to perform the study. Daniel also worked at the McDonough County GIS Center, which is responsible for much of the data development, quality control, and map production for the City of Macomb, McDonough County, and Western Illinois University.

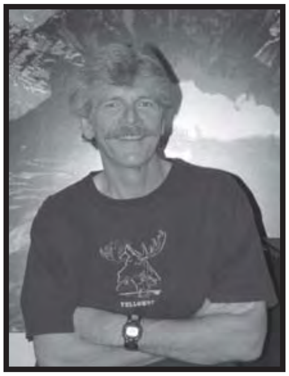
Ben Kinney received his ILGISA award for technical proficiency in, experience with, and enthusiasm for GIS. At the time of the award ceremony, Ben was a senior at Northern Illinois University pursuing a Bachelor's of Science degree in Geography with a degree emphasis in GIS and mapping science.

Mr. Kinney has a keen interest in GIS software and in development of custom applications within the GIS framework. He has an extensive background in programming, with proficiencies in C++, JavaScript, and SQL, among others, which has proved invaluable to the several internships he has held. These have included development of customized applications for a local government group and a volunteer internship with the NIU Libraries Mark Twain digitization project using ArcIMS.

Josh DeFrates received his ILGISA award for superior interest in and knowledge of GIS and its applications. At the time of the award ceremony, he was a senior undergraduate student in geology at Illinois State University. Josh graduated in May with plans to pursue a graduate degree in structural geology at the University of Illinois this fall.

Josh conducted a independent research project in GIS to determine sub-basin morphometric relationships in local moraines. The project design showed Josh's superior understanding of and dedication to applied GIS. Josh also completed an Honor's study in GIS where he conducted a morphometric analysis of Little Kickapoo Creek Drainage Basin above the Illinois State University Teaching Well Field, an exercise which is part of a larger study in the ISU geology program. His analysis can be used to predict the period of rise at the well field for various storm events and storm tracks across the drainage basin.

Monitoring Mount St. Helens - *A View From an Insider*



Steve Schilling, the keynote speaker at the Spring 2005 conference, works for the Cascades Volcano Observatory in the state of Washington. Steve is part of a team that is studying the growing glacier in the crater at Mount St. Helens. His keynote address generated a great deal of interest. Here he speaks with us further about his fascinating work.

What are some of the most significant technological advancements in your field? How have they changed your approach to your work between the 1980s and now with regard your field work and the way your team communicates with both the general public and professional colleagues?

Many of the tools that we use today to monitor volcanoes, analyze data, and communicate with the public have been developed during the 25 years since Mount St. Helens erupted in 1980. Tools now available include new data gathering methods such as Global Positioning Systems (GPS), digital cameras, and radar interferometry (InSAR). Data gathering, data organization, data interpretation, and distribution of the interpretations happen at speeds that were unheard of in the 1980s.

Other tools include personal computers and the myriad types of software that they run. Spreadsheets, databases, geographic information systems, and graphic and drawing packages are a few of the software tools we use to organize, study, and view data that we collect to understand the current eruption. The connectivity of computers including the Internet, Intranet, and World Wide Web make distribution of the information quicker and easier amongst scientists and to emergency managers, the media, and the public.

How has GIS benefited your ability to monitor and analyze changes at Mount St. Helens?

Digital elevation models (DEMs) primarily created using photogrammetric methods are arguably one of the best data sets we have gathered. We use geographic information systems and these data to track basic parameters such as elevations, lengths, and volumes. The volumes are critical as input into models of eruption processes and dynamics.

In addition, GIS is the tool we use to make maps to track equipment locations and statuses, depict hazard zones for planning and decision making, and serve as discussion points for better communication.

You mentioned in your address that your use of the Internet has grown. What are some examples of how it has helped in the work you do?

In addition to what I mentioned earlier, we are able to collect data such as photos, GPS, and seismic information and make it available to fellow scientists in near-real time. This saves the costs of continual trips to the field and increases safety. Communication amongst Cascades Volcano Observatory (CVO) staff and others is often by ubiquitous email. The Internet and World Wide Web help us distribute information to the media and the public via our website, **http://vulcan.wr.usgs.gov.**

Your work appears to the casual observer to be very dangerous. What are some of the procedures you put into place to insure no one gets hurt, particularly when you're on the dome of the volcano?

Safety is paramount in all of our fieldwork. All field personnel must have training in safety, wilderness first aid, helicopters, and hazardous materials. In addition, they must be in good physical condition, be able to carry heavy loads, and be comfortable working in remote areas.

We have rigorous flight-following procedures where the helicopter pilot and field personnel are in continuous contact with the operations desk at CVO. Before any new experiments or instruments are installed in the field, we have discussion and planning sessions where we try to maximize all issues of safety. While we rarely go into the crater on foot, scientists have visited the new dome briefly. In all such cases, there are spotters in the helicopter, on the rim, and in the operations room watching the seismicity. The helicopter is kept running—ready to leave at a moment's notice. We use extreme caution when considering any work within the crater.

The method of stabilizing the GPS, cameras, and other monitoring equipment is ingenious. Whose idea was it to design and build the "Spyders"?

Rick Lahusen in our office came up with the idea to deploy equipment on the dome and telemeter the seismic and GPS data to receiving stations. The Spyders increase safety by decreasing the need for people to be in the field to make measurements and install equipment. These deployable stations have been modified to enhance stability in the field, and recent frame modifications have made them easier to retrieve. The legs added to these instrument packages has led to naming them Spyders.

Several people at CVO contribute to their construction, come up with new ideas to improve them, and help deploy them. In particular, Kelly Swinford, Marvin Couchman, and Matt Logan are all contributors to the evolution of the Spyders.

What steps are taken to inform the public when Mount St. Helens is active?

In the event of suspected or actual activity at Mount St. Helens, operations personnel are responsible for implementing our call-down list. The list includes such organizations as the Federal Aeronautics Administration, because one of the hazards from a volcano is to aircraft, and the National Oceanic & Atmospheric Administration. We ask them to aim their radar toward Mount St. Helens to help detect plumes. The list includes emergency management personnel as well. From these communications people can take necessary actions. For example, local sheriffs can stop traffic if necessary.

In addition, we put out media advisory statements to inform the public of changes in alert levels. These statements are posted quickly on our website. And if needed, we man a volcano call-in line at the Joint Information Center, a cooperative effort between the Forest Service and USGS.

I would also guess you have an education program about living around an active volcano. How does that education program help the surrounding population live around such an environment?

One key to a volcano response is education, and that education can be delivered in a variety of ways. We educate the public on the hazards that are possible from a volcano to help state, county, and local officials determine appropriate response measures. These officials can formulate a plan to mitigate the hazard.

In this manner, people can make informed, intelligent decisions on whether to live in a volcano hazard zone. As part of these decisions the public understands the need to prepare for hazards: for example, they know they should maintain a hazard preparedness kit (water, flashlights, battery radio, etc.) to survive for up to 72 hours.

Your presentation generated a lot of interest among our membership. So much so in fact that more than one person wanted to know how they could volunteer to work at Cascades Volcano Observatory. Do any such opportunities exist?

There are some opportunities for volunteers, but these are usually taken by students learning to become tomorrow's volcanologists. I would recommend that interested people send written requests describing their qualifications to our office.

Concerning the team of professionals working to monitor activities at Mount St. Helens, what does the CVO team consist of, in addition to geologists, GIS specialists, and helicopter pilots?

The CVO team consists of a wide range of professionals. These include administration, management, geologists, volcanologists, gas specialists, seismologists, GIS specialists, geodesists, electronics wizards, computer specialists, outreach and media specialists, and graphic artists.

Concerning volcanic activity in the Cascades, what needs to be put in place, both technically and administratively, to establish effective monitoring networks and warning systems?

The USGS Volcano Hazards Program (VHP) is working with local, state, and federal officials to increase public awareness of volcano hazards and preparedness for future volcano emergencies. These efforts include assessing volcano hazards, working cooperatively to form response plans, and helping teachers educate students.

At the same time, VHP is working to improve its monitoring capability for Cascade volcanoes as part of a 5-year plan to upgrade instrumentation at hazardous volcanoes throughout the United States.

The USGS is also working with university colleagues as part of EarthScope, an ambitious geoscience research program funded through the National Science Foundation. The Plate Boundary Observatory, an EarthScope component, is installing a state-of-the-art GPS and borehole-strain instruments at several volcanoes in the United States, including Mount St. Helens, Mount Shasta, and Medicine Lake volcano in the Cascade Range.

Interview conducted by Ruth Anne Tobias and Keith Caldwell.

initiative and to meet and talk with new and old colleagues about sharing resources and information.

The presentation primarily covered the basic points of the GIS Strategic Plan. The goal of plan is to implement an Enterprise GIS as a component of the overall IT Enterprise Architecture Model. This would encourage communication between GIS professionals and IT / CIO offices within agencies; improve communication between agencies and departments regarding available services and data backed by sound business cases; and fortify and share common geospatial services across stakeholder groups.

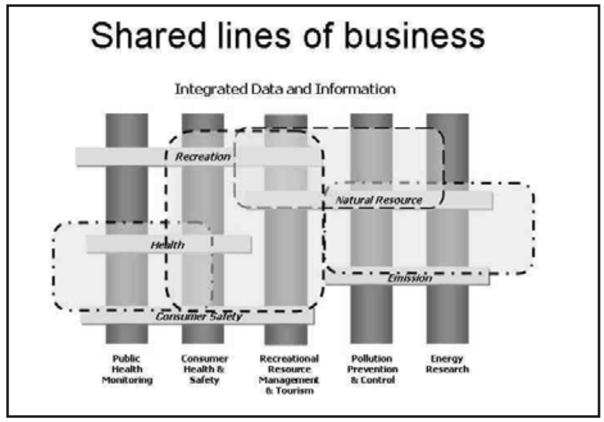
If you would like a copy of the presentation, please contact me at **soliver@dnrmail.state.il.us**.

The GIS Strategic Plan

An important section of the plan is the strategic direction for an Enterprise GIS. This section focuses on three overarching principles, the first of which is the National States Geographic Information Council (NSGIC) coordination criteria. NSGIC's criteria are essential for effective statewide geospatial coordination:

- A designated coordination position with authority to implement the state's business and strategic goals;
- A clearly defined authority exists for statewide coordination of geospatial information and technologies and data production;
- The statewide coordination office has a formal relationship with the state's Chief Information Officer (or similar office);
- A champion (politician or executive decision-maker) is aware and involved in the process of coordination;
- Responsibilities for developing the National Spatial Data Infrastructure and State Clearinghouse are assigned;
- The ability exists to work and coordinate with local governments, academia and the private sector;
- Sustainable funding sources exist to meet projected needs;
- Coordinators have the authority to enter into contracts and become capable of receiving and expending funds; and
- The federal government works through the statewide coordinating authority.

The second principle is that of shared services and reuse. Simply stated, there are common data, application, access, and technical components that can be shared and reused by organizations with shared business objectives (see figure below).



The final overarching principle is the ability to work synergistically with the federal government on national initiatives that help build the National Spatial Data Infrastructure (NSDI). In an effort to align national programs, the USGS Director has realigned the geospatial programs for which the USGS has a leadership responsibility into a National Geospatial Programs Office (NGPO) to serve the needs and interests of the geospatial community throughout the nation. This realignment brings The National Map, Geospatial One-Stop, and the Federal Geographic Data Committee into a single program office.

With the creation of the NGPO, the essential components of delivering the NSDI will be managed as a unified portfolio that benefits the entire geospatial community. The emphasis of the NGPO will be to engage partners throughout the geospatial community in its planning and in ensuring that its unified portfolio meets the needs of those on the landscape.

State liaisons for the USGS have been asked to coordinate with state GIS coordinating bodies and submit their 2006 budget requests to the USGS. Dick Vraga, our State Liaison, has worked with us to prioritize initiatives from an Illinois perspective.

GIS Strategic Plan Draft Outline

Following is a draft of the GIS Strategic Plan outline.

Sheryl Oliver is the GIS Domain Leader for the State of Illinois and GIS Coordinator with the Illinois Department of Natural Resources, ILGIC.

Geospatial Technology: An Enterprise System for the State of Illinois [DRAFT]

Executive Summary

I. Introduction
- A. Defining Geospatial Technology
- B. General History of Geospatial Technology
- C. General Background of Geospatial Technology in Illinois
- D. Document Expectations, Models and Definitions

II. Geospatial Enterprise Drivers
- A. Benefits of the Enterprise
- B. Business Forces

III. Current Status of Geospatial Technology
- A. Agencies use of Geospatial Technology
- B. Agency business objectives and applications
- C. Existing Components of a Geospatial Enterprise
  1. Geospatial Data Clearinghouse
  2. Framework Data Steward Concept (eg. IDOT-IROADS)
     - a. Digital Orthophoto Quadrangles (georeferenced image from aerial photography),
     - b. Transportation(Street centerline network, addresses, and related features),
     - c. Geodetic Control (basic reference framework for all geodata),
     - d. Hydrography (surface water network and related features),
     - e. Administrative boundaries (widely used districts, service, and government boundaries),
     - f. Elevation (digital elevation model of georeferenced vertical positions),
     - g. Cadastral information (property ownership).
     - h. Geocoding
     - i. Additional critical datasets will be identified by State stakeholders.
  3. Oversight, Professional and Technical Organizations

IV. Strategic Direction for a Geospatial Enterprise
- A. Overarching Principles
  1. Coordination and organization(nine criteria from the National States Geographic Information Council)
  2. Shared Services and reuse
  3. Leverage of Federal Initiatives
- B. Transition from Current to Target Geospatial Architecture

V. Target Geospatial Enterprise Architecture Components
- **A. Reference Models**
  1. Business Reference Model (What-Business Objectives)
  2. Data Reference Model (What-Shared Data)
  3. End-User Reference Model (What-Access and Distribution / User Type and Channel)
  4. Organization Reference Model (What-People)
  5. Technical Reference Model (Enable the functions of the BRM, DRM, EURM, ORM)
- **B. Business Reference Model**
  1. Business Areas
  2. Business Functions
- **C. Data Reference Model (What-Shared Data)**
  1. Framework Data (Shared Data)
     - a. Digital Orthophoto Quadrangles (georeferenced image from aerial photography)
     - b. Transportation(Street centerline network, addresses, and related features)
     - c. Geodetic Control (basic reference framework for all geodata)
     - d. Hydrography (surface water network and related features)
     - e. Administrative boundaries (widely used districts, service, and government boundaries)
     - f. Elevation (digital elevation model of georeferenced vertical positions)
     - g. Cadastral information (property ownership)
     - h. Additional critical datasets identified by State stakeholders.
  2. Standards and Procedures for building and using data
- **D. End-User Reference Model (What-Access and Distribution/ User Type and Channel)**
  1. What will be accessed (Geospatial data, Metadata, Mapping Services, other information?
  2. Standards, Policies and procedures
- **E. Technical Reference Model (Enable the functions of the BRM, DRM, EURM, ORM)**
  1. Logical Blueprint for Geospatial Technology Enterprise Architecture
  2. TRM Building Blocks for Geospatial Technology
  3. Relationship to Sub-Domains in the Applications Enablement and Systems Services Software Domain.
     - a. Interaction
     - b. Application enabling
     - c. Application development
     - d. Data
     - e. Access and Integration
     - f. Security
     - g. Program / Project management
  4. Network Connectivity
  5. Computing Infrastructure

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