the GIS PROFESSIONAL

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Nowhere, Fast

Professional Development and Avoiding the "Phantom Stop"

By Jordan Carmona, GIS Specialist, City of McKinney, Texas

Düsseldorf, Germany 2008: Franz-Josef Göbel, chairman of the aid organization Alte Löwen (Old Lions), helps to pioneer the first "phantom stop". This device, both humane and revolutionary, addresses the issue of patients with neurodegenerative disorders wandering away from care facilities. A decoy bus stop. Disoriented patients will find their way outside the care facility, spy the bus stop, sit there, and wait. And wait. In an area of the world with robust public transit, the natural assumption is that the bus will come; that it doesn't, creates an invisible corral where patients feel secure and in control of their ultimate terminus. There a person waits, letting their body cruise in autopilot as their mind embarks on travels that likely they'll never make. Here they idle until a facility worker can tow them back, or they return of their own recognizance. Physical restraints are replaced by mental roadblock and immobilizing straps now become a pilgrim's mirage, mistaking journey for destination.

The issue, as I came to realize it albeit several years later, was that I had done very little to achieve any of these goals.

The trajectory of our own professional development can often be de-railed through similar illusions of security — enclosures of complacency.

The Longest Wait

Finding my first job was a Sisyphean task. Tailoring my applications and cover letter for the hopes of getting an interview, interviewing, and then, radio silence. In those days of desperation, the idea of breaking into the industry seemed mythic. Eventually, I landed an opportunity digitizing cadastral records.

For the first time in my adult life, I had a semblance of stability. Naturally, I immediately mapped out a life plan. Eerily, it looked similar to the expectations for any employer's fabled entry-level position:

- 3-5 years' experience
- Web/Server knowledge
- Programming expertise in multiple languages

The issue, as I came to realize it albeit several years later, was that I had done very little to achieve any of these goals. Other than, of course, waiting. I went to work every day, left at the end of my shift, and spent the weekends laid about, as if I deserved nothing more than to rest after a week's worth of mind-numbing work.

This realization came quiet unexpectedly when the company for which I worked had several bouts of hiring. Fortunately, I had a boss who saw value in both delegating and the collaborative process. We were expected to sift through the hundreds of applications submitted, rank applicants based on our own personal subjective scale, and then reconvene with a final vote as to who should get invited to interview in-person. This consensus hiring continued into the interviews,

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which were an entirely different creature. Often, those that had the most experience on paper could not articulate core technical concepts outside of their daily wheelhouse. When asked about their motivation or future aspirations, the response was something habitual about "liking to make maps", "enjoying the cartographic process", or "being good with computers". I suppose it is somewhat difficult to get excited about cadastral record-keeping; however, I imagined myself on the other end of the interview process and found my own answers to be equally lackluster.

I had been spoiled with a promotion a year since my initial hiring but this forward momentum began to falter after our manager left. A replacement was appointed from within our team without a competitive process, which was not unusual considering the size of the company and the relatively clear lines of hierarchy. Team consensus was abandoned, new positions were opened and appointed. Suddenly it seemed that the metaphorical emergency brake had been applied full force. The months dragged on. I watched as my more ambitious peers moved on to other companies.

I felt bound by my own lack of imagination. I had spent years grinding away, gaining "experience", but in reality, I had done very little to progress. I found myself at my own phantom stop. I had been pacified by the monotony of my own work, sitting at my desk imagining that each day brought me closer to advancement, the next job, a corner office with a placard on my desk. The harsh reality was that the bus I was waiting for was no longer running; that line had ceased regular service even before our profession was defined by a graphical user interface. The idea that somehow being next in line, or that time served was enough to propel a career, to a destination that I hadn't even bothered to articulate, was an illusion born of inexperience and wishful thinking.

Forward Progress

Identifying a problem is not a solution in itself, but it does allow you to formulate a remedy. I began interviewing. Admittedly, interviews were much easier to acquire with the requisite years of experience that I had gained to date. Having been on the driving end of several dozen interviews, the exchange seemed more mundane as I better-understood business requirements and their relation to spatial technologies. At that point in my career, it would be disingenuous of me to say that I understood accurately how to treat the malaise of idleness.

Frankly, it was not until my current position that I began to adequately conceptualize habits that contribute to forward progress. As much as I appreciate a top ten list, for me, there are only two salient actions: getting your foot in the door and being able to make an impact once you're there; or in other terms, pairing networking with research and development. Previously, I had stumbled on elements of each but never had pursued the broader themes in any deliberate sort of way. As a consultant, my job was essentially to network. Learn their name, understand the situation from their perspective, solve problems, smile when you talk, be both pleasant and approachable. Our services were on retainer, no penalty contracts; we retained clients based on how we treated them.

The idea of attending professional events, presenting at conferences, writing articles, or setting up a regional Slack channel, is deeply unnerving to me. Almost mechanically, I force myself outside of my comfort zone; ask questions at the end of presentations, introduce myself to strangers, keep business cards on hand, and practice my 10 second response to "what do you do in your position?". The result is somewhat comical as I battle to hear myself and others over a pounding heart, rushing blood, and a near constant stream of internal dialogue. This a set of skills that I neglected to develop outside of a professional client-consultant relationship; however, it is something that can be taught and learned. Maintain eye contact, don't overpower a group conversation, and be comfortable with listening.

Rote actions will appear as hollow as they feel when they lack appropriate intent. A hammer for the sake of the object itself is only a showpiece; the utility materializes in the presence of a nail. When meeting new people, or reconnecting with acquaintances, my goal is always to learn. Every individual has expertise gained through virtue of their position, their work environment, and their life experiences. People are generally interested in discussing things that they know; in most cases, people will discuss themselves. This dynamic works well with patience, practice, a few leading questions, and an easy pivot. "What are you hoping to implement in the near future", "what's been the most challenging project", "how did you implement that", and "why is that". Cultivating a genuine desire to explore and discover the stories of others has catalyzed my new conception of networking.

Additional positions were predicated on some of the unique experiences that I had acquired as part of the official workday at my first job. Client site visits for sales and installations, web service administration and application building, and some light automation. It was beyond fortuitous that a first position would span such a wide vertical integration of skills; the second position was far narrower. The pay was better but contractual, the company was national,

> **Cultivating a genuine desire to explore and discover the stories of others has catalyzed my new conception of networking.**

and suddenly I felt expendable. The notion of a "safe" job had evaporated, along with it, my complacency. I began spending all my free time developing the traits that made me marketable.

Destination Ahead

My research and development (R&D) time was exclusively during lunch hours. Although restricted to the technology that the organization currently used, I was more than free to use our software to test new workflows, run different analyses, and prepare articles and presentations. Outside of specific software applications, I organized my lunch hours around interesting webinars and explanatory YouTube videos covering a variety of topics. And I read. Constantly. The wide availability of both digital and print materials makes most subjects accessible to those that are willing to spend the time to seek them out.

Sacrificing personal time and pursuing R&D outside of working hours has several distinct advantages. Chief among them, working

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with other software and versions that are unapproved. In the Esri realm, your organization may not have certain extensions or be several years behind the current software release. An ArcGIS Home-Use license costs $100 per year and comes fully loaded with all extensions, allowing the ability to hone skills that you would not otherwise have access to, and remain on the cutting edge of functionality. Outside of Esri products, there is an entire world of spatial technology not commonly used in American workplaces. QGIS is free and delivers the most up-to-date spatial functionality, including working in 3D; it also natively uses modern file formats like the GeoPackage. Moving beyond graphical interfaces, any sort of programming is made easier with unfettered admin rights. Python and R deliver incredibly fast, capable, and visual solutions to geospatial problems; paired with Project Jupyter, programming is becoming more collaborative and approachable to a wider audience.

As providence would have it, my current position quickly followed my second. Here, my interests are closely aligned with those of the organization: use spatial technologies to enable efficiencies and analysis-driven decisions. I had spent years effectively sitting on a bench, waiting for something to come and deliver me to a future that was nebulous and undefined. When I finally woke from my self-induced daydreams, I was startled into action, but without a clear destination in mind. I wasn't sure where I wanted to go, but I had an idea of the skills that I would need to be successful.

My current organization is aggressively pursuing a transformation into a High Performance Organization (HPO). As such, opportunities abound to study organizational dynamics, performance, and agility. Among other things, this has impressed upon me the importance of a structured R&D program for employees. The idea that knowledge workers are only as effective as the knowledge that they possess, makes imperative the continuing acquisition of knowledge and skills. Today's high-octane pace of technological change argues that the stagnant mind becomes increasingly outdated and obsolete. Hiring an employee without a training infrastructure is akin to purchasing a vehicle without a thought given to refueling it. The cost of doing business includes investing in the continuous education of your workforce. Acceptance of this new reality, like many things, is a spectrum. While few of us may be in a position to dictate organizational policies, we all have the agency to pursue personal growth and influence others through our example.

My journey continues. Within my team, our measures of success involve setting aside time for R&D; we use the term "Q2", shorthand for Quadrant 2 from the Eisenhower Matrix and are expected to dedicate a minimum of 10% of our working hours towards this goal. In addition to this, I still set aside my lunches for reading and webinars. The more that I learn, the better idea that I have about what else I should know. And the wider that I branch out, I find myself less satisfied with my current level of expertise.

Hiring an employee without a training infrastructure is akin to purchasing a vehicle without a thought given to refueling it.

In life, destinations require planning and measurable effort. The bus isn't real. There does not exist a vehicle, actual or metaphorical, that will spirit you away into a rosy and productive future. Our personal phantom stops may not be physical but their effects are tangible. Often times it is difficult to discern these mental decoys because they are so comfortable. We're bored. Cruising on autopilot. Waiting passively for something to happen for us. At the heart of this illusion of security, a lack of skills development and refusing to learn from others. While these mental enclosures may be a figurative shelter of sorts, the world continues moving forward. And the complacent wait. And wait.

About the Author: Jordan Carmona is a GIS Specialist at the City of McKinney, Texas. He leads the geospatial program across four departments at the City's Development Services Division. Since 2017, he has established multiple citizen-centric web applications, integrated non-spatial databases into the GIS, forged two public-private partnerships, and launched the City's first spatial drone program. Jordan recently presented at the TNRIS Texas GIS Forum, "Growing Pains: Automating an ETL with Limited Resources". He is focusing on a needs assessment and analysis, GIS literacy training, and is particularly interested in agile methodologies in government. jcarmona@mckinneytexas.org https://www.linkedin.com/in/jordancarmona






The Gift of Feedback
7 Steps to Move from Confrontation to Conversation

By: Dr. David Chinsky

Feedback is a gift that anchors your relationships in honesty. Everyone depends upon the feedback they receive to appreciate and reinforce their areas of strength, and to identify areas for personal and professional growth and development.

While there is no question that many people miss numerous opportunities to provide more frequent positive feedback that is specific, timely, and genuine, the bigger challenge for most people is providing constructive feedback that reduces the wall of defensiveness that often accompanies their feedback.

The seven-step constructive feedback process outlined below offers a framework that converts the typical constructive feedback confrontation into a more productive feedback conversation.

The Seven-Step Process

Step 1: Describe the Performance Problem

Employees (or colleagues or bosses) must first understand the problem that you're experiencing with them before they can be expected to improve. In this step, you should describe the actual performance and/or behavior and contrast it with the expected performance. To begin, simply describe the problem in a sentence or two. Remain as objective as possible and stick to one point—do not talk about multiple performance issues in the same feedback discussion.

Here's an example: "Tom, I'd like to talk with you because I've noticed that you've been late to four of our last five meetings." That's it. If you can't describe the performance problem in 30 seconds or less, you don't know what the problem is yourself. In Step 1, state the performance problem in a concise, simple-to-understand fashion. There should be no ambiguity as to why you're having this conversation.

Step 2: Explain the Impact

During the typical feedback discussion, leaders often jump from the description of the problem directly to the development of an action plan. They want to know immediately what the employee is going to do to resolve the problem. To assure meaningful feedback conversations, employees must know how their behavior is impacting others. In this step, convey the unacceptable impact of the behavior, or the unacceptable performance, on colleagues, the organization and perhaps even the individual himself or herself.

Let's go back to the previous example of Tom being late to meetings, as described in Step 1 above.

Step 2 would continue the conversation with: "When you are late, it causes us to have to stop what we're doing while everyone acknowledges your late arrival, and this interrupts the momentum of our meeting and lowers our productivity."

This second step is very important because many times the employee doesn't even realize his behavior is causing a negative impact. If you don't describe how his behavior affects others, he might quickly dismiss the problem, saying something like, "Yeah, so what's your point? A lot of other people are late, too." So, rather than just talking about the problem of being late, help him

understand the impact he's having by being late. It's not just the lateness you're talking about, it's the diminished productivity, the lack of momentum, the interruption—and some might even say it's the dishonoring of the punctuality of the other people who arrived on time.

Here's another example, incorporating both Steps 1 and 2:

"Jen, I wanted to talk with you today because I've noticed that you are the first to dismiss the ideas of other members of our team. Before you ask questions and try to understand someone else's position, you immediately go on the attack."

That's the problem, or Step 1, in 30 seconds or less. The impact might be stated as follows, in 30 seconds or less:

"When you are so quick to judge, it causes other members of the team to withdraw and withhold their input because they are afraid that when they speak you're going to cut them off or give all the reasons why their idea is stupid. This works against the environment I'm trying to create where everyone feels comfortable sharing their unique perspectives."

Step 3: Identify the Cause

Once you have described the problem and explained the impact, then you can work with the employee to identify the cause of the performance problem you described in Step 1. Don't jump in and immediately propose what you believe is causing the problem. Let the employee take the lead here. Your job is to ask one good open-ended question that invites him to think about what might be causing his lateness—or what might be preventing her from listening before she shoots down a teammate's idea.

The goal with this step is to develop a shared understanding about the situation and to identify causes of performance problems. Encourage the employee to discuss the performance from his or her point of view. Once you've asked your one open-ended Step 3 question, such as "What's preventing you from getting to our meetings on time?" or "What is preventing you from asking questions first before becoming critical of others' ideas?", your job is

to let "silence do the heavy lifting". Do not give in to the temptation of answering this question for the other person. What you think may be causing the problem is not always the case.

Step 4: Develop an Action Plan

You will develop a more meaningful action plan once you've clearly described the problem, explained the impact and identified the cause. If you simply leap from performance problem to action plan, you'll miss out on a lot of conversation that might help to customize the specific elements of an action plan.

In Step 4, you're looking for the employee to tell you what he will commit to doing differently to ensure he's able to get to meetings on time or what she will do to take time to listen first to her colleagues' ideas before jumping in and being negative.

Step 4 leads to the identification of a solution, a time table for any follow-up actions and an action plan that is specific and measurable.

Step 5: Confirm Understanding

Before the conversation ends, ensure that both you and your employee are on the same page. This is an opportunity for you or the employee to summarize what was discussed, who has agreed to what, and when you expect these changes to occur. If there is any disconnect, you can identify it and resolve it during Step 5—not two weeks or a month down the road when you expect something to be done and then realize you misunderstood each other.

Step 6: Document the Conversation

Take a few minutes to document the conversation, even if this is the first time you've had to talk with an employee about an issue—and certainly if it's the second time you're having the same conversation. When you document the conversation you've had, you'll have the information available should this develop into a more serious performance management issue.

Step 7: Follow Up to Ensure Satisfactory Performance

More than likely, you or your employee will make some kind of commitment during the feedback conversation. It's incredibly important to follow up on these commitments. This helps you determine if the employee has actually improved or changed behavior. Your efforts are wasted if you don't take the time to follow up as needed.

When these seven steps are performed in the order in which they are presented above, you will engage more confidently and effectively when the need arises to provide constructive feedback. In about a minute or less, you will have set up the conversation by describing the problem, explaining the impact and asking one good question to turn the conversation over to the person receiving your feedback. This will ensure that you maintain control of the beginning of these conversations when others may attempt to derail your efforts or move you off point.

ABOUT THE AUTHOR:

Dr. David Chinsky is the Founder of the Institute for Leadership Fitness, a celebrated speaker, and author of *The Fit Leader's Companion: A Down-to-Earth Guide for Sustainable Leadership Success.* After spending nearly 20 years in executive leadership positions at the Ford Motor Company, Nestle and Thomson Reuters, he now focuses on preparing leaders to achieve their highest level of professional effectiveness and leadership fitness. For more information on Dr. David Chinsky, please visit: www.FitLeadersAcademy.com.

Barry Wellar Receives Order of Canada

URISA Past-President and member of the URISA GIS Hall of Fame, Barry Wellar recently was honored with the Order of Canada by Her Excellency the Right Honourable Julie Payette, Governor General of Canada at Rideau Hall in Ottawa.

"Barry Wellar is a trailblazer in the field of geographic information science (GIS). Professor emeritus at the University of Ottawa, he has been a strong advocate for the field's recognition as a legitimate domain of scientific inquiry as well as a fundamental research tool. He pioneered the use of GIS applications in public-sector planning at all levels of government, particularly within the urban context. His leadership within the field, both in academia and industry, is extensive and lauded."

About the Order of Canada

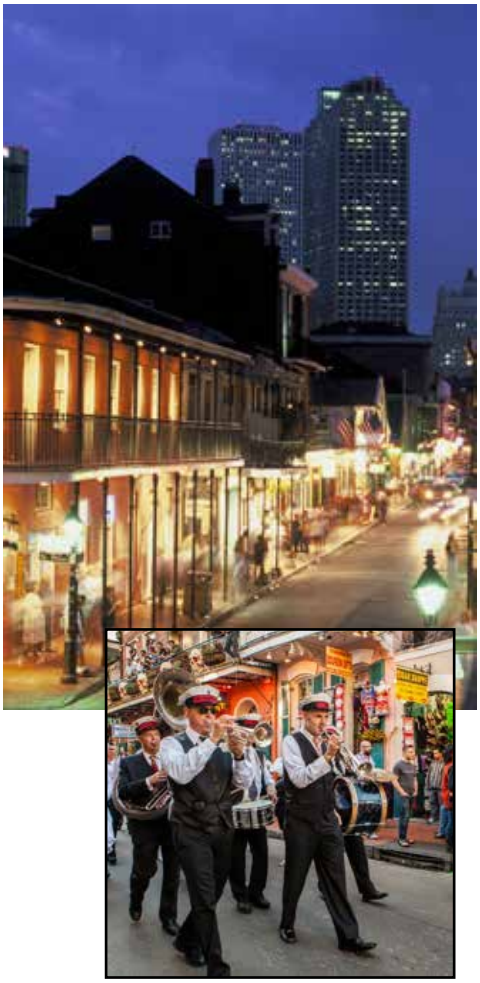
The Order of Canada is one of the country's highest civilian honours. Its Companions, Officers and Members take to heart the motto of the Order: DESIDERANTES MELIOREM PATRIAM ("They desire a better country").

Created in 1967, the Order of Canada recognizes outstanding achievement, dedication to the community and service to the nation. Close to 7 000 people from all sectors of society have been invested into the Order. Those who bear the Order's iconic snowflake insignia have changed our nation's measure of success and, through the sum of their accomplishments, have helped us build a better Canada.

Appointments are made by the governor general on the recommendation of the Advisory Council for the Order of Canada. For more information about the Order of Canada or to nominate someone, visit www.gg.ca/en/honours.

Registration Now Open

GIS-Pro 2019
September 28-October 2, 2019
New Orleans, LA



Start reviewing the comprehensive workshop and training opportunities, the keynote addresses, professional development and networking events, and the abundance of concurrent breakout sessions in several focused program tracks:

- GIS Leadership & Management
- Community Resiliency and Sustainability
- Social Justice and Equity Implications of GIS
- GIS Supporting Health and Human Services
- Data Management and Analysis
- Geospatial Technology Innovations
- Inspiring the Future of GIS and Education

The agenda is detailed online here: https://gispro2019.sched.com/. Start making your plans to join us in New Orleans and get ready to experience the amazing sights, tastes and sounds of the Big Easy!

Registration & Venue: GIS-Pro registration is open (early bird discounts until July 15) and the Hilton New Orleans Riverside is accepting your reservations.

Exhibitor and Sponsor Opportunities are posted with early bird discounts until July 15. The exhibit hall schedule has been condensed and focused and is situated in the center of all of the conference action. Grab your booth early!

Workshop and Presentation Proposals Invited for the 9th URISA Caribbean GIS Conference in Trinidad

URISA, in conjunction with Caribbean Chapter, is pleased to announce the 9th URISA Caribbean GIS Conference taking place November 18-21, 2019 in Port of Spain, Trinidad. The Planning Committee is accepting workshop and presentation proposals until May 8.

Suggested Workshop Topics:

- Disaster Management
- Application Scripting and Development
- GIS Program Management
- Strategic Planning
- Enterprise GIS
- Public Participation GIS (PPGIS), CrowdSourcing, Citizen Engagement
- UAS Usage, Strategies, Legalities
- Open Source GIS
- Policy Creation and Agreements
- Standards Development
- Addressing Issues
- Professional Development & Certification
- ArcGIS Applications & Topics
- Other topics of interest to the community that would best be presented in a half or full-day course setting

Presentation Themes and Topics to Consider:

Environmental Applications using Geospatial Technologies

- Natural Resources Management
- Oil, Gas and Renewable Energy
- Climate Change
- Earth Observations
- GIS in Agriculture and Sustainable Resources
- Modelling the Marine Environment with GIS
- Land Degradation Neutrality (LDN)
- Other related topics

Managing How Humans Impact the Community

- Flood Risk Modelling & Mitigation (e.g. Coasts, Rivers, Watersheds, etc.)
- Disaster and Emergency Response Planning using GIS
- Geomatics
- Land Management and Administration
- Land Use Planning
- Transportation and Public Works
- Crime, Safety and National Security
- Citizen Engagement
- GIS for Public Health Care
- GIS for Human Geography (e.g. Census, Elections, etc.)
- GIS for Non-profit & Humanitarian Applications (e.g. Refugees, homeless, aging, disabled, etc.)
- Other related topics

Technological Advances in GIS

- Big Data Analytics
- Geospatial Cloud Computing
- Application Development
- Automation, Artificial Intelligence, R & Machine Learning
- 5G & The Internet of Things
- Open Source GIS
- Mobile & Web GIS
- BIM for GIS
- Indoor Mapping
- Remote Sensing, Photogrammetry & LiDAR
- Drones & UAVs
- Other related topics

Governance, Education and the Future of GIS

- GIS Leadership & Management
- Spatial Data Infrastructure
- Data Management
- Realization of ROI Benefits for GIS
- The Value of Standards in GIS
- Legal & Ethical Issues Impacting GIS
- GIS Policy Making & Governance
- GIS in Education & Academia: Certification vs Certificate vs. Diploma vs. Degree
- Mapping your way into a GIS Career
- Women in GIS
- Introducing GIS to the Next Generation (From Primary School and Beyond)
- Mentorship
- Evolution of GIS over the Decades
- Volunteering in GIS (eg: Humanitarian OpenStreetMap, GISCorps, MapAction, involvement with professional associations)
- Other related topics

Business Intelligence

- Addressing in the Caribbean
- GeoMarketing & Sales Campaign Management
- Crowdsourcing / PPGIS Applications
- Event Planning using GIS (e.g. Olympics, World Cups, etc.)
- Facilities Management
- Application Development
- Supply Chain & Logistics
- Integrating Geolocation to Business Workflows
- Critical Infrastructure Protection
- Smart Cities
- Utilities & Telecom (e.g. Water, Sewage, Electricity, Gas, Telecommunications, etc.)
- Other related topics

Submission Deadline: May 8
For details and online proposal submission forms, click here.

The Mosaicking of Abandoned Coal Mines: A Case Study in the Pennsylvania Anthracite Region

By: Craig Lewis, Harrisburg University, clewis@harrisburgu.edu

Background:

Since the early 1800's, mining has been an integral part of Pennsylvania's economic history. From the Bituminous coal region in the western part of the state to the Anthracite coal region in the northeastern part of the state, Pennsylvania has a wealth of information on this coal that is stored in the form of underground mine maps. While also an important piece of history, these maps are crucial to insuring the safety of citizens today. Having accurate, geospatial data on the extent and complexity of the underground mine workings allows citizens to be more informed about the potential risks around them and thus providing them the knowledge needed to make a decision on the purchasing of mine subsidence insurance – something not covered by regular homeowner's insurance policies. To provide this accurate geospatial data, three universities and non-profit institutions across the State of Pennsylvania were awarded a grant to scan, georeference, and digitize mine maps to provide to the Pennsylvania Department of Environmental Protection (DEP), which will be stored in their publicly accessible data repository. In particular, the case study outlined in this article will detail the process used to create a single mosaic dataset of scanned maps across the entire Southern Anthracite field.

Georeferencing Prior to Mosaic Creation:

After maps have been scanned using a ColorTrac wide-format scanner at 400 dpi resolution, they are entered into the Pennsylvania Historic Underground Mine Map Inventory System (PHUMMIS) where crucial information, such as data, scale, the location of the mine and the coal seams that run through the mine, is entered. Next, each of the maps that have at least four accurate control points, such as road intersections, railroads, bridges, etc. that are easily able to be seen on aerial imagery or current vector datasets are georeferenced. Even though the preference is to georeference the subsurface mine maps using visible surface features, sometimes these simply do not exist on the underground mine maps. In scenarios such as this, georeferencing the maps using bore holes, benchmarks, and other mine workings that may be seen on a surface mine map in the same area is required. This creates a large quantity of individual maps (there are currently ~ 180,000 scanned maps in PHUMMIS and tens of thousands have been georeferenced) for very specific mine workings throughout the state.

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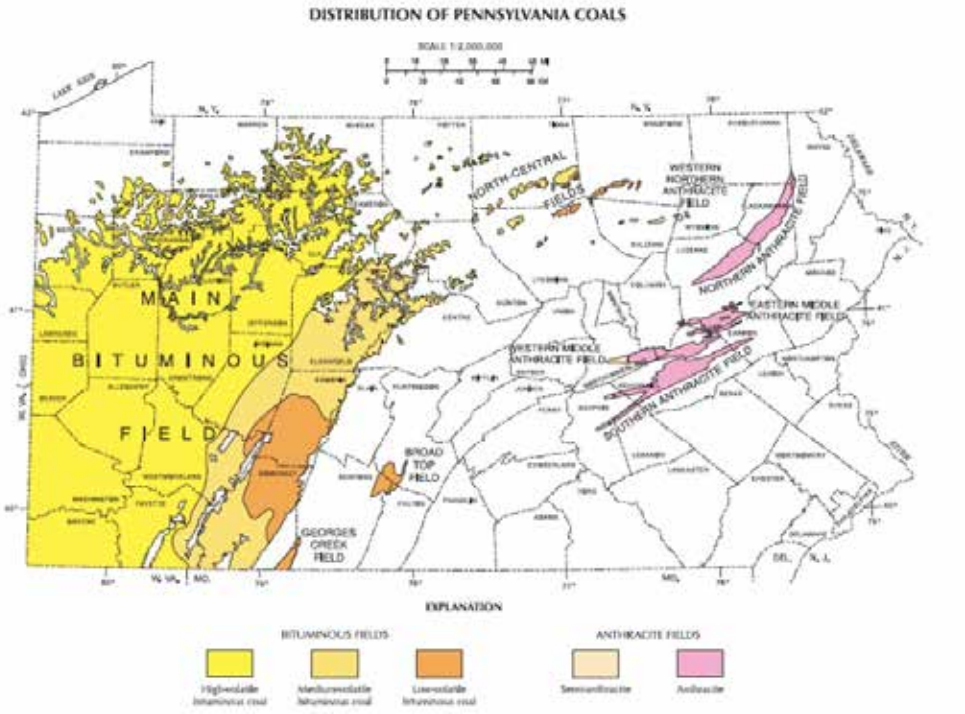

Figure 1: shows the various coal regions across the State of Pennsylvania.

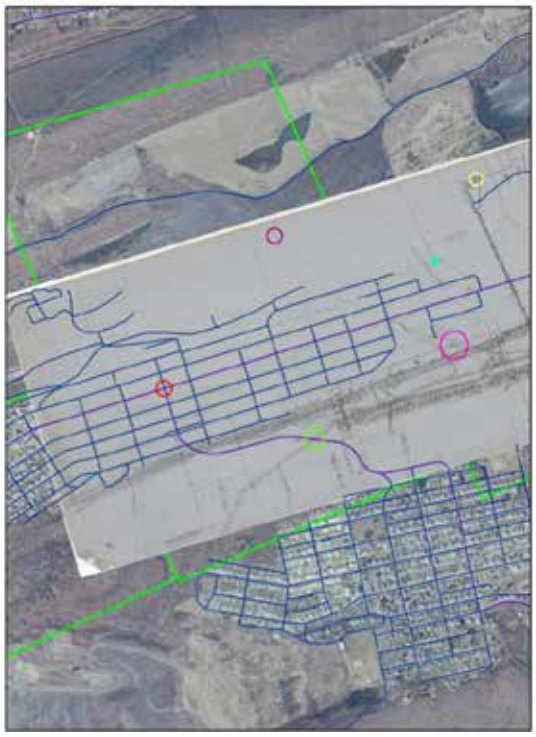

Figure 2: shows the location of various georeferencable features on an underground mine map including road intersection (red), bridge (green), building (pink), grid line (purple), mine entrance (yellow), and municipality boundary (blue arrow).

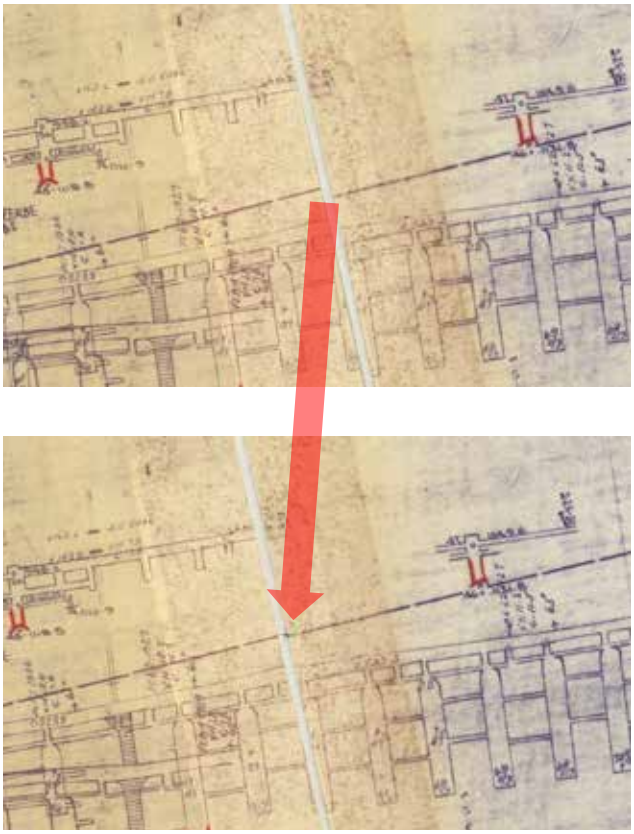

Figure 3: shows an example of how edge-matching brings two images closer together so that the workings of the underground mines line-up within a mosaic.

Purpose of Mosaic Creation:

As you can imagine, the sheer number of these individual maps makes for a large and complex data collection. Therefore, the creation of mosaic datasets allow for a much more manageable collection of maps that show all of the necessary workings across a given coal seam, within a coal field. In the case of the Southern Coal Field, this will allow the DEP and other users to look at approximately 17 mosaic datasets, as opposed to thousands of individual of maps – significantly speeding up the response time in the case of emergencies and general inquiries. Additionally, the mosaic datasets allow us to take a comprehensive look at the full extent of any mine workings and elevation points within a given mine or coal seam. In the future, the plan is to create a 3D model from these datasets – a process that would be much more cumbersome when examining thousands of maps.

Map Selection Process:

The first step in the mosaicking process is to select which map "best" represents the mine workings in a given area. When dealing with mine maps that are sometimes over a hundred years old, the term "best" is sometimes used fairly loosely. The criteria that we are looking for when identifying the "best" maps are 1. The most complete and extensive workings 2. Most recent date 3. Smallest scale and 4. Easiest to read. This map will be the one that ultimately ends up in the mosaic datasets for that specific extent – one for each coal seam. For organizational and planning purposes, PA DEP has specified that the mosaic datasets will be constructed geographically using the USGS quadrangle boundaries. Because thousands of maps (in varying levels of conditions) have been scanned, many of these will show similar workings but the project is most interested in the map that shows the most complete and accurate workings. Within an .MXD document, all of the potential images in a USGS quadrangle are brought in to determine A. Which of the images are the "best" image and B. How the images fit together.

Mosaic Creation Process:

When each map is brought into the .MXD document, it will have already been georeferenced. However, because these map are often wrinkled, torn, taped, etc, and sometimes have minimal georeferencable features on them, the georeferencing often needs tweaked slightly in order to create one fluid mosaic dataset image. This involves a combination of searching for additional georeferencable features, which will be used as control points, and some edge matching techniques to insure that when going from one map to another, there is a smooth transition in the mosaic dataset. Gaps and overlaps from one image to another are not ideal and while the georeferencing to the surface features is definitely preferred, sometimes the edge matching from one underground map in a given coal seam to another, is necessary.

After the georeferencing of all images in a given coal seam is set, the mosaic dataset for that seam must be created. To do this, various Python scripts are used to create the mosaic. First, the CreateMosaicDataset tool is used to create a blank mosaic dataset

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Figure 4: shows an example of how underground mine maps are footprinted so that only the desired portions of each map are displayed.

file. This is a tool that is located in the Mosaic Dataset directory in ArcMap. With that said, because this task is repeated frequently, this is set as an automated process in Python to ensure that all of the settings and environments remain the same each time we create a new mosaic dataset. After the new mosaic dataset is created, all of the images that are in the current .MXD, that belong to that coal seam, are added. This could be done via the AddRaster tool in ArcMap but like the CreateMosaicDataset, a Python script to automate this process and to ensure all of the settings remain the same has been developed. To do this, a .txt file is created to ensure that all of the .sid files (map images) are added to the blank mosaic dataset and then an AddRaster Python script is run. At this point, all of the map images (.sid files) are a part of that mosaic dataset for the given coal seam.

Footprinting:

Even though all of the "best" map images of a given coal seam are in a single dataset, the images will not form one fluid dataset until the footprints for each of the images is set. To do this, an Editor session in ArcMap is opened and then the vertices of the automatically generated vector boxes are dragged to the corners of the map – or to capture whatever map elements must be visible in the mosaic dataset. For example, if there is a slight overlap between 2 maps even after edge matching, one can adjust the footprint of the images so that only the desired image is displayed within the footprint boundaries. In addition to making sure that one fluid image with no overlap is displayed, footprinting can be used to remove some of the excess borders that sometimes comes with images that are scanned. Simply drag the vertices of the footprint boundary to the edge of the actual map (excluding the "dead" scanning space) and then a clean mosaic datasets with only the desired mine maps will be displayed. One thing to remember when footprinting the mosaic datasets is to make sure that the vertices of all of your footprints are snapped. If this is not done, once zoomed in, areas where there is "dead space" may be noticeable, as there won't be an image in that particular location.

Conclusion:

While the process of creating mosaics can be a fairly complex one, the potential uses in the future for having one complete dataset for each coal seam far outweighs the effort that creating these take. While this is one example of mosaic datasets that Harrisburg University is working on, there are other opportunities in other applications to create one inclusive dataset as opposed to many maps in a geodatabase. Another application of mosaic datasets that the University is working on is to use mosaic datasets to stitch Sanborn maps (older fire maps) of the City of Harrisburg together and tie them with a variety of Census data to see how the demographics of the city have changed over time. This is a task that would be nearly impossible without the compilation of mosaic datasets so that there is one fluid image to analyze the trends of the city. I hope you have found this article useful and can potentially apply it to some of the work you are doing in your organization and if you have any further questions about our methodology our results, please feel free to contact me at the email address above.

About the Author

Craig Lewis is the Geospatial Lab Manager at Harrisburg University. He is responsible for managing various projects in our lab. Through the Geospatial Technology Center, students are able to gain valuable experience in their field before entering the workforce upon graduation. Prior to working at Harrisburg University, he held various roles in the GIS industry for 8 years as an analyst and project manager. Craig hold both a Master's and Bachelor's degree in Geography from Ohio State and Buffalo State respectively. In his spare time he enjoys spending time outdoors and sports of all varieties.

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President's Corner

Kim McDonough

Have you heard it? It is out there, just kind of far away. But, it is most certainly happening and we will all be hearing it soon. There it is. GDPR. That stands for General Data Protection Regulation and it was created by the European Union. If you work for a data company that has business with any part of the EU, you are well aware of this because you have to comply with it in order to do business there. Some have suggested that it will become a force here on our continent eventually. That is still a matter of opinion, but, it is certainly worth looking at.

There already is a lot of talk about data privacy here in North America. I am well aware of the debate in the U.S. having taught the URISA workshop, "Public Data, Public Access, Privacy, and Security: U.S. Law and Policy" for several years and comparatively speaking, we really don't have a lot of privacy protections over here. On the public side, there is not much that is kept private, and for good reason. The foundation of our democracy is that the governed deserve to know everything that goes on with how their government operates. So that means much of the information the government has about you is in the public domain. People can easily look up who owns property around them and how much they paid for it as well as its current assessed value and how much tax is owed on it. Access is typically controlled by a state's open records act or, if an agency receives federal funding, the Freedom of Information Act. There are always exceptions protecting individuals rights to privacy or confidentially or personal or public safety. As a result, there is an almost constant struggle by governments to provide or restrict access to public information based on authorities interpretation (or desired interpretation) of the law. URISA has followed these debates and has even been directly involved in several. It is an aspect of public administration that many professionals don't even notice, until it impacts us directly. Digital data introduced a whole new aspect to this complicated equation. Some governments have tried to use digital data as a revenue stream while others saw an opportunity to simplify their public access and the two objectives don't always play well together. So, the dance between access and restriction of public data continues.

On the private side, it is more of the wild west out there, at least in the United States. As we are well aware, the data that is collected about us by private companies is extensive. If you shop at any major chain store, corporate headquarters knows not only what brands you like, they know what day of the week you tend to buy certain things as well as the time of year you are most likely to buy them. Multiple companies have figured out how to literally track your every move, sometimes with your complicity, sometimes not. They then market that vast data collection to other companies which then use it as part of their market analysis. Government is increasingly a customer for these datasets, especially Departments of Transportation and local planning agencies. At that point, the whole public/private issue gets really muddled. The private company licenses the data to the public agency, which then uses it to produce analyses which are involved in influencing public decisions. That means that at least some of that falls under a public records act of some type. But how much of it is really public? And who really owns that source? Would the true source actually be you? Someone got that data from you during your daily course of business after all. So if it is "private" data, whose private data is it really? At what point do we have control of all this mountain of information that is about us?

And that is where GDPR comes in. The European Union has really given this whole thing a lot of thought and if you look at the concept behind the GDPR, it makes some good sense. First of all, the EU takes a completely opposite position about privacy rights. There, data about you is yours. Someone else can use it only if you "opt in", grant them permission to do so. This has given some internet companies fits and some cases, resulted in hefty fines when they did not play by the EU rules. But people there have a lot more personal security. Here, well, it's complicated. For the most part, it seems that whatever a company can scrape off from your interactions with the rest of the world is theirs to exploit. There are some protections, but they tend to be based on the world long before the internet. So we really need to update our laws to catch up with the Internet of Things.

GDPR has some really good points to consider. It guides data use with 7 basic principles:

- Lawfulness, fairness and transparency
- Purpose limitation
- Data minimization
- Accuracy
- Storage limitation
- Integrity and confidentiality (security)
- Accountability

It essentially says you cannot collect and use data specific to an individual without valid grounds for doing so. Then, you must ensure that you don't use that data to break other laws. The data you collect must be used in a fair way. It cannot be used in a way that is detrimental, unexpected or misleading. And finally "You must be clear, open and honest with people from the start about how you will use their personal data." There, in order to use a person's personal data, they must agree to the use first, or "opt out" of privacy.

Even if you aren't doing business in Europe, these are some really good principles to go by if you are dealing with data about individuals. If you work for a government agency, these are probably really good rules to go by as well. I pledge, as president of URISA, that I will look at our data policies and work to comply with the GDPR. Because, it is good business.

So, listen carefully, its coming.

For more information about the GDPR, a great source is: https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/

More Good Reads: Denis Wood has published two books that are good reads for geographers. The first is *The Power of Maps* and the second is *Rethinking The Power of Maps*. Denis Woods is trained as a cartographer and was a professor in the Landscape Architecture program and North Carolina State University when I was a student there. Based on the stories I heard about critiques he gave of designs, I was terrified of him and avoided taking any classes under him until my final year. As it was, I found I actually agreed with many of his views and came to respect his challenges to design philosophy at that time. His books also challenge our ideas of what a map is and what stories a map can tell.

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Another Geospatial Fact Sheet Published on the 2020 Census

URISA's Professional Education Committee has been working on a series of Geospatial Fact Sheets (FAQs) to highlight relevant issues and policies and provide guidance on how you can obtain more information about these topics.

- 2020 Census Participant Statistical Areas Program - published December 2018
- Geospatial Data Act - updated November 2018
- 2020 Census - published December 2017
  - 2020 Census Update - **NEW** updated April 2019
- Addressing - updated November 2018
- Open Source GIS - published August 2018
- NextGen 911 - coming soon

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Submissions are due on or before Wednesday, May 29, 2019. A detailed application requiring details about the Jurisdiction/Organization, System Design, Implementation, Organizational Impact and System Resources is available online. To view recent winning submissions, visit: http://www.urisa.org/awards/exemplary-systems-in-government/

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Cyclomedia offers the following licensed products:

Content

- Cycloramas – Seamless, accurate 360° panos taken at street-level with our patented recording technology.

Viewer Software

- GlobeSpotter – Our feature-rich web app for viewing Cycloramas that runs on any browser supporting Flash.
- GlobeSpotter for ArcGIS Desktop – The power of GlobeSpotter inside Esri's leading GIS software.

Hosting Solutions

- GlobeSpotter Cloud – Secure, scalable hosting service managed by Cyclomedia that's free to customers.
- GlobeSpotter Server – Locally hosted option supporting all Cyclomedia's content and software.

Developer Tools

- GlobeSpotter API – Integrate GlobeSpotter components into your user's existing business workflow.
- Panoramic Rendering Service – Extract pictures for reports and texture map buildings with Cycloramas

Data Transfer Solutions

3680 Avalon Park Blvd East, Suite 200, Orlando, FL 32828
Phone: (407) 382-5222
aibaugh@dtsgis.com

Headquartered in Orlando, DTS is a leader in asset management, geographic information systems, and transportation planning. We specialize in creating solutions to help clients automate their worlds, reduce their workload and organize their data through customized technology.

DTS is comprised of seven divisions, each with its own scope of services. Often however, a single project spans several divisions before completion because we uniquely offer all the necessary cutting-edge services, integrated within one company.

EagleView Technologies

3700 Monte Villa Pkwy, Ste 200
Bothell, WA 98021
1-855-984-6590

EagleView Technologies offers Pictometry® Intelligent Images®. The high-resolution oblique and ortho images are captured and processed with patented technology and delivered through innovative analytical tools to allow for the most accurate assessment of properties.

Used daily by GIS, assessment, public safety, defense, insurance, construction and utility professionals, Pictometry solutions bring field work to the desktop. Solutions are easily integrated into existing workflows through strategic partnerships and make it easy for users to make informed decisions and enhance productivity. To find out more please visit www.eagleview.com

Every day, new applications for Pictometry are realized. Discover how Pictometry can help you work better, faster, smarter and with optimal cost savings.

Bronze Corporate Partners

Clark Nexsen

Our clients leverage our expertise and rely on our long history of proven performance to develop geo-related solutions, including Geographic Information Services, GPS survey and map grade data collection, geo-enabled photogrammetry, aerial imagery analysis and processing, and cloud mapping.

As a trusted partner, we collaborate with our clients to identify their goals and deliver solutions and products that exceed expectations. Our team's cutting-edge technical capabilities meet the emerging survey, mapping, data collection, and application development needs of our clients, building on a strong foundation of experience and proven ability to perform and execute multiple, simultaneous task orders.

Learn more: Featured Projects

2019 Partner Directory

Evari GIS Consulting

Evari GIS Consulting, Inc. (Evari) was founded in 2009 with the mission of providing high quality, custom GIS solutions for municipal projects. Evari has a wide array of project experience supporting municipalities, utilities, and energy service companies, providing As-Needed GIS support for Transportation, Civil Engineering, Storm Water, Undergrounding Master Planning, Street Lighting and Planning projects. Evari is driven to innovate, employing GIS to streamline data management, empower field crews with mobile GIS technology, and facilitate Smart City, IoT solutions. With a focus on producing clear, accurate and valuable data, maps and figures, Evari's provides its clients with effective decision-making and project communication tools. Evari leverages the Esri Technology Stack (ArcGIS) and the Amazon Web Services Cloud Computing platform for a broad range of municipal GIS applications.

New Light Technologies

New Light Technologies Inc. (NLT), a small business based in Washington DC, provides comprehensive information technology solutions for clients in government, commercial, and non-profit sectors. NLT specializes in DevOps enterprise-scale systems integration, development, management, and staffing and offers a unique range of capabilities from Infrastructure Modernization and Cloud Computing to Big Data Analytics, Geospatial Information Systems, and the Development of Software and Web-based Visualization Platforms.

This broad technology expertise enables customers to:

- Take advantage of best in class capabilities
- Leverage existing technology investments
- Be more integrated, scalable, secure, adaptable, and sustainable
- Reduce cost and risk
- Meet & exceed mission requirements

Learn more about NLT today: https://newlighttechnologies.com/

GeoDecisions

GeoDecisions® is an international consulting firm specializing in geospatial information systems, cloud technology, and analytics for commercial, municipal, state, and federal government organizations. We offer a suite of Software as a Service and custom-designed solutions that equip decision makers with the data, intelligence, and visual information critical to planning, logistics, public safety and emergency response, security, asset management, incident management, resource management, and mass notification. We improve existing infrastructure and implement new systems that integrate vast collections of location-based data assets to help clients streamline processes, boost productivity, and push the boundaries of data-based insights. We are ISO 9001:2015 Certified, which assures clients that we meet the most rigorous and independently audited quality standards.

Visit www.GeoDecisions.com for more information.

Pond & Company

Pond, an Atlanta-based company founded in 1965, is a progressive, full-service architecture, engineering and planning consulting firm, and was recently named Engineering News Record's (ENR's) Southeast Design Firm of the Year. With over 550 employees, Pond provides technology-driven full-service engineering, architecture, planning, construction and geospatial design solutions to defense, government, corporate and private sector clients worldwide. With 25 locations throughout the world, Pond is one of the fastest growing A/E/P and Geospatial firms in the country.

Pond provides comprehensive GIS solutions to a variety of clients throughout the continental US and overseas including Department of Defense, Federal, State, Energy and other private sector clients. Our hub for Geospatial services is located in New Orleans, with support offices in Huntsville, AL, Colorado Springs, CO, and San Diego, CA.

For more information please visit us at www.pondco.com

Business Partners

AmigoCloud

Based in San Francisco with an additional location in Lima, Peru, AmigoCloud was founded by a team of GIS experts in 2013 to empower companies and individuals to collect, manage, visualize, and analyze location data to better understand their business and reveal and hidden patterns to reduce costs and increase operational efficiency.

AmigoCloud has developed the first Collaborative Mapping Platform, offering two products, amigoCollect and amigoPlatform. amigoCollect is a mobile application, built for Android and iOS devices, that helps your field crew collect data, whether online or offline, and collaborate with as many people as your team needs.

With a streamlined and quick workflow, you can collect, storage, transform, enrich, visualize, and analyze data as well as easily create, embed, and publish meaningful maps. We reduce, and in some cases completely eliminate, mapping workflows that would normally take several days or weeks. Our software is designed to require no GIS training or any other kind of specialized hardware.

amigoPlatform enables companies to build a custom mapping solution, analyze big location data and real-time data, even a petabyte scale, and add location intelligence to your own software.

A powerful enterprise-ready platform to manage from remote sensing data and satellite imagery to Internet of Things data coming from sensors.

Connected Nation

Connected Nation is a national leader in broadband expansion programs. Our mission is to improve lives by providing innovative solutions that expand the access, adoption, and use of high-speed internet and its related

RFP Distribution

URISA members, remember that URISA will distribute your RFP/RFQ announcements to our corporate and business members at no charge. Simply email your announcement to info@urisa.org (Subject: RFP Service) and we'll send it right out for you!

2019 Partner Directory

technologies to all people. Everyone belongs in a Connected Nation.

Since its start in 2001, Connected Nation has been offering programs and initiatives across the United States to help bridge the Digital Divide. From state-based technology planning and mapping programs to national educational technology initiatives, Connected Nation has partners in all sectors including libraries, schools, state and local governments, large technology companies, and small businesses.

Connected Nation offers the following core competencies:

Mapping & Analysis: We provide more accurate and granular mapping of broadband service areas to empower local, state, and federal leaders to make better analytics-driven decisions that positively impact people.

Community Solutions: We measure and evaluate the state of technology and broadband access, adoption, and use in towns, cities, counties, and regions to develop community-specific Technology Action Plans.

Digital Training & Jobs: We provide digital training and job placement assistance for veterans, single parents, senior citizens, and others in rural and urban areas. Our approach focuses on the demand for a nontraditional, remote workforce.

Transforming Education: We believe all children should have adequate access to the latest technology in schools. Our work includes school technology assessments, E-rate program assistance, and more.

Environmental Science Services, Inc. (Es^2)

Es^2 is a registered engineering firm in Louisiana, Mississippi, Florida, and Texas that provides a wide range of environmental consulting, engineering, and science support services for both government and private sector entities. Established in 1996, the foundation of Es^2 has always focused on the leading-edge technologies in GIS, Global Positioning System (GPS), photogrammetry, and remote sensing to support its environmental and engineering projects. Es^2 offers an industry-leading array of GIS services. Our diverse background, experienced and professional teams, combined with the most current Enterprise GIS technology allow Es^2 to provide customized, web-based, enterprise-wide solutions using the Esri platform.

Additionally, Es^2 also offers:

- Enterprise GIS Consulting Services, Including Installation, Setup, and Configuration of ArcGIS Enterprise and SQL Server
- Web and Mobile Application Development Utilizing Esri Configurable Apps
- CAD / GIS Data Conversion and Import
- Survey-Grade Field Data Collection Utilizing RTK GPS and Robotic Total Station Systems
- Mapping and Data Analysis
- UAS Aerial Photography Acquisition and Digital Photogrammetry
- Esri Silver Partner with the following specialty designations:
  - Local Government
  - ArcGIS Online
  - Federal Small Business
  - Release Ready

Contact: info@es2-inc.com
For more information: http://www.es2-inc.com/#

MGP

701 Lee Street Suite 1020
Des Plaines, IL 60016
Tel: (847) 656-5698
info@mgpinc.com
www.mgpinc.com

MGP is an information systems services company that specializes in geo-spatial solutions. Our comprehensive range of geographic, data modeling, and business process solutions provide you new opportunities to find a better way. We believe that innovation creates opportunity and collaboration breeds success. MGP was formed as a shared business model in which clients are partners. This philosophy enables significant cost savings and makes it possible for any client, regardless of size, to get where they need to go. MGP is the managing partner of the GIS Consortium.

Planning Communities, LLC

9131 Anson Way, Suite 304
Raleigh, North Carolina 27615
919-803-6862 (Office)
919-882-1206 (Fax)
contactus@planningcommunities.com
ttownsend@planningcommunities.com

Planning Communities, LLC provides a wide range of multi-disciplinary planning services for local, state and federal agencies, tribal nations and community organizations. Community, transportation, environmental and GIS services include local/regional planning, visioning/scenario planning, land use, socioeconomic, market and cost-benefit analysis, community asset mapping, tool/application support and development, process improvement/integration, consensus-building and facilitation.

Headquartered in Raleigh, North Carolina, Planning Communities has additional offices in Charlotte (NC) and Seattle (WA). Planning Communities is a North Carolina certified Small Professional Service Firm (SPSF) and is certified as a DBE in North Carolina, Tennessee, Florida and Delaware.

Solv3D, Inc.

Solv3D creates tools that enable people to effectively use large 3D point clouds and immersive imagery within their existing workflows. Using the 3DPointLogic™ toolkit, individuals can easily turn massive point clouds into manageable data sets. With the SiteVisit360™ collaborative platform, companies can merge 3D point cloud data, panoramic imagery and other photography, resulting in a virtual project environment, allowing them to more effectively leverage the value of their datasets for estimation, planning, design, and decision-making.

Spatial Relationships, LLC

800 Boylston St #990756
Boston MA 02199
(857) 400-8920

Contact:
Kathryn Brewer
James Armstrong

Spatial Relationships, LLC is a consulting firm that provides on-demand teams of expert Geospatial Professionals to ensure organizations have the capability to deliver on existing and future goals, manage business risk, and increase profitability.

Think of us as your geospatial concierge. Our "concierge services" provide resources and solutions for planned or abrupt disruptions as well as future projects. These can include:

- Being a key person down – planned leave or unexpected departure

2019 Partner Directory

- Technical requirements – fill skills, knowledge and training gaps
- Budget constraints – less than anticipated funds for the same scope of work
- Capacity constraints – completing urgent priorities for overbooked staff

Spatial Relationships, LLC was born out of the necessity to create new flexible and affordable ways to work that support organizations to manage ever-increasing demands as well as the need to support the community of Geospatial Professionals.

XSoft, Inc.

XSoft, Inc. (**XSoft®**) is an innovative technology company focused on government financial software solutions and consulting services. The company was formed in January 2006 with one goal in mind; *providing local governmental agencies with a dynamic alternative to the traditional assessment software solutions available.*

Since its formation in 2006, **XSoft®** has focused 100% of its efforts on our CAMA and Tax client base. We see ourselves as partners with our clients, working together to generate fair and equitable assessments, on-time tax bills, and collections/distribution of funds in the most effective and efficient manner. We feel that the solution is simple; *provide a superior product with superior service.*

COMPANY MISSION: We partner with our clients to deliver government financial solutions, which generate fair and equitable assessments, on-time tax bills, and collections/distribution of funds through the effective and efficient use of CAMA and Tax software.

Educational Institution Members

Brandman University

Brandman University is a private, non-profit regionally accredited institution that provides educational opportunities for working adults. There are over 25 campuses throughout California and Washington, and a virtual campus online.

Undergraduate Certificate, GIS Use in Non-Profit Organizations - An innovative, problem-solving approach to learning and using GIS.

Lakeland Community College — Kirtland, OH

- Geography and Geospatial Technology - Associate of Applied Science and certificate programs

North Carolina State University - Center for Geospatial Analysis

- Master of Geospatial Information Science and Technology (MGIST)
- Graduate Certificate in Geospatial Information Science (GIS)

Texas A&M University — College Station, Texas

USC Spatial Sciences Institute

Roster of Academic Programs:

- B.S. in GeoDesign
- Spatial Studies minor
- Human Security and Geospatial Intelligence minor
- Online Graduate Programs in Geographic Information Science and Technology
- Graduate Certificate in Geographic Information Science and Technology
- Graduate Certificate in Geospatial Leadership
- Graduate Certificate in Geospatial Intelligence
- M.S. in Geographic Information Science and Technology
- M.S. in Spatial Informatics
- Ph.D. in Population, Health and Place

Government Agency Members

URISA Government Agency Members

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City of Salinas, Salinas, CA
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City of Westminster, Westminster, MD
City of Wilmington, Wilmington, NC
Coastal Regional Commission, Darien, GA
County of Maui Department of Finance Real Property Assessment Division, Kahului, HI
Forsyth County, Winston Salem, NC
Harris County Appraisal District, Houston, TX
Linn County, Cedar Rapids, IA
Los Angeles County, Los Angeles, CA
Manatee County Information Technology Dept., Bradenton, FL
Metro, Portland, OR
Routt County, Steamboat Springs, CO
St. Johns County, Saint Augustine, FL
Wasco County, The Dalles, OR

Mark Your Calendar!

May 20-24, 2019
URISA GIS Leadership Academy
Raleigh, North Carolina

August 19-23, 2019
URISA GIS Leadership Academy
Toronto, Ontario Canada

September 28-October 2, 2019
GIS-Pro 2019: URISA's 57th Annual Conference for GIS Professionals
New Orleans, Louisiana

October 21-25, 2019
URISA GIS Leadership Academy
Phoenix, Arizona

November 18-21, 2019
URISA 2019 Caribbean GIS Conference
Port of Spain, Trinidad

March 23-26, 2020
GIS/Valuation Technologies Conference (formerly GIS/CAMA)
Louisville, Kentucky

September 27-October 1, 2020
GIS-Pro 2020
Baltimore, Maryland

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