ILLINOIS GIS NOTES
THE NEWSLETTER OF THE ILLINOIS GIS ASSOCIATION Fall 2013

THE "GIS BRIDGE": WHAT IT IS, WHY IT IS IMPORTANT, AND WHY WE NEED TO BUILD IT

John Kostelnick
Associate Professor
Director, GEOMAP, Illinois State University

Like many of us who practice GIS for a career, I enjoy the challenges of a new project, especially if it means that I will have an opportunity to learn much about a topic that I know little about. As GIS/mapping practitioners, we must be versatile and adaptable—willing to learn, grasp, and understand how the world works in order to devise effective spatial analysis methods and geographic visualization techniques best-suited for a given project. In my own career as an academic researcher, I've been fortunate to experience this firsthand through GIS project work for topics ranging from landmine clearance in mine-affected countries to ethnicity in Chicago neighborhoods, from biodiversity in Africa to emergency management in Illinois.

As I reflect on any GIS project, I realize that mapping and GIS analyses are excellent opportunities to learn much about the world around us. This is a motivating factor, I'm sure, for many of us, and fuels our passion for GIS. Likewise, any mapping or GIS activity is contingent upon a full understanding of exactly what it is we are mapping. Whether a GIS project is ultimately successful, I believe, is contingent on mastery of two important areas or "domains" of expertise: the GIS/mapping domain and the subject domain.

So what do I mean by these two domains and why are they important? Let me explain. First, the GIS/mapping domain is what we, as GIS/mapping professionals, contribute to any project. This includes the expertise that we offer as mapping scientists and GIS "gurus." For example, we know about map projections (when to use an equal-area projection vs. a conformal projection), database design (how best to encapsulate geography in a digital database), methods of analysis (when to choose buffering, overlay, hot spot analysis, etc.), data classifications and optimal methods for visualization. However, despite our expertise in the GIS/mapping domain and the versatile nature of GIS, we may have limited knowledge about a specific topic that is the focus of a project. I remember (quite vividly) starting a project in graduate school that incorporated GIS for ecological niche modeling of black-tailed prairie dogs in Kansas. Needless to say, my knowledge of the little critter was minimal at best (I'm a geographer after all, not a biologist)! The other ingredient to the recipe is the subject domain—expertise in the topic or subject for which GIS is utilized in a project. Subject matter domain experts have vast knowledge of a topic, but perhaps limited background in GIS and mapping. Our ecological niche modeling project turned out successful in the end in large part because I was fortunate to interact with wildlife biologists throughout the project, the subject domain experts.

The GIS Gap

Mastery of the GIS/mapping domain and the subject domain does not come magically, of course, but is contingent upon experts from both groups collab-

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IN THIS ISSUE

THE NOR'EASTER from your President

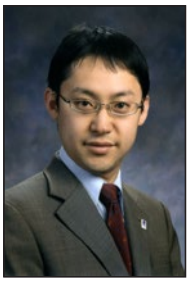
By Greg Johnson

Well the dog days of summer are upon us at the time of this writing. Who knew when the kids went back to school is when Mother Nature decided to heat up our area. This recent heat wave pales in comparison to ones during the summer of 1995 or the summer of 1988. Still we are only weeks away from autumn breezes, the falling leaves, and for me, the conclusion of my term as your president.

Since the last Nor'easter, all of you received a thorough survey of your opinions about ILGISA. The majority of you responded to our survey, and we are very appreciative of your responses. You will be receiving some findings about the survey results in the near future. At the fall conference you will be invited to attend a presentation about the upcoming road for ILGISA. Many of the topics in that presentation are tied to the survey results. I think many of you will be in agreement with our plans for the near future. Just a reminder, this fall's conference will be held at the Wyndham in Lisle on October 22 and 23.

This issue of GIS Notes is filled with informative articles and other features. One article talks about a village's use of GIS to respond to this spring's flooding. Another article discusses about the real and perceived return on investment for a GIS. You will learn about the "GIS Bridge" and ArcGIS Explorer Desktop from two of our notable GIS educators in the state of Illinois. Finally, there are a couple of stories concerning MAGIC, USGS, and National GeoTech Center. I hope you enjoy this issue of GIS Notes.

I wanted to close this Nor'easter by thanking several people who assisted me through my term as president. First, I want to thank our management staff who helped our association grow through this year. I know their work during the transition and finalizing our strategic planning for the future. Second, I want to thank my fellow board members who worked together to improve our association for our membership. Most importantly, I want to thank all of our members. Our association would not survive without your interest in ILGISA. Whether it is participating on a committee, attending a conference, or responding to the membership survey, your input is vital to ensure ILGISA can fulfill our mission for years to come. Thank YOU.



TO THE ILGISA COMMUNITY,

First, I would like to thank everyone who contributed articles for Illinois GIS Notes summer edition. We were fortunate enough to receive six articles and one photograph in addition to any recent news from the ILGISA president and committee chairs. It is always my pleasure to compile a variety of GIS information and share them with follow ILGISA members. I have a couple of main goals I would like to accomplish this coming year as an editor of GIS Notes. These would include creating useful articles for students and organize archived newsletters onto the ILGISA website. By the end of this year, GIS Notes will be stored in an EBSCO database which many academic and research organizations could access. I strongly believe that a semiannual newsletter containing both informal and technical articles from a variety of industries would benefit all ILGISA members. I will continue searching for valuable information from all over the state and seek out the input from the GIS community. Once again, I would like thank you for your support. I always appreciate and welcome your suggestions and comments regarding *GIS Notes*.

Sincerely,

Keisuke Nozaki

ILLINOIS GIS ASSOCIATION

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BENJAMIN MALONEY, NIU, TO BE AWARDED FIRST ILGISA SCHOLARSHIP AT FALL CONFERENCE

During the ILGISA Fall Conference Awards Luncheon on October 22, 2013, ILGISA will present the first ILGISA Scholarship to Benjamin Maloney. Ben is working towards a Masters in Geography with an emphasis on Urban and Economic Geography at Northern Illinois University. Ben received a Bachelor's of Science in Meteorology from NIU and also earned an undergraduate certificate in GIS. He currently serves as Graduate Research Assistant at American Farmland Trust in DeKalb. Ben was recommended by Rich Greene, Associate Professor, Department of Geography, at NIU.

The ILGISA Scholarship helps students working toward a degree in Geography, GIS, or related discipline. This scholarship is funded through donations from private individuals, organizations, and other funding activities of ILGISA. One scholarship in the amount of $1,000 is distributed annually.

Contribute to the ILGISA Silent Auction to raise monies for the educational scholarship. Please complete the donation form at https://www.surveymonkey.com/s/ILGISAauction and bring your donation to the Fall Conference.

ILLINOIS GIS ASSOCIATION

Members who have obtained their GISP Certification since November 2012

Matt Boyle, RJN Group Inc.

Jared Collier, Juneau Associates

Mike Dahm, Ruettiger Tonelli & Associates Inc.

Matthew Jefferson, Illinois State Water Survey

Jean Johannes, Baxter & Woodman Inc.

Jeff Judycki, EN Engineering

Cameron Rex, RMI Midwest

ILLINOIS GIS ASSOCIATION NEW STUDENT MEMBERS

Xhoana Ahmeti, DePaul University

Brett Barkley, University of Illinois

Jane Bartman, University of Chicago

Derek Bus, Northern Illinois University

Kevin Cebulski, Elmhurst College

Anjanette Chan Tack, University of Chicago

Andrew Donakowski, Northeastern Illinois University

Lauren Hoffman, Illinois State University

Mark Jensen, Northern Illinois University

Donghee Koh, Western Illinois University

Jan Krysa, Northeastern Illinois University

Jessica Magolan, Elmhurst College

Benjamin Maloney, Northern Illinois University

Imelda K Moise, University of Illinois

Rich Ostrowski, Western Illinois University

Justin Pinnell, Eastern Illinois University

Cecilia Smith, University of Illinois Chicago

Taylor Thornton, University of Illinois

Ryan Trullinger, Western Illinois University

Lauren Umek, Northwestern University

Sanjiv Vajjala, Eastern Illinois University

GIS TO THE FLOOD RESCUE

By Heena Lee, GISP, GIS Coordinator, Village of Algonquin

Many of you may or may not have encountered flooding this past spring. Unfortunately, the Fox River in Algonquin did experience this flooding and we would like to share a story with you about how our GIS assisted the flood projection, response, and recovery in Algonquin.

A week before the flooding, the Fox River was at major flood stage; the National Weather Service (NWS) forecasted showers for a week. While we were monitoring the warnings, staff requested a flood scenario application, similar to the way Gurnee uses for the Des Plaines River. The Village of Gurnee used a topographic contour layer to project river flood scenarios.

Algonquin had acquired two-foot contour lines with one-quarter-foot aerials back in 2006. We used two-foot contour lines to generate a polygon feature class. Next, we went to the Advanced Hydrologic Prediction Service website which is operated by NWS. They provide the elevation and the location of the river gage in Algonquin in KML format. We were able to download the river gage and incorporate the file into ArcGIS. The website of NWS also provides the flood stages in feet, so, staff could easily calculate the correlation of the Flood Stage and the Elevation. We made five flood stages in a polygon feature class: 1.) Action Stage, 2.) Flood Stage, 3.) Moderate Flood Stage, 4.) Major Flood Stage, and 5.) beyond Major Flood Stage. Then staff selected buildings with addresses that are intersected with each flood stage and exported them in Excel format for the emergency planning team. Data was consequently ready for the flooding event.

The following Monday, April 15, the NWS web site showed that the Fox River in Algonquin reached Major Flood Stage and subsequently the Village set up an Emergency Operations Center. Although GIS staff was not physically present at the Emergency Operations Center, we worked remotely with them to update and to provide necessary information for public information efforts. As the flood situation kept changing, we were able to modify and update maps immediately and seamlessly for the Emergency Operations Center.

The Major Flood Stage of the Fox River lasted for more than a week. While monitoring the damages of the flood and the impact, the Emergency Operations Center provided the printouts of Flood Projection Maps to impacted residents. The team also alerted residents by an automated callout generated from GIS, which integrates with the Village's utility billing database. The flood scenario application was also used to identify how the flood may affect Village water and sewer facilities and infrastructure to proactively protect these assets. After the flood stage went down to the moderate, the team used the flood projection maps to inspect affected areas and the damages.

As you read our story, you can clearly tell that in all aspects of flood emergency response, from the planning to the recovery, GIS played a key role. GIS helped to prepare for the unseen situation, to manage assets and facilities, and to assess the damage. There are a few things that could be improved, of course. One-foot contour lines would have allowed mapping of the flood projection more precisely and staff could have better utilized mobile technologies to disseminate flood map products to our field workers.

Village of Algonquin GIS staff continues to be optimistic about assisting our operating departments provide public services in the most efficient and effective ways possible. GIS provides unlimited opportunities to improve our organization!

For more information, please visit www.algonquin.org/GIS.

Where Has The Cartography Gone?

By Todd Schuble, University of Chicago

Some GIS education programs still recognize the value of cartography as a necessary skill. Students should pay close attention to this. Many in the most recent GIS generation never knew of a time before Apple Maps, Google Maps or Bing Maps. Much like Rand McNally and the United States Geological Survey did before the online onslaught of maps, they set a standard for how maps should look. The difference is that only in the past 5-10 years have users been able to add these online templates as a background or use them as a crutch to design maps for presentation purposes. Before this time, a user actually had to learn how the large producers of paper maps actually blended colors, represented a bridge or culvert, or chose where to place a label for a map feature. Nowadays, map design is taken for granted. A user only needs to add a few dots or lines to a map and use a background template in order for the map to be deemed acceptable. However, students should realize that throughout their entire academic careers they are taught to respond to questions in a quantitative or written medium. Communicating information in an aesthetic manner is extremely unique. It can be very powerful and successful if done properly but also very damaging and dangerous if done poorly. Students may even realize the importance of cartography and proper map design but may be unsure about how to become good at it. As stated earlier, pick out those academic programs that pay attention to cartography as a necessary skill in a GIS curriculum. Also, students need to realize that cartography borders on an art form. Even after learning the basic standards of cartography, it can take years to become skilled in map presentation. It does not happen overnight. It takes time and practice. But the benefits of acquiring such a skill can be extremely rewarding. Being a great GIS analyst or GIS programmer does not mean very much if you cannot communicate your findings in the proper manner as well.

MAGIC REPORT

By Shelley Silch, US Geological Survey

The annual MAGIC Clearinghouse Summit is scheduled to take place this year in Bismarck, ND on August 28-29th. Illinois will be sending three representatives this year! The MAGIC Clearinghouse Committee was established for the sole purpose of facilitating progress and growth among state GIS data clearinghouses in order to enhance statewide and national initiatives and better serve local, state, and national GIS communities. Additionally, this Committee is expanding the technical capabilities of state clearinghouses through the open exchange of information regarding successful programs and projects, strategic plans and standards, technical architecture, and the like.

This year's agenda includes the following speakers:

Christopher Dunn – There have been numerous news items about the Orange County open data issue and the recent California Supreme court ruling confirming the public's right to government data in the same format that is used by the government. Mr. Dunn, who is pursuing a law degree at the University of Missouri, will be talking about his experiences that began with him requesting local GIS data.

Eddie Pickel – Mr. Pickel is the CEO of OpenGeo which provides a suite of open source GIS web-mapping software that includes integration with commercial software. OpenGeo has recently been in the news including their investment in the QGIS desktop GIS software and the U.S. intelligence community investing in OpenGeo.

Dr. Mark Askelson – There has been a lot of recent news and discussion on unmanned aircraft and their applications along with safety and privacy issues. The University of North Dakota offers a major in unmanned aircraft system operations and Dr. Askelson is thus well-positioned to speak about the status and challenges of unmanned aircraft.

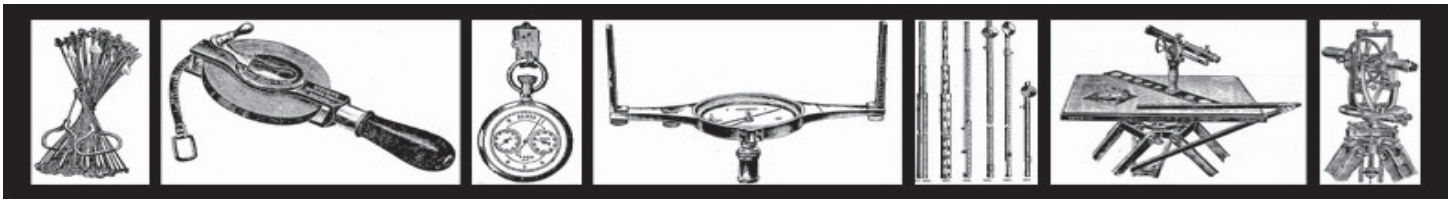
By Rich Ostrowski,
Western Illinois University GIS Center

The ROCKIT "roving overland conveyance kinematic interpolated topography" is a versatile unit that is used to collect GPS points through a time or distance platform.

This particular day the device was used in a corn field just south of Macomb, IL

THE NATIONAL MAP CORPS: EARN YOUR BADGE

By Shelley Silch, US Geological Survey



Citizen volunteers are making significant additions to The National Map (TNM), a web-based geospatial visualization platform. The public is encouraged to collect data on manmade structures such as schools, hospitals, post offices, police stations, and other buildings. The project started last year in Colorado and has expanded to 35 states. A recognition program has also been created where badges can be earned based on the number of data points a volunteer contributes.

This effort is through The National Map Corps (TNMCorps) Volunteered Geographic Information project, which partners with organizations such as 4-H and GISCorps. To start your own badge collection, go to the TNMCorps project site to learn more and sign up as a volunteer!

The USGS is currently testing procedures for volunteers to collect and update USGS geographic data. Similar to how OpenStreetMap allows anyone to collect, edit, and use geographic data through an online map editor, the USGS has developed a prototype online editor customized to our data to allow volunteers to contribute data to *The National Map* and *The National Structures Dataset.*

We are looking for people like you to work with us to collect structures for the USGS. The data you will collect during this project will be loaded into The National Map. If you have access to the Internet and are willing to dedicate some time editing map data we hope you will consider participating!

For the past year volunteers have been updating data in Colorado with great results. As we get close to finishing Colorado we are opening up editing in more states! Volunteers can now contribute data for **Alabama, Arizona, Arkansas, Alaska, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, Montana, Nebraska, Nevada, New Hampshire, North Dakota, New Jersey, New Mexico, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Utah, Vermont, Washington, West Virginia and Wyoming.** You do not need to live in available states to participate. Our editing guidelines explain how you can contribute data from anywhere.

As the project progresses additional states will be released.

What Would I Be Doing If I Participate?

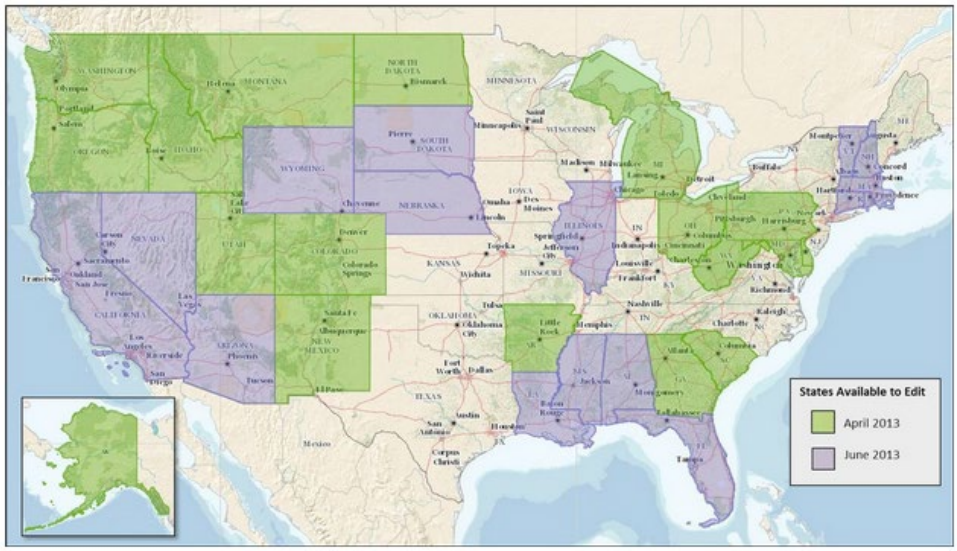
You would be using our online map editor to edit USGS structures data by updating existing features, adding new features, and removing obsolete features. You can choose what types of structure features to edit (from our list of structures) and edit in any of the available states shown above!

How Do I Get Involved?

1) Read through the editing guidelines to learn more about the project and how to contribute.
2) Create an account to access the online map editor .
3) Follow the directions on how to edit and add points to get started.

Please visit: https://my.usgs.gov/confluence/display/nationalmapcorps/

Current States Available to Edit:



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NATIONAL SCIENCE FOUNDATION FUNDS NATIONAL GEOTECH CENTER

By Rich Schultz, Elmhurst College

Center draws expertise from across the country

LOUISVILLE, KY – Thanks to a $3 million, three-year National Science Foundation grant, the National Geospatial Technology Center of Excellence, or shorter, the "National GeoTech Center" will begin to expand its efforts to elevate national expertise in this rapidly growing science.

Guided by 14 partners, including Dr. Rich Schultz from Elmhurst College, the national center will be a hub for both educators and industry.

The grant was awarded June 5; the center officially launched June 15, moving from Corpus Christi, Texas, to Jefferson Community & Technical College in Louisville, Ky. The national center will be led by Vincent A. DiNoto Jr., Jefferson's Dean of College and Systemic Initiatives.

"The work we will do is more critical than ever as the demand for geospatial expertise continues to grow," Schultz said. "Educators and industry nationwide will benefit from this work." This dovetails nicely with Elmhurst College's highly acclaimed Online GIS Certificate Program and future plans for a new online graduate program in Applied Geospatial Sciences (AGS), which Schultz oversees.

The National GeoTech Center is a coalition of educators and experts from across the country, who will establish a cutting-edge knowledge base known as a "Community of Practice," create and maintain educational standards and pedagogy, educate Geospatial Technology instructors, and work closely with business and industry to both ensure workforce needs are met and to create career paths in the technology.

"We are excited to embrace such an important technology and to be at the center of educational leadership in this rapidly growing field," said Dr. Alzada Tipton, Senior Vice President for Academic Affairs and Dean of the Faculty, "And we are pleased that Rich Schultz could play such a vital leadership role in a center that will have a national impact."

Sometimes referred to a "visual database" or "data on maps," geospatial technology is a rapidly advancing science that allows data to be used in meaningful ways.

Approximately 80 percent of all data have a "spatial" or location-based component. Blending data with advanced technologies such as GPS (global positioning system), remote sensing, GIS (geographic information systems), and mobile technologies, allows researchers and others to spot trends, maximize logistics, plot movement and much more.

"It allows people to make informed decisions by pulling data together in a way they can visualize and understand," Schultz said.

One common example of Geospatial technology is surveying. But it is used heavily in marketing, logistics, education, by the military and police, and in other areas where data and locations combine to tell a meaningful or useful story.

The geospatial industry continues to expand at a phenomenal rate. The U.S. Department of Labor statistics show more than 850,000 current geospatial workers with an additional 350,000 needed by 2018; GIS alone is listed in the top 10 high growth, high wage industries.

In order to meet workforce demand, the GeoTech Center's goals include expanding the number and quality of programs offered at two-year colleges. The center also plans to reach out to special populations including veterans, women and underserved communities to develop career paths.

Schultz, a former ILGISA Board member and recipient of the inaugural Richard Hilton Collaboration Award, will assist the Geo Tech Center in leading efforts to building a geospatial technologies community of practice and with professional development for faculty in the area of geospatial technology.

The GeoTech Center is led by:

Vincent A. DiNoto, Project Leader and Principal Investigator, JCTC
Rodney Jackson, co-Principal Investigator, Edgecombe Community College, North Carolina
Ann Johnson, co-Principal Investigator, formerly of ESRI Inc.
Chris Semerijan, co-Principal Investigator, University of North Georgia
Kan Yanow, co-Principal Investigator, Southwestern College, California
Danielle Ayan, George Tech
Wing Cheung, Palomar Colleges, California
Scott Jeffrey, Community College of Baltimore, Maryland
Michael Krimmer, Northern Virginia Community College
Thomas Mueller, University of California, Pennsylvania
Rich Schultz, Elmhurst College, Illinois
Ming-Hsiang Tsou, San Diego State University
John Johnson, DACUM
Candiya Mann, Evaluator, Washington State University

ILGISA Is Listening To You!

The ILGISA Website Committee has been working hard over the past six months reviewing membersí comments and feedback and will release an RFP for a website redesign and hosting vendor in September. The Committee hopes that the newly redesigned ilgisa.org website (coming Spring 2014) will include features for members such as enhanced profile and conference history, discussion forums, and a resource library for conference presentations, videos, and other documents.

POINT OF BEGINNING: KANE COUNTY, IL CADASTRAL GIS

By Michael Mullins – Kane County, IL GIS-Technologies

It began with some simple items: a wooden post, a mound of dirt, and 2 quarts of charcoal. The post, pounded into a mound of soil over charcoal, marked the survey point. The Kane County, IL cadastral Geographic Information Systems (GIS) originated with the United States government survey of the region in the mid-1800's. The Public Land Survey System that was measured and strategically placed upon the open prairie and Fox River Valley established a framework that formed the present day Kane County, IL cadastral GIS data layer.

As the United States sold land to settlers for private use throughout the surveyed land, Kane County officials needed an efficient way to graphically represent the land as it was sold, divided, and combined. A cadastral map or graphic depiction of the ownership boundaries of parcels of property within a region was essential. During the late 1800's the county began hand drawing cadastral assessor's maps for taxing purposes. The cadastral maps reduced the number of legal descriptions read and time township assessors spent processing property valuations. The early maps showed only the boundaries of property and the land owner name. Inaccuracies existed, but this created an early GIS database of geographic locations and data.

By the 1940's the property owner names were replaced with numbers on the maps. Thirty years later the hand drawn maps were still in demand, but were produced more professionally. Aerial photography had been incorporated with the line work creating more accurate maps. It still was a cumbersome and lengthy process to change parcel boundaries or add a subdivision. Revisions to the paper maps took a year to produce. County officials sought a better solution for their cadastral mapping needs. The Supervisor of Assessments Office understood GIS was a perfect match for their cadastral records and tax roll. All of their paper maps were converted into a digital form and were edited in an Intergraph minicomputer system by 1985. The data was eventually migrated to MicroStation (a computer aided design program with GIS capabilities). Drawn lines and printed parcel numbers had been replaced by points, lines, polygons, centroids, and tables of data. At that time, GIS was a relatively new concept to county government. It was a costly venture for Kane County to assume, but the benefits were just beginning to unfold. Different file configurations of MicroStation were utilized for the county cadastral map for a number of years until 2003 when it was decided to convert the data and work entirely in ArcGIS.

Today the whole cadastral mapping maintenance process is a streamlined procedure. The GIS Cadastral (CAD) team creates and maintains the boundaries of approximately 200,000 parcels of property. All land records filed with the Recorder's Office that change property boundaries are referred to the GIS-Technologies department. Parcel divisions, consolidations, deletions, subdivisions, condominiums, and land taken by eminent domain for road right-of-way purposes are handled by the GIS CAD team. GIS CAD team members, with knowledge of legal descriptions, determine what is described and make the necessary adjustments and changes to the GIS cadastral layer. Lines are tagged or untagged with features that describe the boundaries which they represent. Common tags for lines include parcel, section, lot, subdivision, road centerline, road right-of-way, water, railroad centerline, railroad right-of-way, geographic township, political township, political corporation, and county. Attribute information relating to parcel, lot, and road right-of-way dimensions, condominium and subdivision names, and lot and parcel numbers are positioned on the map. Parcel polygons are constructed, split, merged, modified, and deleted. Once the parcels are mapped and a polygon is created for the region, a parcel number is linked to it from an associated database. A multi-level quality control procedure ensures the cadastral map reflects the legal description found within the recorded documents.

As the system evolved, additional uses for it expand. The cadastral data layer has become the foundation from which data is further developed within the county. Kane County law enforcement uses GIS to depict the locations of where registered sex offenders live in relation to a buffer zone around schools. They also use layers for police patrol regions and accident and crime locations. Road centerline and address points are a necessary requirement for E911 purposes. The Transportation Department employs GIS to map the locations of road construction and closures. Zoning maps are created by the Development Department.

The States Attorney's Office exhibits GIS cadastral data for graphic reference in court cases. The County Clerk uses GIS to view their election zones in relation to polling places. The Supervisor of Assessments map real estate sales data for property tax purposes and soil type for land values within parcel polygons. Buildings within the county that potentially may contain lead paint are analyzed by The Health Department. The Kane County board, municipalities, fire, library, park, school, and county forest preserve districts all depend upon GIS for their boundaries. County aquifer, bedrock, watershed, flood, building footprint, planimetrics, and topography layers are available to departments for study.

As a final point, the historical significance of the GIS data can't be overlooked. Kane County's extensive library of data from prior years, with older aerial photography, proves to be invaluable. Archives of data allow one to see a snap shot of the county at a former time.

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WHAT IS ARCGIS EXPLORER DESKTOP?

Keisuke Nozaki, GIS Specialist
Western Illinois University GIS Center

Introduction

The Western Illinois University (WIU) GIS Center provides a variety of maps to the partners through ArcReader and ArcGIS Server. Even though some maps are distributed to certain clients directly and secured by password, McDonough County Map (http://www.wiu.edu/GISCenter) is available to the general public who would like to view parcels, addresses, roads, and other data. But the author sometimes receives a phone call or e-mail from those who would like to install free GIS software and overlay multiple layers from several resources.

The first answer that came to the author's mind was ArcReader, but there is some misconception about this software. ArcReader is definitely free to install from the esri website, however, users only see a blank map when opening the software (Figure 1). ArcReader can open only packaged maps called a pmf, published by ArcPublisher. Thus, a creator must purchase at least ArcView and this extension. Besides, it is not possible for users to add or remove layers. Although the general public seems to like user-friendly interface, this seems to be one of the major limitations of ArcReader.

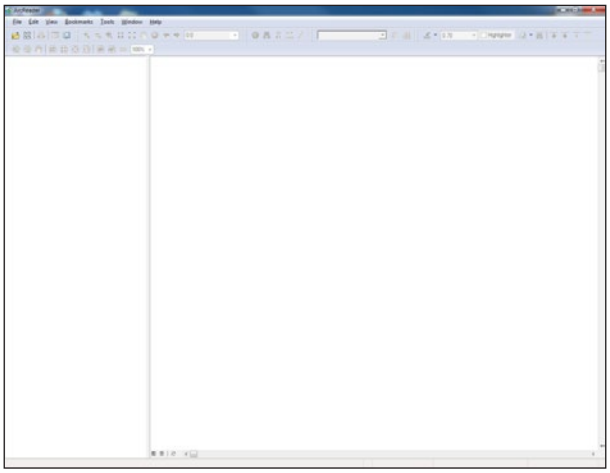

Figure 1. Initial Screen of ArcReader

ArcGIS Online is a web application which esri recently developed that could be another possible solution to the problem at hand. It is, however, important to mention that only public accounts (non-commercial use only) are free. Esri has prepared several basemaps that are available to ArcGIS Online. Users may add local data and map services from multiple locations (Figure 2). Detail functions of ArcGIS Online were discussed on page 1 and 4 of *Illinois GIS Notes* February, 2012. Please note that all data is stored on the esri server, which requires a consistent internet connection to access. Users need to sign up for an esri global account to create and customize this web application.

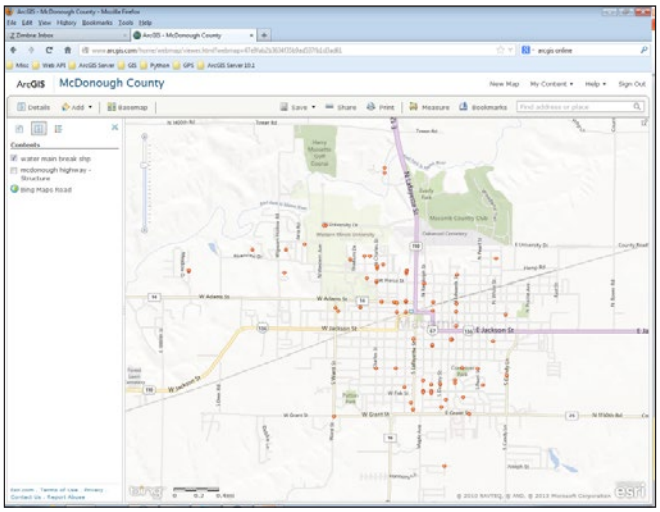

Figure 2. ArcGIS Online

ArcGIS Explorer Desktop

Esri released ArcGIS Explorer Desktop Version 2500 last February, and the author decided to investigate the pros and cons of this application. One of the pros was that this software allows users to add basemaps such as topographic, street, and imagery from ArcGIS Online. But an internet connection is required for this function. It is possible for users to access other layers from ArcGIS Online and download USA layers, including census data. ArcGIS Explorer Desktop can also open a variety of file formats (Figure 3). There are no 1,000 feature limits like ArcGIS Online, but adding many features may lower software performance.

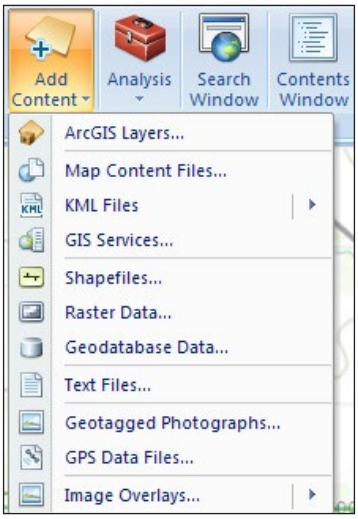

Figure 3. Supported File Formats

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WHAT IS ARCGIS EXPLORER DESKTOP?

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Another pro is that users can create texts and graphic on the maps. It should be noted that these are stored in the projected file called nmf. This application has a capability to open attribute table for layers. It is possible to export selected records in the attribute table to text format. Another benefit is that a query function is available. It is similar to "select by attribute" function in ArcView, but a difference is that users must click "text" before executing the query (Figure 4). There is also a spatial query feature, which is similar to "select by location" function in ArcView.

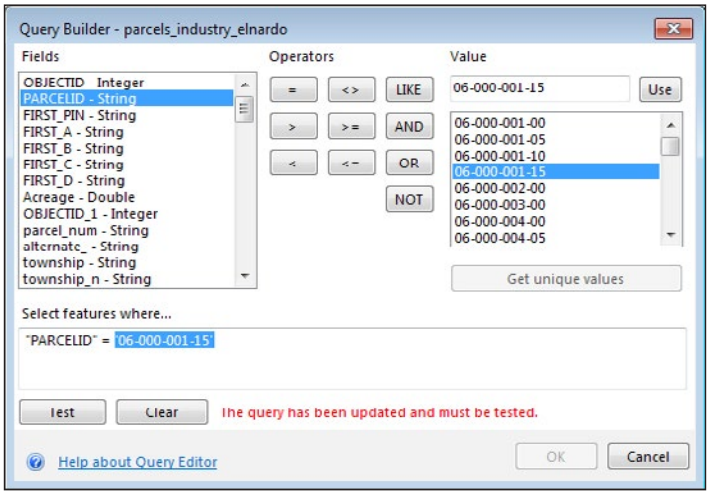

Figure 4. Select by Attribute

One of the biggest benefits is the sharing map content or layer package tool. A layer package saved as lpk is compatible with ArcView. Map content may be shared through ArcGIS Online, but data also needs to be uploaded because map content only contains a link to the data sources like mxd.

There are some limitations of this application however. First, editing data is not allowed. Second, software is relatively heavy. Microsoft .NET Framework 3.5 Service Pack 1 is necessary prior to the installation. Additionally, software must be installed on each computer. The interface and some tools may not be very user-friendly for non-GIS people like ArcReader or ArcGIS Online. Therefore, basic GIS training or detailed manuals would be recommended.

Conclusions

Based on this investigation, ArcGIS Explorer Desktop is great free software with a handful of GIS tools. Even though editing is not allowed, users may be able to overlay multiple layers and produce creative maps and share them with their clients. Online help is available at http://resources.arcgis.com/en/communities/arcgis-explorer-desktop. It would be a good idea to compare ArcGIS Explorer Desktop with ArcGIS Online because they both have pros and cons and you must weigh these options to meet your specific needs. This author believes that this software may be appropriate for those who need only limited GIS functions, or would like to learn basic GIS concepts before implementing full-function software like ArcView.

THE GIS "BRIDGE"

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orating and working together. The scenario plays itself out often in my world: a faculty member on the Illinois State University campus contacts me inquiring about how GIS or mapping might be integrated into a particular research project. The project might have its intellectual roots in a one of several academic disciplines — agriculture, archaeology, biology, business, criminal justice, health, hydrogeology, or sociology just to name a few. It's likely that I know little or nothing about the topic initially (although my natural curiosity kicks in and I am eager to learn!). Likewise, it's not uncommon for the subject domain expert to know very little about exactly how GIS might be integrated into the project, other than the fact that he/she knows that GIS is a powerful platform for spatial analysis and visualization, and has the potential to lend much to the project at hand. I like to think of this "divide" as the "GIS Gap"—a disconnect between the GIS/mapping domain and the subject domain.

The GIS Bridge

The best way to span any gap, of course, is to build a bridge across it. The "GIS Bridge," as I like to think of it, is built when the GIS/mapping domain and the subject domain converge from both sides of the "GIS Gap" to meet and form an avenue that connects together. Here is where ideas, theory, methods, and "best practices" from both sides may flow together. In my experiences, the "GIS Bridge" is not built immediately, but is gradually constructed over several sessions of brainstorming between experts from both sides. During these sessions, my role as the GIS/mapping domain expert is to educate the subject domain expert on what GIS is and what value it may add to a project (and equally as important, what it cannot do). The subject domain expert, in turn, educates me on the topic at hand (for example, the wildlife biologist who teaches me about the natural habitat preferences of the black-tailed prairie dog). Throughout these exchanges, there is a point when

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FYI: ROI, REAL & PERCEIVED

By Jeff Palmer, Learning & Technical Strategies, Inc.

Over the years I have experienced situations that we probably have in common. For example, I have never worked with an over-funded budget and some of my projects never received funding. Despite having returns several times greater than the cost of money, many budgets and projects went unfunded. Since I am the common denominator, what am I missing? That's rhetorical. I hope to answer that question so you can learn from my mistakes.

Reading Richards J Heuer, Jr's book *Psychology of Intelligence Analysis*[1] one finds ideas that are applicable to any analytical effort and for us the message is very clear."

> "… analysts should be self-conscious about their reasoning processes. They should think about ***how*** they make judgments and reach conclusions, not just about the judgments and conclusions."

My ***how*** is to count what goes in and what comes out — oops, my engineering comes to the surface again. ***How*** do I make judgments and reach conclusions? The <u>real</u> part of the return is based on technology that can be counted; but the <u>perceived</u> return is based on those who approve the funding.

Sharing some of my mistakes may give you some useful insight:

For the longest time GIS was just a sub-set of the IT function. But today, I know that GIS is so much more. I'll try to explain what I now feel.

Geography answers the question, "Where?" Geographical Sciences answers, "What is there?" and Geographical Analysis answers, "Why is it there?"

Information is formatted data, a descriptive element of "What is there." When we digitally share, we can share data in a table or information in a shape file. Data can't be copyrighted but information can be. You add the creative spark that turns data into information — you're the unique catalyst.

Systems were just a set of hardware and software, but now I understand that the relationship between individual data elements is the bigger picture, **the system**. The relationship is the soul of GIS.

My default mistake assumes that my "approvers" have the same background, same goals and objectives as me. But do they? Are your "approvers" a technical wizard like you? Don't know, then let's test it, are all of your "approvers" at least geographically informed?

> "<u>The geographically informed</u> person is prepared to meet the challenges of understanding what is happening in the world, why it is happening in a particular locale, how these things might change in the future, and how to make geographically informed and reasoned decisions."[2]

If not, will the "approvers" drop everything and work on the geo-problem or am I responsible for justifying the project based on their perceived criteria? In other words, I assume that the technical strength will carry the day, but in reality, meeting the perceived criteria wins the funding.

Next mistake assumes that the decision process is void of emotion — how can you count emotion? In reality, the stronger the emotion the faster the approval or disproval; even negative return projects get funded when the emotions run high.

The last mistake I'll share with you assumes that "today" is the future-state, but in reality perceptions are based on past-life-events, not present facts or future ideas. For example, I am a paper-person; I am always looking over my shoulder for evidence of replication-fade, something that doesn't exist in the digital world. I use a drafting table and I also rough out my work on paper with a number 2HB yellow Ticonderoga pencil. You ask me for a copy and I go to the copy machine, make the copy and send it to you in an envelop with a *Forever Stamp.* So to send you an email, I have to first unlearn or ignore my paper-based life. I have also assumed that the "approvers" know their past-life-events and will unlearn or ignore them too. Big mistake.

So I have painted myself into a corner, in fact the "approvers" will <u>not</u> drop everything and learn anew and I don't have the vision to see their horizon.

An illustration might help to separate real from perceived: My girls will travel to the next town to save $20 on a pair of shoes but they will not travel to the next town to save $20 on a new car. The returns are exactly the same: my girls invest a trip to the next town and the return is $20 in both cases. The work is the same and the reward is the same, but even when my girls are spending my money, they will buy shoes and not a new car to save $20. Behavioral research suggests that you're saying something like: "Travel to the next town just to save $20 on a new car is just crazy."

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FYI: ROI, REAL & PERCEIVED

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The trick and it isn't magic is to understand what "justification" my girls will use to save $20. What will they tell those who must approve their trip and final purchase? You will not travel to the next town to save $20 on a new car until your information gap is filled with facts that align with your perceptions. Your "approvers" are no different.

Like it or not, we are responsible for the technical strength of the project **AND** for aligning the facts with our "approvers" perceptions. What justification will your "approvers" use to OK funding for your next project or budget or budget overrun? You don't know! But can you ask them? Or you can try the following:

1. Make your report technically sound and priced conservatively. If you're not sure, ask for peer review. (Peer review is always a good idea.)
2. Cover your report with a single sheet carrying just the title. Please resist the urge to include endorsements, signatures, total costs, departments, mandates, or direct references to the technical report, etc. You'll thank me later.
3. Translate all technical terms to simple terms. Petaflop, a thousand trillion floating point operations per second is too technical. IBM knew this and named their first Petaflop Computer "Roadrunner."[3]
4. List 3-5 statements that your "approvers" can use to describe the outcomes of the project, everyone works for someone, what will they say about your project? Put words to the technical details for the "approvers." Use the active voice only; for example:
   - Will comply with all federal and state standards.
   - Digital sharing will reduce data acquisition costs.
   - Is compatible with all of our life-safety systems now and in the future.
   - Will deliver home-health care just in time.
   - Will be available on all mobile devices.

Be brutally honest at all times, if you don't know, say you don't know. STOP: Right now say, "I don't know!" Out loud three times, see that wasn't so hard.

We need some practice:

Pretend that you and I are tasked with placing at least one Geo-System in each of the governing bodies in the State of Illinois. How hard can this be?

Before we begin, we'll need to take a hard look at the possible future state of the geo-systems we would or could use.

We stop in for a visit with Mr Peabody and Sherman.[4] We explain our mission and without any hesitation, we step into the WABAC (pronounced "wayback") machine and set the controls for the future. Since our last visit, Mr Peabody has upgraded his control system and can now lock in on a time convergence; in this case a time when all geo-systems come together. He pulls the leaver and we're off, only to return to where we began. Seems the geo-systems have converged while I was sleeping. Maybe even while you were sleeping too.

We listen while Mr Peabody explains to Sherman that 4 geo-systems have merged, but few have taken advantage of the union. Mr Peabody draws Figure 1 on his blackboard as he explains, "Each system stands by itself, but together they're stronger than the sum of their parts, orders of magnitude stronger."

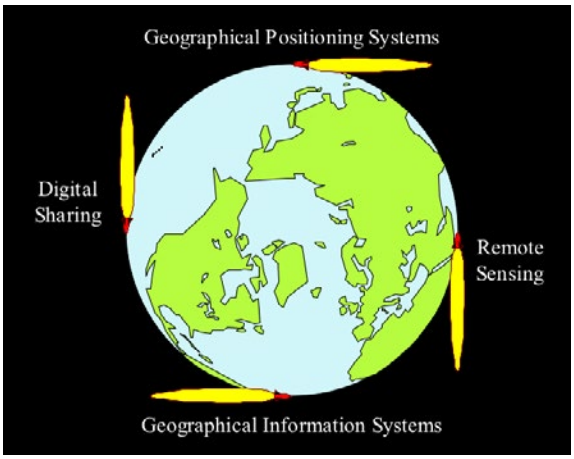

Figure 1: 4 Geo-Systems Stablizing Our World

Sherman gets the entire picture except for why digital sharing is an equal part of the foursome. Mr Peabody explains, "That many have ignored the growing library of digital information that can be downloaded for the commitment to honor the restrictions." Sherman still hesitates to accept the equal weight digital sharing has. I agree, digital sharing just seems like a big folder and not a system.

Patiently Mr Peabody sets the WABAC to travel over the last 110 years, stopping to observe latitude and longitude data collection techniques. While we travel you and I along with Sherman understand without any doubt that data collection has been the greatest unseen cost of any project. Digital Sharing is part of the 4 geo-systems and maybe the biggest contributor to very high returns.

The WACBAC slows so we can watch an old guy working alone in his basement. He plans to demonstrate the power of the geo-systems by tagging each geo-coded transportation segment with attributes that quantify the "integrity" of the segment. He downloads data and shape files from IDOT,[5]

from the Illinois Geospatial Data Clearinghouse[6] and a table of integrity codes for Illinois' transportation segments from The American Society of Civil Engineers.[7] He successfully builds a compelling map with a layer for each transportation segment in a little less than a calendar week and without spending any money.

Mr Peabody explains, "The cost to develop the old guy's geo-data just for this report would be so large and take so long that the project wouldn't be funded." With digital sharing, the report was completed and the public was able to prioritize the badly needed infrastructure work while providing thousands of new jobs.

Sherman and I were still trying to get our arms around this idea when Mr Peabody interrupted with, "Let's assume that the original cost to develop all of the old guy's data was a million dollars. Digitally sharing this data is like a million dollar gift and gifts aren't taxable. The digital sharing system is huge. For example, besides the Illinois GIS Clearinghouse[8], there are 60+ known agencies[9] that share Illinois GIS data. Think of their combined payrolls; then think about the hardware and software dedicated to the sharing effort. Consider all of these people as our benefactors, and as we download data from their sites they are giving us a significant gift, the financial value of which is beyond calculation. Now think about all of the others who benefit from sharing GIS data, school children, teachers, administrators, non-profits, governing bodies, relocating businesses and for-profits (domestic and international), just to list a few. We collectively couldn't find the money to build an equivalent system and that is only in Illinois." Sherman and I now recognize the benefits of digitally sharing and we know that digital sharing is the biggest system of the 4 geo-systems.

We turned to leave. At the door of the WABAC machine Mr Peabody asked, "Now you have the real part, but what about the perceived part of placing a geo-system in each of the governing bodies?" He was right. Rats, we're only half way there. What about the perceived part?

Mr Peabody returned to his blackboard where he had sketched out Figure 1. I think it was getting close to dinner time, so Mr Peabody turn to the blackboard and with impatient strokes drew a circle around the 4 geo-systems, around Figure 1. Rhetorically he asked, " What's inside of the circle? Any one? Sure it is the governing body that you're working for." Without his usual eye contact, he then divided that area into three roughly equal parts and labeled them, Life Safety, Service, Fiscal Responsibility. He asked with a very strong voice, almost barking, "Isn't Public Trust measured in Life Safety, Services and Fiscal Responsibility?" We shook our heads. Yes!

Figure 2: 4 Governing Body's Geo-Kernel

Mr Peabody continued with another rhetorical question, "How do the 4 geo-systems enable the directors of these governing bodies to maintain and improve Public Trust?" We didn't recognize the rhetorical nature of the question and began a long-winded explanation of how the technologies interlace with each other and how they operate as tools to do government work faster and better. We stopped tech talking when we saw Mr Peabody writing on the blackboard. He first touched Life Safety with his chalk and said, Life Safety is measured in Time and the 4 geo-systems make Every Second Count. He touched Services with his chalk and said, Services are only good when they are delivered and the 4 geo-systems deliver Services Just In Time. Touching Fiscal Responsibility with his chalk he said, "Fiscal Responsibility is measured in the absence of waste and the 4 geo-systems eliminate duplication making Every Penny Count."

Mr Peabody stepped to the other blackboard and started to tap his chalk on the board. He was more impatient, we're probably past his dinner time, so we understood his blunt question, "In words, how would a governor describe the benefits of using the 4 geo-systems?" As we brained-stormed he wrote down, some of our global ideas.[10]

- Compatible with all federal and state standards.
- Compatible with present and future life safety systems both ours and those who come to help us in an emergency.
- Delivers services just in time without duplication.
- Provides the requisite data and information for federal and state granting agencies.
- Provides basis for parcel transfer fee.
- Promotes economic development with data, information and relationships that can be seen by the public.

We clearly see that the 4 geo-systems' value is in "how" we use their combined nature.

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POINT OF BEGINNING: KANE COUNTY, IL
CADASTRAL GIS
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As Kane County's rural land becomes urban and the growth outward is limited, the demand for spatial data will grow. The base of the GIS will remain constant while citizens benefit from its power and county departments further embrace the technology. The GIS cadastral data layer will be the point of beginning.

Please visit http://gistech.countyofkane.org/kanegis/kanegis.html and http://gistech.countyofkane.org/KaneCrimeTracker2/KaneCrimeTracker2.html to see the utilization of GIS within Kane County, IL.

2013 ILGISA HILTON AWARD RECIPIENT

Thomas Nicoski, GIS Technologies Kane County, Illinois
nominated by Mazher Ahmed, Kane County

Tom joined Kane county in 1992, prior to that he was a "V.I.P." on SIDWELL's CID NET staff. He joined SIDWELL straight out of school and has been involved with mapping, computers, and GIS for more than 39 years. An integral part of the Kane County GIS team for 21 years, he currently serves as the Kane County GIS Director. He holds a number of GIS and programming certificates including a degree in Geographic Information from Ferris State University, the Ames Leadership Award in 2012 and an MA from Judson University.

The Hilton Distinguished Collaboration Award was established in 2010 in memory of Founding Member, Richard Hilton. This award is presented to an individual for extraordinary service to the GIS community in the advancement of coordination between GIS professionals. This award is presented to an individual who has made a significant contribution to the promotion of cooperation within our community and with the people we serve.

FYI: ROI, REAL & PERCEIVED
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Mr Peabody smiled and walked toward the door, tossing the chalk over his shoulder; he missed the chalk tray, but we gave him the three points anyway. As we left the WABAC machine, Mr Peabody waved and said, "Write when you find work and remember: There are 6968[11] governing bodies in Illinois, 2063 more than any other state. You will need a lot of luck too."

We have returned to our time with the bigger picture firmly in our grasp. We have learned how the elements of our work interlace and can list the benefits they provide. With some peer review we should be able to complete a return on investment report, covering not only the technology but also the perceived features.

In closing, in all of my years, I have never seen any technology universally solve so many humanitarian problems. I am proud of you because you are more than geographically informed, you are geographically responsible. You are part of the geographical information systems or the geographical positioning systems or the remote sensing systems or the digital sharing systems. And as these four systems, interlace their abilities; our world is becoming a better place for all.

Also remember I make mistakes so you don't have to.

—— Jeff
847-891-7966
Training Consultant

He can be reached at askjeff@LTS2Enable.US

Endnotes

1 Center for the Study of Intelligence, CIA, 1999, http://www.odci.gov/csi for educational purposes only.

2 Geography for Life: National Geography Standards, 2nd edition, ISBN 978-1-884136-41-2 and available for $20 at the National Council for Geographic Education on-line store, http://www.ncge.org/

3 http://www.pcmag.com/article2/0,2817,2417271,00.asp — the five-year life of the "Roadrunner," the first petaflop computer.

4 http://en.wikipedia.org/wiki/Mister_Peabody — background http://www.imdb.com/title/tt0864835/ — March 2014 Movie

5 http://gis.dot.illinois.gov/gist2/ — access the frozen annual GIS datasets of roads, structures (bridges) and railroad crossing data

6 http://www.isgs.uiuc.edu/nsdihome/webdocs/browse.html — the Illinois GIS Clearinghouse

7 http://www.infrastructurereportcard.org/a/#p/state-facts/illinois — Illinois's grade was a D+

8 http://www.isgs.uiuc.edu/nsdihome/webdocs/browse.html — data provided by the clearinghouse

9 http://www.isgs.uiuc.edu/nsdihome/webdocs/data-list.html — other data providers

10 These global statements may apply to your work and they may not; hint, start with global ideas and work backward to your project, but in the end you are responsible for turning your technical work into words.

11 http://www.governing.com/blogs/by-the-numbers/local-government-consolidation-fragmentation.html — 6968 Governing Bodies in Illinois, 2063 more than another state. This is another story for another time.

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the light bulb turns on, and the structure for the "GIS Bridge" now starts to take form. Eventually, both sides of the bridge continue to be built towards each other through continued conversation and collaboration, both ends meet. At that point, the success rate of the project has increased substantially.

Spanning the Gap

So how do we build this so-called "GIS Gap" between the subject domain experts and the GIS/mapping experts for the benefit of a project? Here are a few tips, tactics, and strategies that I employ as I try to build the "GIS Bridge:"

Learn about a topic, especially if you know little about it.

Learning as much as possible about a topic is very beneficial prior to any mapping or GIS project work. Talking with subject domain experts and reading up on a topic, of course, are obvious, yet sometimes overlooked tasks, that may be very beneficial in the long run.

Understand how to communicate effectively with maps and other visuals.

Maps and other visuals are our most powerful tools for demonstrating the power of GIS. A well-designed map or visualization that is simple, effective, and communicates clearly to experts in a specific subject domain can do wonders for demonstrating the potential and value of GIS for those with limited prior knowledge.

Sit down at the computer and give demos.

Many people are visual learners. I find that explaining how a GIS analysis might be performed can be useful, but quick demonstrations on the computer with real GIS datasets and analyses are even better. For example, a demonstration of a buffer analysis at the computer is much preferred to a verbal description. Unleashing the power of GIS with demonstrations like this has the potential to build the "GIS Bridge" at a much accelerated pace.

Convey issues related to geographic scale.

Many subject domain experts with little knowledge of GIS may not understand issues related to geographic scale. As GIS/mapping experts are well aware, GIS datasets are limited by the scale or spatial resolution at which they are created, and this defines the "fitness for use" of a given dataset for a project. For some projects, datasets at an adequate scale may not exist, which may not be apparent to subject domain experts. For example, I encounter this frequently when working on large-scale, local projects where fine-scale land cover/land use datasets and/or digital elevation models (DEMs) may not be available to support the intended analyses.

Understand how accuracy and precision may influence project results.

Similar to scale, the accuracy and precision of GIS datasets may pose limitations for a GIS project. It may not be apparent to subject domain experts that GIS datasets are subject to many types of imperfections and uncertainties that may be prohibitive to project goals. Certainly, GIS and remotely sensed datasets continue to improve in accuracy and precision, but any type of mapping, after all, is prone to various sources of error and uncertainty. As GIS/mapping experts, we come to realize these limitations through our past experiences, but these may not be readily apparent to those with limited exposure to GIS.

Keep expectations reasonable.

GIS is a powerful platform for analyzing and visualizing trends and patterns in geographic data. But we have to realize its limitations as well, and communicate those limitations to subject domain experts.

Why We Need to Build the GIS Bridge

Why should we care to invest our time in building the "GIS Bridge?" Perhaps most obviously, to ensure that our projects are successful. But from a broader perspective, building the "GIS Bridge" is crucial for our profession as a whole. Although we will never know the answer, take a minute to contemplate how many projects either fail or were never started because the "GIS Gap" was too much to overcome. These are missed opportunities, of course. As we all know, too frequently the public has limited knowledge about what GIS is, what it can do, and why we need it. By building the "GIS Bridge," we can start to reverse this trend, if even one person at a time, as we "evangelize" the merits of GIS. We can't afford not to. In a time when budgets are tight in universities, governments, and private firms, we need as many GIS advocates as we can find. If we, as GIS/mapping professionals, do our job to build the "GIS Bridge," we will develop more GIS champions throughout our respective organizations. This, in turn, builds a society that is more GIS-literate, and as a result, better positioned to make informed decisions.