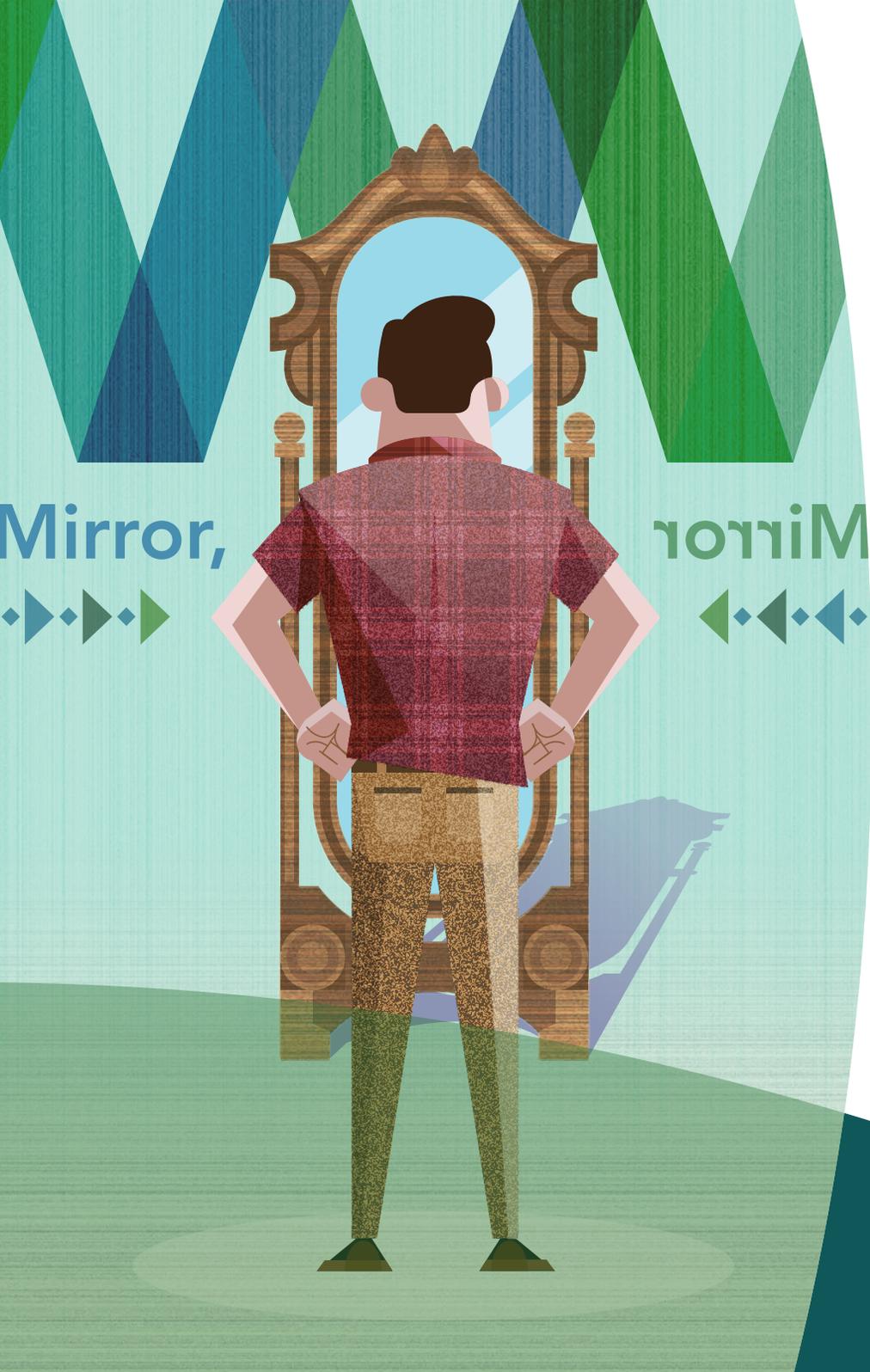


November 2014



# Managing GIS 3



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# The Key to a New Wave of Enterprise GIS Users

By Christopher Thomas, Director, Esri Government Markets—Federal, State, and Local



In my early days as a GIS administrator, one of my number-one priorities was to build an enterprise, or organization-wide, GIS program.

I worked hard to figure out how to get GIS software directly into the hands of people in fire, planning, building and safety, engineering, public works, finance, parks and recreation, economic

development, airports, code enforcement, housing, and any other discipline who would take a moment to listen to the benefits of GIS. As the Esri tools and supporting technologies progressed, the GIS team was able to achieve a vision of "no department left behind."

We went from mainframe applications, extended through emulation software on dumb terminals, to stand-alone and networked desktop software, and eventually to Internet and mobile devices. My team and I moved closer and closer to this vision each and every day. And along the way came a lot of firsts: from GIS use on fire trucks to nonsurvey uses of GPS for public works asset data collection, from public access to GIS via the

public library to the use of GIS for 3D statistical modeling, and from using GIS for revenue auditing to being one of the first local governments to use GIS on the Internet. The journey we took led us to a greater understanding of the return on investment of GIS, and we realized a lot of innovation by becoming creative as we sought to reinvent government.

Some of my peers in information systems and GIS, both inside and outside the organization, openly and critically questioned why I would want to encourage others to use the technology themselves. I was puzzled by this question. These peers would go on to ask, If everyone else was able to use the power of GIS, what would we do?

These were the same peers who could not understand why the GIS profession could not gain significant traction inside their own organizations. I simply did not see the logic in this line of thought. After all, there were so many other things we could work on: creating new datasets, developing data repositories, integrating GIS into mainstream applications like 911 and permitting systems, building kiosks and front counter applications, building citizen engagement websites, increasing operational efficiency through

in-vehicle and mobile applications, and developing regional cooperatives, to name a few. There was just so much more to do.

And the more GIS was embraced by the various departments and the public, the more GIS became mission critical to the organization, and the more important we became to the organization. While the question my peers asked so many years ago still exists, we have been presented with an even greater opportunity to extend the power of GIS to every discipline in government.

More important, there's an opportunity for GIS personnel to become even more mission critical to their organizations. The key today just might be Microsoft Office 2010. Think about the number of individuals who use Excel spreadsheets and PowerPoint presentations in your organization. There are millions of Microsoft Office users worldwide. What if you could harness their work to extend GIS through a tool they are already familiar with? With respect to Microsoft Excel, what if instead of performing analysis through pie charts or scatter diagrams, people could show their information on a map by clicking an Esri Map button on the toolbar?

Well, that's exactly what your users can do with Esri Maps for Office, a simple plug-in for Microsoft Office. The power of mapping comes through an ArcGIS Online subscription extended through the add-in. Microsoft Office draws from basemaps

and leverages the data you and your colleagues have been developing and maintaining for decades.

Public works professionals could take spreadsheets of capital projects and create interactive maps of the locations of those projects ranked by cost, time to completion, or any other factor and perform their own analyses. Finance directors could take spreadsheets of delinquent payments by billing route or by month and build heat maps of the patterns to better understand their businesses and citizens' payment habits and set course corrections. Or the same department could show where money was being allocated across a community. These maps and analyses could be used for internal review or, with the click of a button, turned into web maps that could be embedded in public-facing accountability and transparency websites.

Consider the hundreds of PowerPoint presentations created each year. While these presentations are impactful and professional, what do you do if someone asks a question about the information in a map image and the map itself doesn't contain the answer? You may come off as unprepared, or you may have to have another meeting. With Esri Maps for Office and ArcGIS Online, you can create presentations with live maps embedded in them. When an elected official raises a question, you simply click the live map inserted into the PowerPoint to navigate to the answer. You move from presentation to interaction.

These are simple routines that GIS professionals have performed on behalf of other disciplines for years. Now everyone can make his own maps. Try ArcGIS Online and Esri Maps for Office yourself—or better yet, show them to the finance director. See [esri.com/maps4office](http://esri.com/maps4office).

(This article originally appeared in the Winter 2014 issue of *ArcUser*.)

# The Data Miner's Quest: Drilling for and Refining GIS Data as the GIS Manager

"Managing GIS," A column from members of the Urban and Regional Information Systems Association

By Alicia Gayle, GIS Manager, National Works Agency, Jamaica

Oil is valuable, but if unrefined, it cannot really be used. So must data be broken down and analyzed for it to have significance. From the GIS perspective, we believe that for geospatial data, it will be the value-added products, developed using customized methods, that will create new insights in any organization that embraces GIS. By looking at geospatial data that is created and maintained in relation to the critical workflows of your organization, you are providing everyone with a simple principle by which decisions can be vetted. Finding a cultural changing perception is generally hard, but its concept is so valuable and powerful that it will drive real change within an organization.



## Drilling for Data

GIS data and products are often time-consuming to create. Additionally, with the fast-growing use of some popular geovisualization tools available on the web, many individuals are resorting to faster ways to create data through estimation and approximation. Yet in examining its value to an organization, it is easier to prioritize the use of these geovisualization tools and achieve a good balance between "guesstimation" and

accuracy with the use of GPS technology. As such, at the National Works Agency of Jamaica (NWA), a critical workflow of the GIS department is to use GPS technology for mapping features, such as bridges and roads, and responding to other periodic requests from technical staff. We therefore prepare our technical staff through GPS training to collect their relevant data. Additionally, training sessions are available on request and may be carried out if an upcoming project requires new road features to be mapped. GIS personnel will also accompany internal clients to work sites and project areas. This approach not only facilitates quick access to mapped datasets but will also encourage on-site training and exposure to in-house techniques and processes by all personnel involved. All datasets are downloaded and stored to the GIS server at NWA's head office. Therefore, collected datasets can be considered as crude, needing refinement into products and services to meet the requirements and issues of the organization.

With the influx of smartphones, collecting geospatial data is not only easier through mobility but also less time-consuming. In fact, technical officers at NWA have been encouraged to download free GPS mapping software for their BlackBerry phones to further assist in logging project area features. The beauty of this process is that the free software creates files that are compatible with our

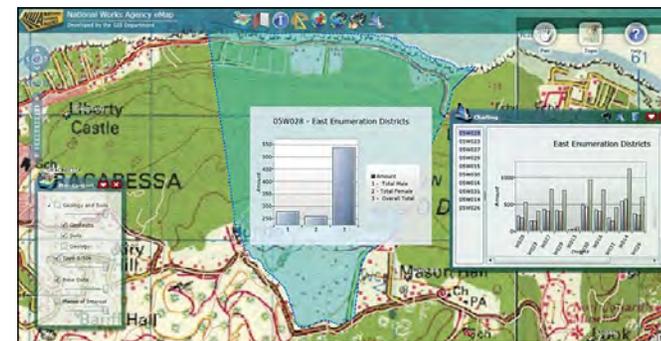
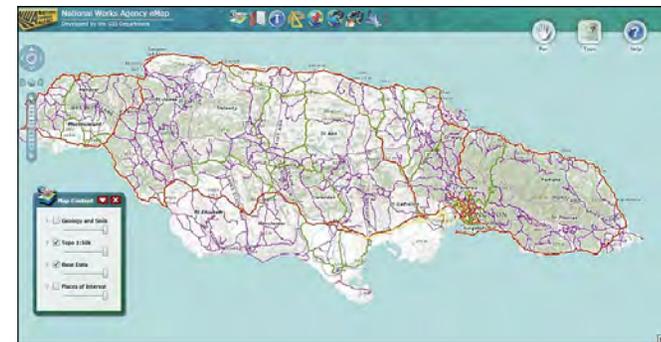
in-house GIS applications. An obvious combination with great possibilities!

## Refining Data

After finding or creating geospatial data, the GIS department defines how to use our data to best help/fix our customers' challenges and satisfy the project planning requirements of NWA. As data providers, adopting this kind of service thinking will allow us not to be superseded by more accessible web-based applications (Benson Reason, director, live|work). Therefore, at NWA, we can categorically highlight the following processes that are undertaken to develop our geospatial data into value-added services:

**Customization**—In some cases, where our customers are accustomed to only viewing base data as published hard-copy maps from other government agencies, the service opportunity is to help them customize their use. This means enabling them to transform existing information into their data with dynamic tools. As we customize, clients get better results from their information, and we develop a deeper understanding of their requirements, which helps to further refine the service. The GIS department developed an online web-based map service called NWAEMAP. NWAEMAP simply enables customers to view, search, and create custom maps using base data files published through the intranet-based application. It is unique in the way that it enables users to easily adjust their search terms and refine their maps

dynamically before printing. This simple customization empowers the users to get exactly what they want, extremely quickly. It also allows them to explore the range of data available. As the customers use the service, they build value through the repeated exchange of information.



National Works Agency of Jamaica eMaps.

**Enrichment**—Our technical clients have their own information that aids greatly in their workflows. This may be their GPS mapped features, such as bridges, breakaways, and roadways. The approach, in this case, is to augment that information with additional data to make our clients more effective in their job. As such, this kind of service is often about aiding decision making or enabling customers to use more customized tools for increased productivity. In doing this, our data is core to NWA's business processes and fits directly into several departments' workflows, since pertinent and well-presented data enables critical business decisions to be made more quickly and with less risk.

**Enabling**—On the flip side, we also cater to users who are not geospatially technical. Their objectives require a customized solution that is based on our existing in-house platforms. Such applications create value-added services using existing data in a more cohesive and intelligent manner, therefore enabling them to collectively examine and analyze this information. NWA GIS-LAMS satisfies these users' needs. This online GIS web application has taken accessible geospatial land parcel data online to create a service that provides GIS functionalities to nontechnical users. For NWA GIS-LAMS users, we realized that we needed to take geospatial data and refine it further by not only improving access to the information but also helping customers employ it for ordinary uses.

## Conclusion

Geospatial data requires customization for better application. The most important approach is to determine the objectives of clients and provide them with services that help in their workflows. Therefore, value-added products will be provided/created for ubiquitous use throughout the organization.

## About the Author

Alicia Gayle is the GIS manager at the National Works Agency of Jamaica. She's a graduate of the University of Liecester, where she pursued an MSc in GIS. Her current projects at the National Works Agency range from road works prioritization models to land acquisition data management and spatial analysis.

## Reference

Reason, Benson. Director, live|work. "[Data Is the New Oil, Part 1: Business Information.](#)"

(This article originally appeared in the Spring 2013 issue of *ArcNews*.)

# Mirror, Mirror

## A self examination for GIS managers

Do you want to ensure your GIS survives any imminent or future reorganization of your organization? Adam Carnow assembled the following questions to help you identify areas for improvement (and perhaps even growth) that can make your GIS an indispensable part of your organization's operation. Carnow, a GIS professional for more than 21 years, is an account executive in Esri's southeast regional office in Charlotte, North Carolina, where he helps local governments use GIS more effectively. These questions address not only your processes and goals but also what you and others in the organization think about your GIS program.

What do you think about your GIS program? Can you justify your GIS budget?

Are you prepared for change?

Are you proactive or reactive?

Are you innovative?

What plans do you have for your GIS?

How do you measure success for your GIS?

Are you proud of your GIS?

What do others think about your GIS program? Is there a bottleneck in your organization for access to GIS?

Do you have management support?

Is your GIS a mission critical enterprise IT system?

Does your annual GIS budget include funding for software, hardware, training, services, and data?

Are you using the latest technology? Are you using shapefiles?

Are you using ArcGIS 10.1? Have you made plans to move to 10.2?

Do you have IMS or Web ADF applications in production? If so, when will they be replaced?

Are you using ArcGIS Online?

Do you provide easy-to-use, focused apps available on any device?



Do you prioritize Commercial Off-The-Shelf (COTS) applications over custom solutions?

Do you favor solutions you configure over those you code?

Have you implemented GIS across all five business patterns (e.g., apps that help manage data, transform data into actionable information, get information in and out of the field, disseminate knowledge where and when its needed, and engage constituents?

Are you participating in the Community Maps program?

Are you using ArcGIS for Local Government?

Are you using Community Analyst?

Do you follow IT, GIS and Esri best practices in your implementation of GIS?

How do you run your GIS program? Do you know your customer's needs?

Do you run your GIS like it is a private business, eliminating competition, increasing your customer base by exceeding their expectations, and generating a profit?

Is your GIS integrated with enterprise IT systems?

Do you sell your GIS to your management?

To be an effective enterprise-wide GIS, it should be woven into the fabric of daily operations. It should be the core technology of a business. If it's not, something needs to be fixed. Create a system everyone needs and can use. Make GIS an indispensable technology platform for your organization.

(This article originally appeared in the Fall 2013 issue of *ArcUser*.)

# Collaborating Regionally Is Vital to GIS Management in Rural Settings

"Managing GIS," A column from members of the Urban and Regional Information Systems Association

By Greg Newkirk, GIS Manager, Fremont County, and Adjunct Faculty, Brigham Young University-Idaho

Despite the tendency of geogeeks to bury themselves in their work, professional collaboration (contact with other humans) is essential to identifying the broad spectrum of challenges facing GIS professionals, as well as the range of viable solutions. This is something we all learn sooner or later in our careers. We must crawl out from behind our monitors and interact with other professionals. This is helpful not only in finding solutions to our challenges but also in making sure we have identified these challenges in a broad and comprehensive manner. Otherwise, our solutions are too short-lived.

## Idaho

Idaho is largely rural in nature. Boise and its environs are rapidly urbanizing, but there remains a significant amount of farmland, open range, and natural lands surrounding the urban area. Outside this island of urbanity, Idaho's character is rural as far as the eye can see. Small towns dot the landscape, and larger cities (translation: population 50,000) are few and far between. Still, most of the counties in Idaho use GIS as part of their daily operations and employ one or more GIS professionals to staff their operations. As a result, GIS cohorts are scattered hither and



Geographic area of the Eastern Idaho Regional Resource Center.

yon with little or no daily contact outside of e-mail and phone calls.

Idaho's GIS activities have been robust for some time now, yet in the last few years significant efforts have been undertaken to provide better coordination between state agencies, counties, and cities. Idaho now has a geospatial information officer and a geospatial office for coordinating statewide GIS activity. This is helpful when dealing directly with the state, as access to resources and personnel is easier to find. With regard to regional collaboration, the state expanded its efforts by bringing in the consulting firm Crowell-Schulte. This resulted in Idaho being divided into three geographic areas represented by a Regional Resource Center to assist local GIS professionals to collaborate on issues of regional and statewide importance. In 2010, two regions adopted a business plan providing organization, structure, and guidance for improving GIS coordination and collaboration between cities, counties, the private sector, and others.

## EIRRC

Moving to Idaho in 2011, I was surprised to find an active regional GIS group in the form of the Eastern Idaho Regional Resource Center (EIRRC). This group consists of GIS managers, analysts, private-sector GIS users, university staff, and survey professionals who meet on a monthly basis to discuss challenges facing the

region. The group also coordinates with statewide officials, agencies, and councils. Its business plan says the following:

*Regional Resource Centers (RRCs) are organizational components of The Idaho Map (TIM), Idaho's statewide GIS program. RRCs have the primary mission of supporting and coordinating GIS activities and users in specific geographic regions of the state, in coordination with the Idaho Geospatial Council (IGC) and the Idaho Geospatial Office (IGO).*

EIRRC is refreshingly active, with a full agenda of topics and undertakings that affect all the local participants. The group has active leadership and members who serve on both regional and statewide subcommittees. The group faces many challenges. Perhaps the biggest challenge is how to standardize a spatial data infrastructure that works for everyone. This challenge is being tackled both from the top down in the form of statewide leadership and from the bottom up in the form of regional collaboration and problem solving. As a rural state, Next Generation 911 is a critical opportunity to provide better geolocation from cell service. And more basic challenges, such as improving road centerline data or standardization of parcel data, remain a perennial focus.

## Fremont County

I represent Fremont County, which covers more than 1,800 square miles with a year-round population of just over 13,000. It doesn't get more rural than that. However, it is one of the gateways into Yellowstone National Park, and a large part of the county consists of the Caribou-Targhee National Forest. Fremont County is the most popular fly-fishing location for all Idaho and maintains one of the best snowmobile trail networks in the West. The southern portion of the county is rangeland and farmland with significant harvests of potatoes and barley. Fremont County is very active and faces many challenges, especially at the peak of summer tourist and harvest seasons. Most of the time, I am the only GIS professional working at the county. I try to keep a GIS intern employed, but with semester changes and graduation, there is downtime. Before the recession, Fremont County GIS maintained a staff of four. Now, fiscally challenging times make regional collaboration all the more important.

Neighboring counties face many of the same challenges. Sharing data and collaborating on the development of regional datasets are part of any successful GIS work program. Few things can be more exasperating than completing a project only to find someone else has already done the work or found a better way to do it. Being part of a regional GIS allows face-to-face interaction and the development of friendly and helpful associations. Meetings can be designed so that everyone can gather at a local restaurant afterward. In the business world, many deals

have been struck during a meal. When people are relaxed and enjoying themselves in a less formal setting, challenges are seen in a different light. Often, assistance is more freely offered, and personal friendships develop that improve working relationships.

## Travel

Traveling long distance for meetings is also part of the work program. Just about anything that cannot get done over the phone or by e-mail requires traveling. Rural Idahoans are used to it; it is part of daily life. Still, EIRRC employs online conferencing to include those individuals who cannot always travel. This helps to keep everyone involved and the work moving forward. Personally, I look forward to face time and to interacting with other GIS professionals, even if it burns up much of a workday. In the long run, it improves productivity through insight into creating products that have a longer life cycle. Thornier issues, such as standards for core GIS datasets (i.e., parcels and roads), are more easily addressed through a little give and take around the table. And the ability to read nonverbal communication helps steer the topic in a helpful direction.

As a young professional, I dreaded meetings as unproductive downtime and useless bantering by people who seemed never to get anything done. Over the years, however, I found that such meetings were tools of collaboration that prevented problems and produced products useful to everyone. Now I look forward to opportunities that allow collaboration and professional

relationships to flourish. Because Idaho provides such opportunities, the future looks bright for the state, the region, the organization, and the individual.

### **About the Author**

Greg Newkirk, GISP, AICP, is the GIS manager for Fremont County and adjunct faculty for Brigham Young University-Idaho. He has more than 20 years' experience working with GIS.

(This article originally appeared in the Fall 2013 issue of *ArcNews*.)

# Providing More Value

City turns necessity to its advantage

By Bob Blackwelder, City of Chula Vista, California



Photo courtesy of Mark eggrole /Flickr (cc).

*A Southern California city of slightly more than 250,000 is using the latest GIS technology to help it implement a management philosophy that eliminates waste and tightens processes to deliver better service more efficiently.*

Like many local governments around the country, the City of Chula Vista has experienced a reduction in city staffing, resources, and funding during the recent economic downturn. To help counteract this loss of manpower and resources, in 2012 the city adopted the Lean/Continuous Improvement (CI) program, which was derived from the Toyota Production System as a way to improve overall productivity and efficiency.

A number of city employees were trained in the Lean/CI concepts that focused on reviewing current work processes and eliminating wasteful steps and unnecessary tasks that do not provide value to the organization. With the reduction in staffing, all employees have been asked to take a closer look at how they do things and find more creative ways to do business to maintain quality service

to the citizens of Chula Vista. "Doing more with less" is the new motto throughout City Hall.

## Lean and GIS

At the same time, GIS has continued evolving. Recent changes in GIS data types and the database technologies underlying them must be learned and implemented. The Lean training encouraged GIS staff to focus on leveraging the latest technology whenever possible to create more dynamic, self-sustaining GIS layers and applications while eliminating additional maintenance work and duplicate data entry.

Chula Vista's GIS section recently upgraded its citywide GIS Viewer (commonly referred to as CVMapper). Although the older version was widely used by city staff in almost every department, the viewer used ArcIMS technology. It could not utilize published map services and other technology advancements available with ArcGIS for Server.

An updated version of CVMapper, developed by WebGIS-Solutions, utilizes ArcGIS API for Silverlight and provides a number of enhancements to the mapping system including

custom map themes and the ability to add web-based map services and layers on the fly.

In addition to the out-of-the-box tools, WebGIS-Solutions also developed a number of modules to extend the viewer's capabilities. Chula Vista's Public Works staff immediately expressed interest in the work order module, which can display current fieldwork performed on city-maintained assets. This add-on module, including an intuitive, dashboard-like interface, has tools that display fieldwork based on asset type, status of work, and date the work was performed.

## Seizing an Opportunity

The work order module would be easy to add to the CVMapper interface, but it required that all work orders be mapped as a single point layer before being published as a map service. Although Public Works staff have streamlined how work orders are attached to the city GIS, at the time there was a lack of consistency in how work was entered into the city's Work Management System (LuCity). In certain cases, Public Works crews entered work locations into LuCity as x,y coordinates, while other crews were attaching work directly to GIS features such as street segments, storm mains, and sewer mains. The GIS team had to find a process for aggregating all work orders into a single point feature class, regardless of asset type or the method used to enter the work in LuCity.

Chula Vista, which maintains its GIS data in an enterprise geodatabase, had recently upgraded to Microsoft SQL Server version 2008/R2. With the upgrade, the GIS team also migrated to the new SQL Server geometry spatial type. Staff viewed this as a great opportunity to explore query layers and leverage the new spatial functions that are available in SQL Server.

## Implementing the Latest Technology

The first step in building the query layer needed for the work order module was to compile all the fieldwork to be mapped. With the help of Chula Vista's LuCity administrator, Claudia Block, a SQL Server database view was created containing all fieldwork for 2013. This view contained not only all work associated with each asset type (e.g., storm main, wastewater main, pump stations) but also the date and type of work performed, field crew that was assigned, and location of work performed (provided as a GIS asset ID or an x,y location).

After identifying the information needed from LuCity and compiling this data into a SQL Server view, the next step involved spatially enabling this view to create a unique point feature for each work order. With a basic understanding of Structured Query Language (SQL), GIS staff members were able use Esri's online samples to write a SQL statement creating point features showing all fieldwork with an associated x,y location.

```

-- Graffiti locations entered as x/y. Use STGeomFromText()
-- function to return point object for each x/y location.

SELECT geometry::STGeomFromText('POINT(' + CAST(X_COORDINATE AS VARCHAR(20))
+ ' ' + CAST(Y_COORDINATE AS VARCHAR(20)) + ')', 2230) AS 'SHAPE'
FROM WorkMaster.dbo.GIS_LucityWorkOrders
WHERE WO_DEPT_TY LIKE 'GRAF%'

```

Example of a SQL statement that creates point features for all fieldwork associated with an x,y location.

The team set out to create point features that showed the work orders associated with linear assets like street segments or sewer mains. In these cases, only the associated GIS Asset ID was stored in the work management system, so staff members had to somehow create point features to represent the approximate midpoint of these linear assets.

To resolve this issue, staff downloaded and installed SQLSpatialTools, a SQL Server spatial toolset available from CodePlex, Microsoft's open-source project hosting website. Included in this toolset is a spatial function called LocateAlongGeom(shape, distance) that will generate a point feature at a certain distance along a line segment. This allowed staff to merge the work order data with the appropriate GIS layer and generate points for all fieldwork attached to linear assets such as sewer and storm mains.

```

-- Pothole locations attached to street segments. Use LocateAlongGeom()
-- and STLength() functions to return mid-point of line segment.

```

```

SELECT dbo.LocateAlongGeom(g.shape, g.shape.STLength() / 2) AS 'SHAPE'
FROM gisadmin.STREET AS g, WorkMaster.dbo.GIS_LucityWorkOrders AS w
WHERE w.AS_INV_ID = g.GBALINK AND w.WO_ACTN_TY LIKE 'Pothole%'

```

The LocateAlongGeom (shape, distance) function was used to generate a point feature at a certain distance along a line segment.

The SQL function UNION ALL was then used to group the different asset types into a single SQL statement before copying the SQL query to the Add Query Layer tool in ArcMap and publishing the point layer as a map service.

```

-- Merge different asset types into single sql statement using
-- UNION ALL operator. Requires identical field names and field types.

--SEWER PIPES (Lucity asset type = 6)
SELECT g.OBJECTID, g.GBALINK, dbo.LocateAlongGeom(g.SHAPE, g.SHAPE.STLength()/2) AS 'SHAPE', w.WO_NUMBER AS
'WO_Number', w.AS_TYPE AS 'AssetType', w.WO_STAT_TY AS 'Status'
FROM gisadmin.WW_MAIN AS g, WorkMaster.dbo.GIS_LucityWorkOrders AS w
WHERE g.GBALINK = w.AS_INV_ID AND w.AS_CAT_INV = 6

UNION ALL

--SEWER STRUCTURES (Lucity asset type = 2)
SELECT g.OBJECTID, g.GBALINK, g.SHAPE AS 'SHAPE',
w.WO_NUMBER AS 'WO_Number', w.AS_TYPE AS 'AssetType', w.WO_STAT_TY AS 'Status'
FROM gisadmin.WW_JUNCTION AS g, WorkMaster.dbo.GIS_LucityWorkOrders AS w
WHERE g.GBALINK = w.AS_INV_ID AND w.AS_CAT_INV = 2

```

The UNION ALL function was used to group different asset types into a single SQL statement.

## Doing More with Less

Once the new GIS work order layer was published and added to CVMapper, it was a great information resource for Public Works managers and engineers. The module provides unique symbols for different asset types. It allows users to toggle between open and closed work orders so they can quickly assess and investigate the status of work orders performed in the field and identify possible patterns or trends. Being able to visualize this data can allow them to quickly see assets that need further attention.

"The work order module has allowed our crews to search for property information and access the mapping features from the field to better prioritize which work orders to respond to, allowing us to be more efficient with our limited resources," explained Michael Lengyel, senior management analyst with the Chula Vista Public Works Department.

## More Ways to Leverage Existing Data

Chula Vista's city staff, like many local governments, needs access to GIS layers that have authoritative attribute data stored in nonspatial databases such as work management systems, business license databases, or land management/permitting systems. City staff is now looking at GIS layers like day-care facilities and historic homes that can be leveraged using spatial functions and query layers.

For example, when a new day-care facility is approved by planning staff, the data is entered into the city's land management system (Accela). A hard-copy approval sheet is sent to GIS staff who reenter the same attribute information into the GIS. The GIS team can take advantage of query layers and database views to merge spatial (GIS) data and nonspatial data and provide city staff with more accurate, dynamic GIS layers. In the future, when a new day-care facility is approved and entered into Accela, the spatial location and attribute information of the new day-care facility will automatically be added to CVMapper without additional work by GIS staff. As a result, end users will have more confidence in CVMapper, because they will know the underlying data is coming directly from the system or database that maintains or owns that data.

This solution also fits into Chula Vista's long-term goal of eliminating data silos and duplicate data entry into key city databases. Data will be entered one time and maintained in the most appropriate system.

## Conclusion

The idea behind Lean is to eliminate waste and ensure there is value in everything the city does and the services it provides including GIS. During the next few months, the GIS team plans to meet with staff members from every city department to review each of their GIS layers and attribute information to determine where they can leverage the latest technology, such as query

layers, to provide more dynamic data; minimize or eliminate duplicate data entry; and, in the end, do more with less.

## **WebGIS-Solutions**

[www.webgis-solutions.com](http://www.webgis-solutions.com) [info@webgis-solutions.com](mailto:info@webgis-solutions.com)

## **About the Author**

Bob Blackwelder is the GIS manager for the City of Chula Vista and past chairperson of the San Diego Regional GIS Council. He has a bachelor's degree in city and regional planning from the University of Louisiana-Lafayette.

(This article originally appeared in the Spring 2014 issue of *ArcUser*.)

# Engaging with Executives: A How-To for GIS Professionals

## Three Simple Steps to GIS Management Success

By Keith Cooke

When I first started working at Esri nearly a decade ago, my meetings with clients were almost exclusively with GIS managers and technicians. Today, with many of these same clients, my meetings are more likely to be with CIOs, agency and department directors, and other executives. That's not because *I'm* more important than I was a decade ago; it's because **GIS** is more important than it was a decade ago. And I think two big shifts in the GIS industry have resulted in this change.

First, GIS really started to gain traction in government agencies and the private sector in the 1990s and early 2000s. Organizations wanted it, but they didn't always put a lot of thought into where it best fit within the organization as a whole. Often, it would fall under whatever department seemed the most able or willing to house it. Over time, IT professionals saw the value of GIS in terms of how it could benefit the organization, whether it meant geoenabling an existing business system, providing spatial insight to other departments, or as a way to share data with the public. That's when the game changed. GIS evolved from essentially a niche technology to a mission-critical business system, and as a result, we've seen IT departments increasingly embracing what was previously seen as an "outlier" technology.

Second, commercial mapping and mobile devices over the last decade have become pervasive. People expect to be able to get to a map easily now, anytime and anywhere. They don't feel they should have a gatekeeper controlling access to this information. This evolution has increased dramatically over the last several years with the widespread adoption of web GIS and the availability of focused GIS apps.

As a result of these two big shifts, the role of the GIS professional has forever changed—and for the better! The traditional days of sitting in a corner cubicle and printing out paper maps in a reactive mode are long gone. Colleagues expect more. The public expects more. And executives **demand** more. Therefore, being able to engage with executives is a crucial factor in the future of a GIS professional's success.

So how can GIS managers do this? Like any successful engagement, engaging with executives takes some prep work. Here are three simple steps to pave the way for your interactions with executives:

**1. Understand Their Pain and Vision.** Before you schedule a meeting, you need to understand two key things about executives: you need to know their pain and their vision. They

have something that's frustrating them—something that's keeping them up at night and putting pressure on them. They probably also have a vision—a specific goal—they want to achieve. So what exactly are their pain points and vision? Don't be afraid to ask. I ask executives this question all the time, and you'd be surprised how willingly they'll share this information.

**2. Change Your Terminology.** The way you engage executives is **not** the same way you'd engage your GIS colleagues. The conversation has to be different because it's highly unlikely that executives have the same detailed knowledge of GIS that you possess. In addition, they're generally focused more on the big picture . . . because they have to be! That's what effective executives do.

Your conversation with the executive should focus on three things: organizational workflows, mapping, and analysis. Typically, I try to avoid all mention of GIS jargon and vendor-specific terminology when meeting with executives. I've even had very productive conversations where we never even mentioned the term *GIS*. Focus on how mapping and analysis can be integrated into workflows—not for the sake of just making a map but for optimizing the workflow; making better decisions; and enabling collaboration, communication, and transparency. For example, focus on how GIS can be integrated into your organization's business systems. Are you using location analytics to get the most out of your permitting system or asset management

system? Are there other business intelligence systems that have a location component that could be mapped and analyzed?

**3. Create Solutions.** The most effective way you can become a trusted adviser to executives is to take the information they've given to you and map out a solution. I would even submit that this could be the most important role a GIS professional plays in an organization. To do this, first identify the problem statement, the cause, and the negative impact it creates. The next step is to produce the solution by stating how you plan to solve the problem and what the positive outcome can be. Keep this solution map short and sweet and at a high level. And again, avoid technical terms and jargon. Executives don't care about geodatabase designs, models, or widgets, nor should they. That's what they pay you to do.

This next part is critical: You need to be able to assure the executive that the solution you're implementing is sustainable. Your director isn't just looking at the cost of implementing the solution but also at the cost of maintaining it over many years. Are you offering a solution that is completely customized and constantly relying on either in-house or third-party development? What happens if/when you or the in-house developer leaves? Also, will the solution be able to work on multiple devices?

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The days when the GIS professional could fly under the radar and work independently of the organization's essential workflows and

goals are gone. But have no fear; there is a very important role for you to play in this new work environment. And to be honest, this evolution of your role is actually a process toward making yourself indispensable. This is your chance to make executives see both **you** and **GIS** for what they really are: mission-critical elements to the success of the organization.

## About the Author

Keith Cooke is a state government account executive for Esri. A graduate of Auburn University, he has been a GIS professional since 1994 and has worked for planning and community development agencies at the regional and local level in Alabama and North Carolina. In addition to his state government duties at Esri, Cooke works with the elections solutions team, as well as the planning and community development team. He is an active participant in the American Planning Association's annual conference, where he has conducted over two dozen hands-on GIS workshops for planners since 2004.

(This entry was posted to *Esri Insider* [blog], September 29, 2014.)

# Show Off

Make GIS resources more visible and valuable

By Monica Pratt, *ArcUser* Editor

ArcGIS Online can become the platform for your organization's GIS resources. As the administrator for your organization's ArcGIS Online site, you can showcase the GIS resources your organization has developed so it can get a greater return from its investment in them. Here are some suggestions for doing just that.

## Make Map Services More Valuable

Using ArcGIS Online with ArcGIS for Server makes your published map services more available and more valuable to your entire organization. By registering the map services you created in ArcGIS for Server with ArcGIS Online, non-GIS-savvy members of your organization, as well as GIS professionals, can create web maps.

Now map services depicting voting districts, property boundaries, parks, and building permits can become live, authoritative content for online maps that answer questions for your organization. These valuable services might not be well known internally, but by using ArcGIS Online, you can deliver the most current information to desktops, tablets, or smartphones for a new group of users in your organization.

**Current Status - Jan 10, 2013** [Report an Issue](#)

ArcGIS Online publishes our latest information on service availability in the table below. Check back here to get current status information, or subscribe to an RSS feed to be notified of interruptions to each individual service.

Service Status	Details	RSS
ArcGIS.com Web Site	Service is operating normally	
ArcGIS.com REST API	Service is operating normally	
Hosted Feature Services	Service is operating normally	
Feature Publishing	Service is operating normally	
Hosted Tile Services	Service is operating normally	
Tile Publishing	Service is operating normally	
Esri Basemaps	Service is operating normally	
Geocoding	Service is operating normally	

All

Service is operating normally Performance issues Service disruption Informational message

**Status History**

ArcGIS Online keeps a log of all service interruptions in the table below for the previous 28 days. Mouse over any of the status icons below to see a detailed incident report. Click on the arrow buttons to move forward and backwards through the calendar.

Service	Dec 19	Dec 18	Dec 17	Dec 16	Dec 15	Dec 14	Dec 13
ArcGIS.com Web Site							
ArcGIS.com REST API							
Hosted Feature Services							
Feature Publishing							
Hosted Tile Services							
Tile Publishing							
Esri Basemaps							
Geocoding							

**[RESOLVED] Intermittent timeouts on geocode.arcgis.com**

[01:24PM PDT] We are experiencing intermittent timeouts on our geocoding sub-system. We are looking into the issue.

[06:14PM PDT] The issue has been resolved and the geocoding sub-system is once again working as expected.

Monitor the health of the ArcGIS Online system using the [ArcGIS Online Health Dashboard](#).

You add ArcGIS for Server services to ArcGIS the same way you would add KML and Open Geospatial Consortium, Inc. (OGC), Web Map Service (WMS) resources—by referencing their REST endpoint (URL). After signing in to your organizational ArcGIS Online account, open My Content and click the Add Item button. In the Add Item window, choose On the Web and choose ArcGIS for Server web service.

Type in the REST URL for the service (e.g., `http://myServer/map/wms/myService`). Locate the REST URL for an ArcGIS for Server service by going to the Services Directory page (`http://<server name>/<ArcGIS for Server instance name>/rest/services`), browsing to the service you want to share, and copying the URL from the browser's address bar. If you are adding a secured ArcGIS for Server service, enter its user name and password and check whether these credentials will be stored with the service item. Type a title for the services as well as tags. You can click Choose from your tags to choose from the list of tags previously used. Click the Add Item button. Once the map service is added, it appears under My Content, where you can edit its item details and share it.

## Status Check

You and your users can monitor the health of the ArcGIS Online system using the ArcGIS Online Health Dashboard to keep abreast of any changes that might impact your work. This dashboard provides the latest information on the status of

services, both current and historical. Messages indicate whether services are performing normally, have performance issues, or are disrupted. Hovering over the symbol for each state will give you more information on the service's state.

## Sell Your Home Page

The home page is the first thing your users see when they come to your ArcGIS Online site. Make it interesting and easy for them to find resources. For ArcGIS Online sites that are accessed by people in your organization who may be unfamiliar with GIS and the resources available, use the description section to tell them what they can do and link them to any tutorial or help information you might provide. Alternatively, the description section can be used as a bulletin board for announcements.

You can change the appearance of your home page by customizing the site banner, the featured content ribbon, and gallery contents to make the site both attractive and easily comprehended. A custom banner that incorporates a photo or graphic image will make your home page more appealing. Use a graphics program to make a custom banner that is 960 pixels wide by 180 pixels tall. Go to the Banner section of Home Page Settings to add it to the site.

You can highlight your newest or most useful site content in the gallery ribbon on the home page. Create a group for the content you want to feature and add that content to the group. Select

this group by going to the Featured Content section in the Home Page Settings and choosing that group from the drop-down list.

One way to add visual interest to the ribbon is by placing a larger image that covers the regular banner area and the area behind the ribbon. Create an image 960 pixels by 470 pixels that will fill the banner space and the area behind the ribbon. Under the Banner section of Home Page Settings, click the HTML radio button, click the Insert Image button, and enter the URL for the image location in the dialog box.

If you know a little about HTML, you can also add buttons and other elements to your home page. With the HTML radio button clicked, click the View HTML Source button. Now you can enter HTML to create a button that opens a website, a map, a group, or anything else that can be accessed via a URL. Listing 1 shows the HTML that creates a button that opens a web page.

## Find It Fast with Thumbnails

Thumbnails not only give users of your ArcGIS Online site a taste of the associated item, they can whet a visitor's appetite. To make your map, service, or application more alluring, you can improve on the default thumbnail with a custom one that might include an image.

Thumbnails can provide context (where in the world) and scale (city, state, or country). They can also indicate the map's subject (land use, geology, transportation) or content source (like a

Twitter feed). Thumbnails for map applications can indicate the kinds of tools that are included. They can also feature a logo or other graphic that brands content from your organization or department.

Sometimes a photo or icon can provide users with a better idea of what the map service will provide. The use of icons identifying an item's type as a layer, map, or application can be especially helpful as the number of map services on your ArcGIS Online site increases. Simple visual cues supplied by consistent use of these icons can make it easier for users to find what they need, which will make them more likely to use your site.

Using any graphics program, create a replacement thumbnail image for the default thumbnail that is 200 pixels by 133 pixels. Save it as a PNG, JPEG, or GIF file. Click the associated map service in the My Content page and click Edit. Click the existing thumbnail and browse to the replacement you created.

## Keep It Fresh

As more people in your organization use your ArcGIS Online site, you can tweak contents and appearance to continue meeting their needs and engendering interest in your growing collection of offerings.

```

<div style="width: 960px;
background: url(http://www.esri.com/agol/logo.jpg);
height: 470px">
<div style="margin-top: 180px; margin-left:40px;
float: left;margin-right: 20px">

a href="http://www.esri.com" style="background: #65a9d7;

/* border around the button
*/

border-bottom:#fff 1px solid;
border-left: #fff 1px solid;
border-top: #fff 1px solid;
border-right: #fff 1px solid;

/* spacing around the text
*/

border-bottom: 7px;
border-left: 15px;
border-top: 7px;
border-right: 15px;

/*text
*/
font-family: arial, helvetica, sans-serif;
color: white;
font-size: 14px;
font-weight: bold;
vertical-align: middle;
text-decoration: none;
text-shadow: rgba(0,0,0,.4)

target=_self"> Esri Home
</div>
</div>

```

Listing 1: Creates a button that links to the Esri home web page  
(This article originally appeared in the Spring 2013 issue of ArcUser.)

# Managing GIS Operations for Snow Removal for the City of Columbus—Warrior Style

"Managing GIS," A column from members of the Urban and Regional Information Systems Association

By Darlene Magold Scott, GISP

It may take a village to raise a child, or a team to win a championship . . . but it takes a group of organized "Snow Warriors" to get commuters to work on time during the wintry months in Columbus, Ohio. Managing the complexities of new GIS software, three consultants, more than 100 snow operation vehicles, and a street network of approximately 2,000 miles is a daunting task. The City of Columbus Department of Public Services (DPS) has found a way to provide a management formula that creates, tests, and implements this task.



## Background

The unpredictable nature of snow and ice events makes it difficult to track costs, measure resources, and monitor where and how these resources are distributed throughout the city during an event. Like most public service departments, Columbus DPS staff manages transportation infrastructure and all the operations and maintenance that go with it, including snow and ice. To be prepared for this year's snow season, the DPS Snow Warriors are using a new GIS web application they named "Warrior Watch," which utilizes the Esri ArcGIS GeoEvent Processor for Server.

This new GIS technology will internally monitor both real-time and historical performance of the city's snow and ice removal activities.



A City of Columbus snowplow.

DPS staff worked closely with the city's Department of Technology (DoT) GIS staff to help manage the behind-the-scenes architecture necessary for deployment of the plan. Successful deployment also consisted of a team of consultants

that included T&M Associates (Columbus, Ohio), Esri Silver Tier partner Network Fleet (San Diego, California), and Esri.

DPS had to devise a system that efficiently and seamlessly managed all the diverse personnel and special expertise involved in the task.

## Managing for Success

The successful implementation of this new technology required successful management and clear communication between and among all the Warriors in the plan, such as the following:

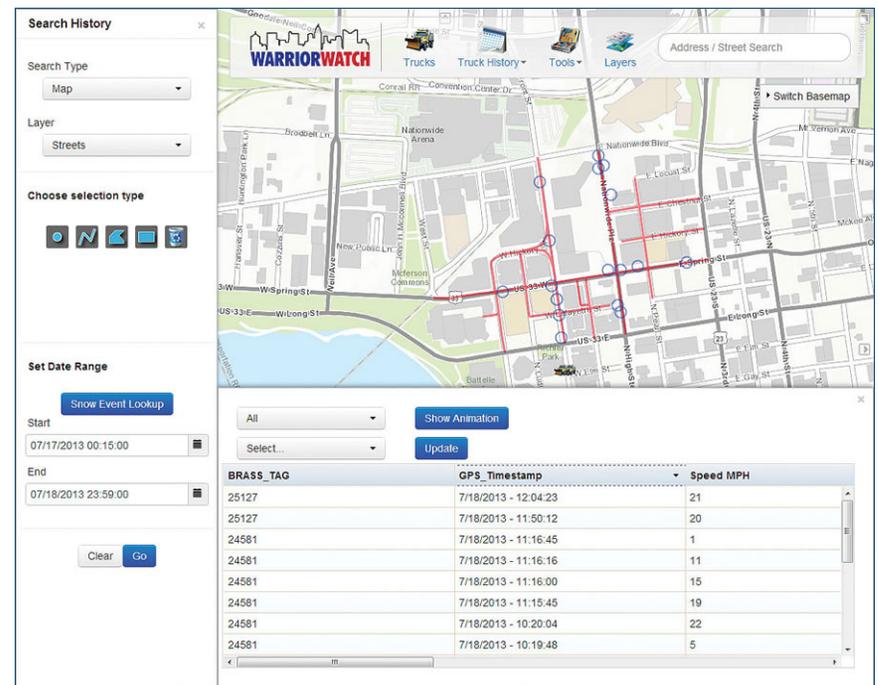
### Define Internal and External Roles and Responsibilities

When working with numerous consultants and multiple departments, it is important that everyone knows his or her role. DPS management procured the project so that roles of the consultants were clearly and contractually defined. It created a team that used the strengths of each vendor and city department. Network Fleet provided the GPS data from the vehicles to feed the GeoEvent Processor. Esri assisted with the GeoEvent Processor configuration and geoprocessing tools. T&M Associates acted as the project coordinator and developed the web interface as the front end of the application. The city DoT provided general GIS support, as well as server configuration and testing for all phases of the project.

DPS managers coordinated through weekly meetings and e-mail updates with the entire project team.

### Determine the Operations Staff Workflow and Verify It Through Testing

It is easy to get management's point of view on how operations should flow, but the real information comes from the staff who is working with the data on a daily basis. The project team



Warrior Watch searches by map to show history of plow data (location, plow up/down, salt spreader) in a specific area.

worked with the staff to determine both common operating and emergency procedures to create tools and reports that will assist them during a snow event.

The DPS staff required that the application display the current location of snow operations vehicles and any additional sensor information in 15-second time intervals. This included heading, speed, whether the plow is up or down, and whether the salt spreader is activated.

Snow Warriors performed dry runs on actual snow routes to test the GPS and provided real data so that the application was tested and validated. They carefully documented and quantified results so that the project team could modify the application for final delivery.

### **Create an Application That Is User-Friendly and Relevant**

There is no need to add complicated tools or widgets to an application that has a specific goal. A user-friendly and relevant application made it easier to keep the roles defined and the task manageable. The city was wise to keep this application separate from others so that it can be used for snow event operations. However, the project team had the foresight to build this initial system in a modular fashion so it could quickly and efficiently add additional vehicles and custom reports to the application and expand the functionality to meet the changing needs of the Department of Public Services while still controlling all aspects of management.

The basic functions of the application are

- Displaying real-time vehicle location data provided by Network Fleet (15-second intervals).
- Allowing users to search historical vehicle activity by a location on the map or by information, such as brass tag, street centerline, or street maintenance zone.
- Providing standard reports for route completion, customer service requests, and truck activity summary.

### **The Nerdy Details of Successful Management**

A JavaScript framework was employed for the web application, which enables users to access the application without the need for separate, desktop browser plug-ins. The application allows users to search vehicle activity using the map or entering information into a standard search form and provides custom reporting capabilities that are easy to access. The application also takes advantage of modern web browser support of WebSockets, which enable real-time, two-way communication between servers and browsers. This enables truck information to be updated in real time within the browser without having to refresh the map or poll the server for new information. Additional Python geoprocessing tools were developed to run on the server to enhance the information provided by the vehicle sensors, which could not be performed using the GeoEvent Processor. For example, a scheduled Python script runs at a regular frequency

to add the street name and snow maintenance zone that each vehicle location is associated with. The server architecture uses a combination of Microsoft SQL Server, Oracle 11g, and ArcGIS 10.2 for Server running on Windows Server 2012 R2.

## Conclusion

Implementing new technology is always a challenge, but DPS management and operations staff accomplished the task with an efficient and methodical management style. By engaging DoT staff at the beginning of the project and choosing a team of consultants who were able to work constructively together, they created an environment that was both cordial and professionally productive.

The City of Columbus can now efficiently coordinate resources during snow events and track information associated with cleanup efforts.

## About the Author

Darlene Magold Scott, GISP, is the GIS director for T&M Associates and is located in Columbus, Ohio. She has worked with the City of Columbus DPS and DoT for the past seven years.

## Contributors

Erick Lobao, GISP, is a GIS manager for T&M Associates and is the project manager for the Warrior Watch project. He successfully

led this project with a talented team of application developers, Jesse Glascock, GISP, and Jon Woyame. City of Columbus DPS project managers Rick Garrabrant, PS; Shane Mark, MS; and Elizabeth Jones led the project and the Snow Warriors using GIS technology. The City of Columbus DoT; Shoreh Elhami, GISP; Brian Nemec, ME, GISP; and Rob Parsons, GISP, assisted with the implementation and management of the new GIS technology.

*(This article originally appeared in the Winter 2013/2014 issue of ArcNews.)*

# Managing Your Ambition: Contributions to Professional Organizations

"Managing GIS," A column from members of the Urban and Regional Information Systems Association

By Ryan E. Bowe, GISP, and Wendy Peloquin, GISP

Word on the street is that professional organizations are dying. One would think that in this unstable economic time, professional organizations would be thriving. Not only do they provide a common place to meet other professionals with similar interests, they also provide connections to career opportunities. One of the major concerns is that they are becoming irrelevant, especially when there are many organizations doing ostensibly the same thing. This concern resulted in several professional organizations reinventing themselves to focus on their "brand." But many individuals are no longer able to justify the cost of being part of an organization in the absence of tangible benefits.



Sometimes advantages made through professional organizations are direct (career listings, resumé boards, mentoring); other times, benefits are more subtle. Many professional organizations provide professional development through certifications and continuing education programs. Beyond opportunities for career connections and professional development, these organizations also provide camaraderie in the form of a friendly environment to test ideas. Although you may not want to take your work home with you, there are few times when a GIS professional can sit

down with someone who has the same base level of knowledge. Many of these organizations are also the first place to learn of new technologies and trends within the industry. They help disseminate information by publishing journals and newsletters highlighting the innovative use of technology by their members.

Professional organizations are vital to the life of the profession itself. Many professional organizations take the lead in developing industry standards. For example, the Urban and Regional Information Systems Association (URISA) authored and maintains The United States Thoroughfare, Landmark and Postal Address Data Standard, and the American Society for Photogrammetry and Remote Sensing (ASPRS) standards committee has authored Accuracy Standards for Large-Scale Maps, LAS specifications (Version 1.4-R12), and Vertical accuracy reporting for LiDAR (Version 1.0). If industry experts do not take the initiative to develop and set standards, who will? These organizations also provide a unified voice for their members by advocating for issues within the industry.

No one ever wants to be in a position where they have to use a safety net, but it is comforting to know one is there. Building connections within a professional organization allows people



**Go to a conference.** Conferences are a great place to meet people with similar interests. It is common for user groups to have a meeting during a conference. Many conferences have mentoring opportunities, physical resumé boards for employers who are looking to hire, or employer meet and greets. Giving a presentation may help your current employer justify sending you to the conference, and it will definitely help build your credibility within the profession. It is also another opportunity to gain valuable critiques from your peers.

**Become involved.** Are you currently a member of a professional organization or looking to get more involved? Scour their websites for working groups and initiatives; organizations are always looking for free labor since essentially none of the professional organization positions are funded. If you volunteer and do what you say you are going to do, providing a quality "product" in a timely manner, more opportunities will become available. Consider sitting on the conference planning committee (once you've attended one, of course). Most of the time, professional organizations will put out a call for participants in their initiatives. These calls will often be on their website or monthly newsletter. If you can't find something that fits, try to contact an active member in the organization. How do you find them? Their name will be on the website! People who are passionate about their professional organizations will be more

than happy to talk to you and may also be able to help find a place for you because they may know about initiatives that are just beginning.

**Do not overcommit yourself.** Most organizations will let you sit in on conference calls or group meetings at conferences to see if they fit you. Have a goal in mind of how much time you are willing to spend with the organization. Know your limits. Once word gets out that you are not only willing to volunteer but you also provide quality input, others will come knocking on your door. But that knocking will stop if you don't show up and deliver what you promised!

To help restate one of the points of this article, this very article itself only came about because we met through URISA: yet another example of the camaraderie that comes about from participating in professional organizations!

Many good things can come from professional organizations, but in order to continue to be relevant, they need volunteers who are passionate and not just there to advance their personal agenda, or professional organizations really will become extinct. Professional organizations are realizing that networking is not the only selling point to retain and attract new members. Now is the time to become involved and help shape the professional organizations into something that is truly for the profession!

## About the Authors

Ryan E. Bowe, GISP, has been working at Photo Science, a Quantum Spatial Company, for eight years as a GIS technician, as well as an alternate sensor operator. She was recently recognized as URISA's Young Professional of the Year for 2013. Wendy Peloquin, GISP, is a GIS analyst at RS&H in Jacksonville, Florida. She serves as a member of URISA's Vanguard Cabinet, Georgia URISA's Event and Conference chair, and Florida URISA's northeast regional director.

(This article originally appeared in the Spring 2014 issue of *ArcNews*.)

# Do You Have a People Strategy?

By Suzanne Boden, Esri Training Services

*Lately, there's been a steady stream of articles telling how tech workers can ride the employment roller coaster and, specifically, which skills GIS professionals need to survive in today's business climate. The last five years have seen major shifts in expectations, and these have had a huge impact on organizations and their leadership. Many organizations are looking for ways not only to meet these expectations but also to create new products and services that reach new customers.*

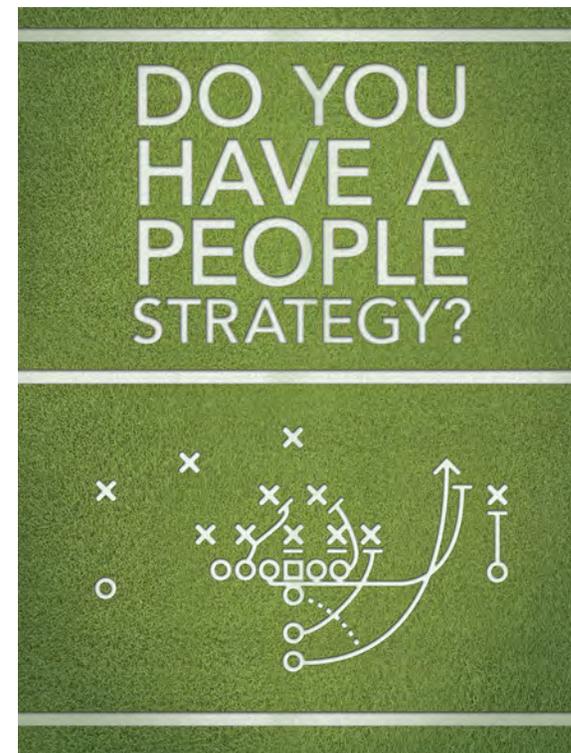
## Grow Your People, Grow Your Business

According to the 2012 Employee Job Satisfaction and Engagement study by the Society for Human Resource Management, employee development is an important way to increase job satisfaction and reduce staff turnover. Higher job satisfaction is associated with increased productivity and higher customer satisfaction.

Despite the amazing technology that permeates modern life, humans remain indispensable. No gadget has yet invented a new gadget. No computer has ever created a web map all by itself, contributed to a white paper, or put together slides for an

executive presentation (although Watson, IBM's cognitive system, may be honing its PowerPoint skills as you read this).

*Higher job satisfaction is associated with increased productivity and higher customer satisfaction.*



Organizations that work at motivating and retaining employees have leaders who understand that people are their most important asset. Employees execute day-to-day operations, engage with customers, and come up with the new ideas that move a business forward.

[Esri Training Services](#) has been preaching the value of staff development for some time. Note that staff development includes—but is not limited to—training. Fundamentally, staff development is a people-centric approach to achieving strategic business goals.

## Staff Development Planning Process

Like anything done well, staff development requires planning. Planning should encompass support not only for current projects and initiatives but also for future projects and initiatives. Your planning process should start with strategic alignment. Directly connecting staff development with the achievement of strategic goals will earn executive buy-in and budget approval.

During this phase, identify strategic business goals. These goals are often articulated in your organization's mission statement. Next, assess how your organization's GIS program supports these strategic goals. Which staff roles create, manage, and use the GIS infrastructure and applications? What GIS roles are in place to support the applications that support the strategic goals?

Next, analyze the available educational resources and delivery methods to select those that will be most appropriate for the GIS roles just identified. Timelines, priorities, and budgets can be discussed and documented in a staff development plan. This plan should answer the following questions:

- What knowledge and skills are required for each role?
- Based on current and future plans, what are staff development priorities?
- What resources are available to develop the required knowledge and skills?
- What's the budget?

## Time for Action

Once the plan is formulated, it is time to execute it. However, that is not the end of the process. It's important to periodically review the progress that has been made and the plan itself. Events like the retirement of a key staff member, reassignment of roles, creation of a new role, or the introduction of a new technology component may necessitate modifying the plan. It's critical to ensure that your plan remains aligned with your organization's strategic goals by adjusting it as needed. If not, your plan becomes irrelevant.

What are the results of all this planning? With an approved budget in place, your people develop the right skills at the right time. Staff members who possess the knowledge and skills they need perform day-to-day operations efficiently. Projects are completed successfully. Just as important, you can demonstrate that your team functions as a strategic asset. Your organization's leaders can appreciate the value of the GIS program. And finally, your employees will feel valued and excited about contributing to new projects.

Contact an Esri training specialist who can partner with you to help determine the best options for equipping your staff with the knowledge and skills they need to help your GIS program succeed. For more information, call 1-800-447-9778, ext. 5757, or send an e-mail to [gistraining@esri.com](mailto:gistraining@esri.com).

(This article originally appeared in the Winter 2013 issue of *ArcUser*.)

# GIS and Beyond!

"Managing GIS," A column from members of the Urban and Regional Information Systems Association

Oftentimes, when young professionals coming out of college utter the words, "I'm pursuing a job in GIS," many friends and family become instantly confused. I am no different. While I was in school, my own friends and family could not understand why I was going from a secure job focus in secondary education to a focus in something no one had ever heard of.



GIS has been nothing but a blessing in my career. Having a love of maps and how the world works and making it into a creative and innovative career move has brought many great opportunities to me and continues to even now.

Many young professionals exiting college just know GIS as a geography discipline, or at least I did. They assume that for the next 30 years of their life, they will either help a municipality do city planning and zoning, collect water samples and save wetlands with a conservation group, or find their way into teaching geography in a middle school. In 2014, that could be the farthest from the truth!

GIS has become one of the largest arenas and skills in analyzing truly how the world works—from utility companies to business to

government to computer software companies. If you love data and how the world is changed by it on a grand scale, GIS is a discipline that now allows you to expand this passion into many industries. With experience in the utilities, telecommunications, and gaming industries, I have been able to not only learn where GIS can be utilized but also how it can solve greater public and private sector problems without it being strictly limited to a geography or environmental focus.

The next question for young professionals coming out of college should be, "If I don't want to focus strictly in geography, how do I gain greater knowledge to get GIS jobs in other disciplines?" One route I recommend is adopting, if you haven't already, the fact that geography affects every walk of life. Having geography influencing how the world works on a grand scale allows you to think of how GIS can integrate into the many industries throughout peoples' professional careers. In the telecom world, for example, the location of a tower will affect what type of service you receive on your phone or through your Internet service. In terms of utilities, locating electric and gas lines to not be interfered with by trees and other obstacles affects the service of these resources to customers. If you are developing a game with the intention of referencing real-time landscape

geography, there is no question GIS can be a major player. The list of industries goes on, but knowing that GIS and geography touch on many different categories in life helps to explain that your very niche skill set can be very exciting when it comes to paving the way for your career.



Another thing to consider is what kind of job would make you happy on a daily basis. Many would look confused wondering how this applies to just having a job in GIS. It's very valid and important not only for your career but also the longevity of GIS as a discipline in the professional world. If you are not passionate

about GIS and your job, the field of GIS remains limited. The purpose of GIS in the world today is not to solve geography problems. It is there to ask questions, push possibilities, and explain something that is not necessarily GIS-centric. GIS simply is the tool to help solve the problem or get to the answer more easily.

To gain perspective of how GIS is integrated in small, medium, and large businesses/agencies throughout all industries is tough. One thing that is in your court is that you are the "specialist," even if you are just entering the work force. This means that you are in a very niche skill set that many employers both don't understand and may not be well versed in. So for those who have no idea what GIS is, this gives you the opportunity to sell yourself as an employee and possibly bring something new and innovative to that business. There is nothing limiting you from doing on-site visits to companies/agencies (using business etiquette, of course) to research companies, ask questions, and meet the personnel that already work there. One note: do your research of the company before going blindly into a visit. Employers who are familiar with GIS as a technology will find you to be a commodity because, even though you are new to the work force, you hold a unique skill set today!

As a prospective GIS analyst, engineer, or technician, congratulations on taking a risk and graduating in a focus that is still a mystery to some and a desire for others. Congratulations on graduating in something that you are passionate about! Take

that passion to pave the way (much like you did in college) to find the job that you are equally passionate about. The reward will not only satisfy your career right off the bat but will also increase the longevity of a still niche but very interesting field!

## About the Author

Jennifer Egan was born and raised in Washington State. She graduated from Western Washington University with the intent of going into secondary education in social studies but chose to pursue a career in GIS instead. Now she is in her eighth year of GIS, and her career has covered multiple industries. She has enjoyed working in the utilities, gaming, and wireless industries, with wireless being her overwhelming favorite. The ability that GIS has to integrate into a number of industries is what drives her most, because GIS is a universal tool (although geographic-centric in many cases) to help people understand and articulate the world in a different way, unlike any other specialty skill sets. Looking into the future, she is excited to be soon obtaining her GISP certification and continuing to add skills to her GIS resumé and contribute to the GIS community.

(This article originally appeared in the Summer 2014 issue of *ArcNews*.)

# Attention GIS Managers: New Strategies for New Times

Overcome the Challenges of Your Role by Learning New Skills and Applying New Strategies

By Adam Carrow

Defining the role of a successful GIS manager today is vastly different from how we would have defined a successful GIS manager even five years ago. If you are using the playbook from five years ago, the odds are stacked against you. This conclusion comes not only from my personal experience as a GIS manager but from my professional experience at Esri working closely with local government GIS managers.

Most GIS managers have worked their way up to manager positions from GIS technician/analyst positions, and many have GIS/geography or similar academic/professional experience. While this background is great for being a successful GIS **user**, it does not necessarily provide you with the skills necessary to be a successful GIS **manager**—and this is exactly what I have experienced in my career.

In my 20-plus years in the GIS industry (spanning the public and private sectors and academia), and 12 years as a GIS manager, I have come to some conclusions about the challenges that face GIS managers.

An enterprise GIS is a mission-critical IT system. Because most GIS managers began their careers as GIS technicians or analysts, they do not have a professional **IT background**. Being

a successful manager also means you need a general **business background**, yet most GIS managers I know have no business background. So we have GIS managers, an entire class of critical employees who lack many of the skills necessary to successfully execute their mission.

To be successful, GIS managers in this situation need to proactively work toward filling in the IT and business skills gaps. From my experience, here are some of the strategies and skills I see as most relevant to overcoming these gaps and being a successful GIS manager.

## IT Strategies and Skills

- Identify and follow best practices (IT, GIS, and vendor-specific).
- Develop and maintain a living strategic plan.
- Design and maintain a mission-critical system architecture to power your enterprise GIS.
- Integrate GIS with other enterprise business systems.
- Implement GIS as a location platform that supports your business.

- Provide an ecosystem for third-party developers.
- Embrace change and plan for it.
- Deploy mobile-capable, focused apps ASAP using a rapid application development methodology.
- Be sustainable: Prioritize the use of commercial off-the-shelf (COTS) over custom solutions.
- Be innovative: Participate in Esri's beta community and make innovation a priority and part of your daily workload.
- Be proactive: Schedule an annual GIS health check.

## Business Strategies and Skills

- Increase your customer base: Bring GIS to everyone, not everyone to GIS.
- Exceed your customer's expectations: Make sure you understand the need behind the need.
- Maximize return on investment (ROI):
  - Provide business solutions across all five business patterns (data management, planning and analysis, field mobility, operational awareness, and customer engagement).
  - Focus on spatial analysis; it is the reason that GIS exists, and it provides the maximum ROI.

- Get, maintain, and expand executive sponsorship for GIS: Learn how to engage with executives and provide them with business solutions that matter to them.
- Don't just be a manager, be a leader: There is a big difference between managing and leading.
- Market the value of spatial insight: Transform your image from mapmaker to solution provider.
- Define and measure success: How else will you truly **know** you are successful?

In future blog posts, I will dive deeper into many of these and other topics to help GIS managers beat the odds.

## About the Author

Adam Carnow is an account executive with Esri who manages large local government GIS customers in Florida, Georgia, and North Carolina. For over 20 years, he has been applying GIS and related spatial technologies to complex, award-winning projects across the globe in the realms of planning, transportation, and environmental sciences for both the public and private sectors. Carnow holds a BA in geography and an MA in urban and regional planning from the University of Florida. He has achieved certification as an urban planner (AICP) and GIS professional (GISP).

(This entry was posted to *Esri Insider* [blog], September 22, 2014.)

# Transforming Essential GIS Skills

By Bern Szukalski, Esri Technical Evangelist and Product Manager

Over the years, GIS has grown to cover a very broad horizon. It's no longer the domain of specialized departments; instead, it has become deeply woven into an organization's fabric and extends to a very public and connected audience. The fact that we think differently today than in the past about how we use—and perhaps more importantly, how we can use—GIS reminds us that we need to continue to evolve our skills in new directions, whether we're seasoned GIS veterans or simply trying to land that first job.

A recent e-mail from someone just beginning to take their first steps into the GIS job market had me thinking about this again. They asked me whether they should take a course in Python to improve their GIS job prospects. "Sure, that would definitely be a good idea," I said. But at the same time I realized that when I meet with GIS organizations, the things they seem to wrestle with are beyond the usually anticipated skills of data conversion and management, modeling, metadata, and Python prowess. Even cartography has to be considered in a different light in the web mapping world of mashups, slippery maps, and fast and furious app development.

In what areas do users feel challenged or tell me they're seeking additional talent? The answers are easy when you consider how GIS has moved online toward transparency, self-service mapping, and great browser apps and into a device-centric world on your phone or tablet. Clearly this is a case where the technology of the day dictates the habits and expectations of consumers of geographic information and also the corresponding requirements for today's GIS professional. Here's what I've come to understand are sought-after skills.

## Design and User Experience

Even the best functionality or information can't be appreciated or effectively used behind a poorly designed website or app. The user experience (UX), and design of compelling apps and websites, is a key factor in reaching a target audience and how that audience perceives the information presented. It doesn't matter whether it be a longtime resident in a city trying to find the office to pay a late bill or a community activist looking to push the envelope by hacking with data the city's GIS has provided. What you deliver must be compelling and friendly. Lots of GIS organizations are challenged with a lack of design and UX talent.

## Web Development

Great JavaScript, CSS, and HTML skills are sometimes harder to find in GIS organizations these days than experience with Python, C++, or ArcObjects. While GIS-centric skills are essential for a nuts and bolts GIS professional, if you want to push into new frontiers or land your first job, core competence in current web technologies is a must.

## Responsive Design

Any app these days must work on a variety of form factors, from full-screen browser to tablets to smartphones. If you can build responsively designed apps that magically morph to fit all needs and form factors, you've got some valuable skills.

## Mobile Platforms

Beyond ArcPad on your Trimble, Android and Apple devices rule the landscape, with Windows tablet devices close behind. If you want to reach a broad, public audience, skills in mobile and native app development are what GIS organizations are looking for. And, as an existing professional or new job seeker, skills in these areas will open doors for you.

## Data Authoring, Cartography, Publishing

Remember when you published a GIS service with 20 layers and 50 sublayers? In the world of mashups, this is more than a speed

bump—it's a roadblock. Understanding the tradecraft involved in delivering building-block layers for authoring web maps begs for a different approach. And web cartography sometimes requires different considerations and thinking than the cartographic design principles applied to that National Geographic-quality map you've hung on your wall.

## Integration with Other Systems

A successful GIS does not live alone but integrates with a variety of other systems in an organization. These can be business systems, enterprise tools, or real-time feeds. Experience in bridging these systems into GIS and integrating the work of other departments with skills in SharePoint, Cognos, or other enterprise software and systems are increasingly valuable.

## Online Best Practices

As the ArcGIS platform moves to the cloud, there are lots of things to know about establishing and curating a successful GIS online. The new pattern of a cloud-based GIS means different ways to do things and a new set of best practices. Many educational institutions are moving forward with specific courses and learning opportunities in these areas that can bring value to you and your resume.

Clearly, GIS and how we use and think about it has transformed. The age of ubiquitous geographic information and geo-enabled

apps is upon us and moving fast. With a few additional skills, you can evolve your role in your organization or land that first job and hit the ground running. GIS has transformed, and you should be sure you've transformed along with it.

## About the Author

Bern Szukalski is an Esri technical evangelist and product manager, focusing on ways to broaden access to geographic information and helping users succeed with the ArcGIS platform.

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