ArcNews

Esri | Fall 2014 | Vol. 36, No. 3

Briefly Noted

16,000 geogeeks gather in San Diego, California, to learn, teach, share, network, collaborate, and just have fun at the Esri User Conference. Read a recap on page 4.

ArcGIS natively supports Mac and iOS with Explorer for ArcGIS. Download the app for Mac from the Mac App Store, the iOS version from the iTunes Store, or go to ArcGIS Marketplace for either. An Android version will be available later this year (www.esri.com/explorerapp).

Newly released 30-meter Shuttle Radar Topograpy Mission (SRTM) elevation data will be incorporated into the World Elevation Map, available on ArcGIS Online.

ArcGIS 10.3 is in final testing and expected to be released in the fourth quarter.

Get productive quickly with more than 200 State and Local Solution templates that can be downloaded (www.esri.com/smartcommunities).

Build intuitive, focused apps that run on any device without writing a line of code using Web AppBuilder for ArcGIS (www.esri.com/software/web-appbuilder).

Landsat image services benefit thousands of users. These image services, available from ArcGIS Online, are updated daily with hundreds of the best images captured by Landsat 8 (www.esri.com/landsat-imagery).

Share data quickly with ArcGIS Open Data, which comes with every ArcGIS Online organizational subscription (opendata.arcgis.com).

"Creating Our Future"

A message to our users

By Jack Dangermond

We live in two worlds.

We live in the ordinary world—a world where we go to work, we eat, we have our family, and we have our friends. We operate in this world in a stimulus-response mode—things happen, we respond, and then we go about our daily lives.

At the same time, we live in an extraordinary world of imagining, thinking, dreaming, and creating.

We live in these ordinary and extraordinary worlds at the same time. A good example of this is the life of an architect. An architect imagines, designs, and then supports a process to create a vision.

You and I also do this every day in our own lives. We imagine buying a house or we imagine a new career…we imagine all sorts of things. And when we act on our imagination, we create something. We create a new future.

We are living in a world facing serious challenges, such as poverty, population growth, urbanization, pollution, natural resource depletion, and climate change. These challenges not only impact us as individuals but affect everything. These truths in turn are also affecting our social and cultural world in terms of social controversies, conflicts, and migrations.

From severe climate events to drought to food production challenges, the world we live in is a complex, interconnected web. We live in an unprecedented time where the work that you do with geography is more important than ever.

Geography as a science provides us with the context and the content of our world. It provides a framework for understanding our world. GIS has extended this science, bringing all our measurements together, analyzing and visualizing them, and ultimately creating better understanding. In the digital age, ArcGIS has become a new medium.

↑ Esri president Jack Dangermond called on attendees at the Esri User Conference to address the complex challenges facing our world by using GIS as a medium to make this complexity more understandable.

Today, GIS is integrating geographic knowledge into virtually everything we do. It's changing the way we think by helping us to see and understand things differently, within our own organizations as well as at the planetary level. And it's also changing how we act. As Richard Saul Wurman says, "Understanding precedes action."

GIS itself continues to evolve, and as a result, your individual systems are now becoming part of a larger, interconnected platform. Your servers are connecting, your desktops are connecting, and your apps are being fed by shared community content. This web GIS is a new pattern that's coevolving with faster machines, web services, open environments, open policies, and networks.

Web GIS is bringing together all our data, technologies, and people. It lets you share your own focused work in the form of web maps and web services

continued on page 8

Esri Supports ConnectED

Free ArcGIS Online for 115,000 schools

Esri is supporting the ConnectED Initiative by offering a free ArcGIS Online account to every one of the roughly 115,000 elementary, middle, and high schools in the United States.

In 2013, President Barack Obama announced the ConnectED Initiative, an effort to provide K–12 students with digital learning opportunities. He challenged private industry to help transform American education by providing devices, connectivity, support for educators, and learning resources.

Esri's offer of free subscriptions to ArcGIS Online, a cloud-based GIS, is valued at $1 billion. ArcGIS Online is hosted through Amazon Web Services (AWS). Amazon has embraced the effort and committed to at least three years of support for the program.

Esri's participation in ConnectED was announced at the fifth annual White House Science Fair in May. This event celebrates student winners in a broad range of science, technology, engineering, and mathematics (STEM) competitions. Esri president Jack Dangermond and students who had participated in courses using GIS from Roosevelt High School in Los Angeles, California, and Washington-Lee High School in Arlington, Virginia, joined the White House in making this announcement.

↑ Using ArcGIS Online to teach STEM-related courses reinforces the scientific method.

"We are honored to be part of President Obama's ConnectED Initiative to provide a better learning environment and future for students throughout the United States," said Dangermond. "By leveraging the power of geospatial technology, students can truly understand how the world is interconnected and help create solutions for the challenges that lay ahead."

President Obama set goals as part of the ConnectED Initiative to establish digital learning opportunities in the United States during the next few years. These goals include

- Upgraded connectivity that provides high-speed Internet access to every school in America.
- Access to mobile learning devices to ensure that students and teachers can engage in digital learning anywhere they can connect to the Internet.
- Support for teachers so every educator has the background necessary to implement digital technology for classroom education.
- Digital learning resources to make available high-quality digital learning opportunities for both students and teachers.

Esri's ArcGIS Online platform allows anyone with Internet access to use, make, save, and share maps that explore the breadth and depth of the world. Pilot programs in hundreds of schools have demonstrated that educators and students can use ArcGIS Online effectively in all grade levels to enhance learning opportunities and build data analysis, visualization, and problem-solving skills.

GIS activities almost always involve thinking scientifically, analyzing mathematically, breaking problems down into manageable steps, and determining a solution using technology. Introducing ArcGIS Online into STEM-related

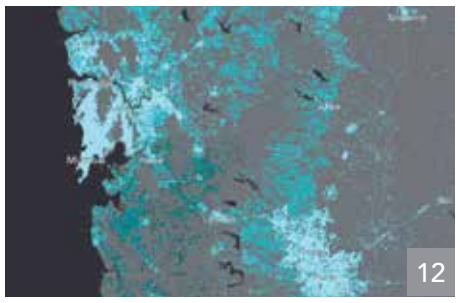
continued on page 8

ArcNews

Esri | Fall 2014 | Vol. 36, No. 3

This map of the Interior Columbia Basin Project, featured on the cover of the 11th volume of the *ESRI Map Book* in 1996, is an example of the cartographic artistry of this issue's GIS hero, Jeffrey Nighbert. Read more about him on page 22.

Table of Contents



Editor in Chief
Monica Pratt

Graphic Designer
Takeshi Kanemura

Illustrator
Daniel Gill

Founding Editor
Karen Hurlbut

Manage Your *ArcNews* Subscription

Subscribe to Esri publications: **esri.com/subscribe**
Unsubscribe from Esri publications: **esri.com/unsubscribe**
Other circulation issues: **requests@esri.com or 909-793-2853, ext. 1-2778**
Outside the United States, please contact your international distributor to subscribe, unsubscribe, or change your address. For a directory of distributors, visit **esri.com/distributors**.

Article Submission Guidelines

Before writing an article, read and follow the publication guidelines at **www.esri.com/esri-news/arcnews/submission**.

ArcNews
Esri
380 New York Street
Redlands, CA 92373-8100 USA
arcnews_editor@esri.com
Tel.: 909-793-2853, ext. 1-1660
Website: esri.com/arcnews

ArcNews (ISSN 1064-6108) is published quarterly by Esri at 380 New York Street, Redlands, CA 92373-8100 USA. *ArcNews* is written for the Esri user community as well as others interested in mapping and geographic information system (GIS) technology. It contains material of interest to planners, foresters, scientists, cartographers, geographers, engineers, business professionals, and others who use spatial information.

Website Helps Anyone Learn Spatial Thinking Skills

Making maps. Solving problems. Sharing everywhere.

These words encompass the theme of a website that presents a new way to learn ArcGIS concepts and technology and emphasizes problem solving rather than software functionality.

Learn ArcGIS (learn.arcgis.com), provides people with access to the knowledge, spatial analysis tools, and data needed to answer geospatial questions that come up every day. The site is designed for self-study and available at no cost. The lessons in the online gallery reflect realistic analysis scenarios that mirror typical, everyday GIS workflows. Lessons teach people how to

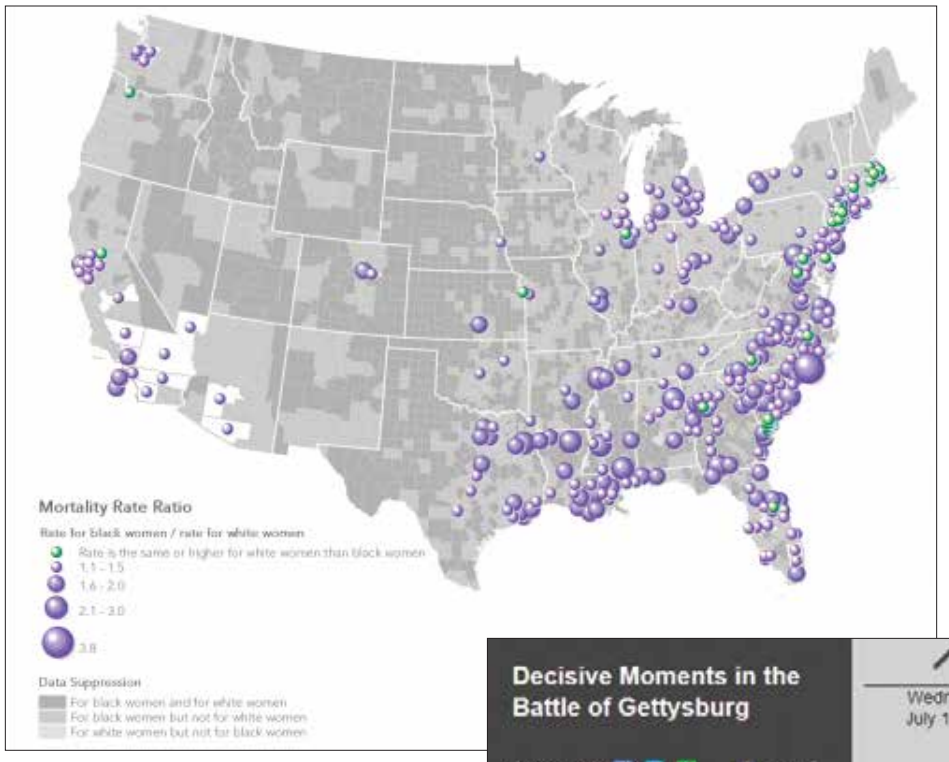
- Formulate a geospatial question.
- Analyze data.
- Interpret results.
- Share results using online maps and apps.

for any type of learner to discover the power of mapping, start making maps, and begin solving spatial problems using geographic analysis.

"The whole world of GIS has changed radically with the rapid evolution of the ArcGIS platform," Brown said. "In the old days, we had to teach people about things like geodatabases and topology—the under-the-hood things that make GIS work. But so much now just works, and we have an opportunity to go beyond that and teach people how to solve real problems."

The site is interactive. Much of the work is done on the web using the mapping and analysis tools and data available from Esri's cloud-hosted ArcGIS Online (arcgis.com). Lessons include online maps that learners can explore to find a spatial question or problem that interests them.

"We are attempting to integrate learning right into the platform," said Christian Harder, a member of the Learn ArcGIS team. "We have an amazing online GIS platform that can run on any web-connected computer on the planet. Figuring out how to leverage it in a learning context has been a fun challenge."



↑ Lessons feature scenarios that reflect realistic GIS workflows such as studying breast cancer mortality rate patterns.

Newcomers to GIS can learn geospatial concepts and the basics of the ArcGIS platform. They can discover how to use maps to better understand information, tell stories, compile data, perform geographic analysis, and monitor situations or operations. They can immediately analyze data and make maps with no major upfront investment other than time.

GIS professionals will find advanced lessons at Learn ArcGIS, which will help them become more skilled at conceptualizing, analyzing, and solving spatial problems in addition to creating and sharing maps. Learn ArcGIS doesn't replace traditional instructor-led training or web courses in ArcGIS. It whets learners' appetites and entices them to dig deeper.

Clint Brown, director of software products and leader of the Learn ArcGIS team, said the website designed by the team provides a new pathway

Begin with a Story

Each project starts with a story that includes a short introduction and background on a situation. One project, A Capitol Offense, is about the incidence of crime in Washington, DC. The student then gets to map crime data and perform hot spot analysis to find clusters of high and low crime rates.

In the Create a Community Garden Web App project, students create a large-scale custom basemap and deploy it as an app that garden plot holders can use to report pests, weeds, and other problems. Students can work with an app that resembles the one they will create, select icons for weeds and pests, and drag them onto the map next to the affected plots.

Join the LearnGIS Community

Using Learn ArcGIS doesn't require the purchase of any Esri software. Anyone can try out the lessons with the sample data, sign up for free membership in the LearnGIS organization, or use an existing ArcGIS Online for organizations account. The LearnGIS organization provides limited-time access to the cloud-based tools and data in ArcGIS Online needed to complete the lessons. For lessons that require ArcGIS for Desktop (which now includes ArcGIS Pro), Collector for ArcGIS, or Explorer for ArcGIS (iOS), free trial-use student versions are available.

Lessons are available in a searchable, easy-to-navigate gallery. Scenarios reflect realistic GIS workflows such as finding areas where Medicare costs are significantly higher; analyzing emergency shelter access in the event of a volcanic eruption; finding suitable sites for parks; and studying breast cancer mortality rate patterns. New lessons will constantly be added.

The site will especially appeal to people new to GIS who want to become familiar with how maps can help them better understand a problem or issue such as how income and ethnicity shaped the 2008 US presidential election.

Think Spatially

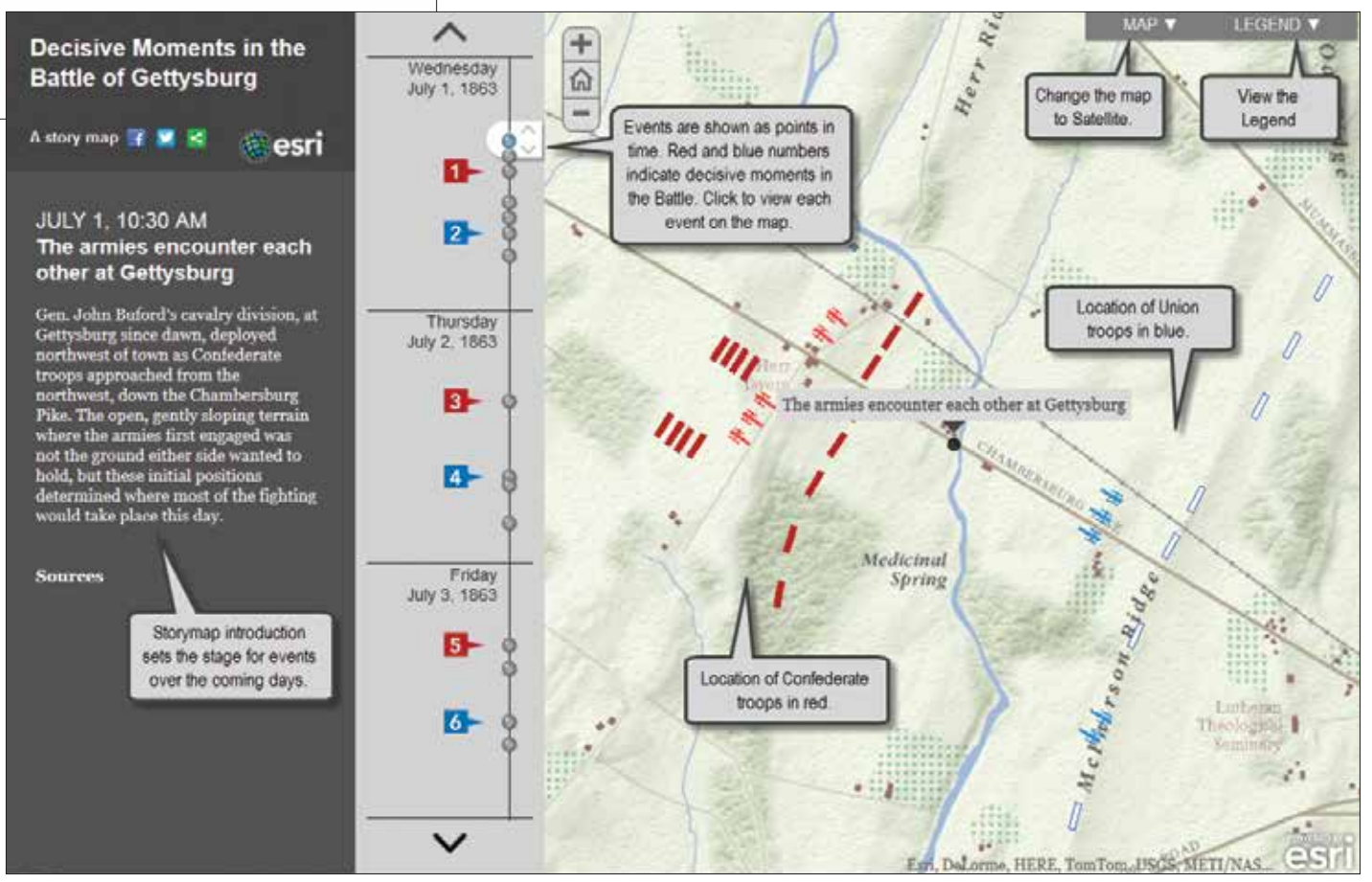
Learn ArcGIS underscores the importance of thinking spatially from start to finish. "Carefully formulate the question you want to answer first," said Aileen Buckley, a cartographer and Learn ArcGIS team member. "Next, collect, analyze, and map your data and then interpret and share the results."

The lessons teach people how to carefully consider the question they want to answer, use the appropriate analysis method, create informative and interesting maps to share with others, and learn to read and understand the maps they use and make. "Not doing it all is not a full analysis," Buckley said.

Initially, the Learn ArcGIS team and other Esri staff will author projects and lessons, but Esri distributors and partners worldwide will add content in the future. As the site evolves, features will be added that foster feedback from learners and let them interact with each other.

"Our long-term goal is to build a worldwide community of learners and educators, with everyone contributing ideas, feedback, and information in a fun, social environment," said Catherine Ortiz, another Learn ArcGIS team member. To start working with Learn ArcGIS, visit learn.arcgis.com.

↓ At Learn ArcGIS, students explore history by examining decisive moments in the Battle of Gettysburg during the American Civil War.



↑ Former astronaut and the new National Oceanic and Atmospheric Administration (NOAA) administrator Kathryn D. Sullivan took center stage at the Plenary Session.

↑ Erwin Rademaker, PortMaps program manager, explains how ArcGIS connects the systems that run the Port of Rotterdam in the Netherlands.

Surrounded by GIS People

Highlights from the 2014 Esri User Conference

"I feel like the kid that just found the world's very coolest candy shop," said former astronaut Kathryn D. Sullivan and the new National Oceanic and Atmospheric Administration (NOAA) administrator, as she took center stage at the 2014 Esri User Conference in San Diego, California. The first American woman to walk in space, Sullivan marveled at the GIS technology she saw and the people who use it to make vital decisions. "Fabulous toys, spectacular colleagues, great talent, interesting perspectives," she said. In her plenary address, Sullivan spoke about NOAA's role as an environmental intelligence agency.

Sullivan and the plenary audience got a taste of how GIS is being used around the globe to make critical and sometimes lifesaving decisions. Presentations focused on humanitarian work, business uses, climate resilience, conservation, emergency operations, transportation, and urban design.

The theme of this year's conference was GIS: Creating Our Future. People can create a better future using GIS by tackling issues such as population growth, urbanization, the climate, food production, pollution, and energy use, said Esri president Jack Dangermond. "Web GIS is bringing together all our data and connecting it along with our technologies and our people. It's creating a framework where we can actually work on those very challenging problems."

Stamping Out Polio

One of those problems is polio, a disease that causes paralysis and sometimes death. Although a vaccine developed in the 1950s eradicated polio in most countries, cases are still reported in a few parts of the world.

The World Health Organization (WHO) and the Bill & Melinda Gates Foundation support the Global Polio Eradication Initiative (GPEI). Currently, attention is focused on eliminating polio in Nigeria, Afghanistan, and Pakistan—countries where polio has been difficult to stamp out.

In their keynote presentation, Dr. Bruce Aylward from WHO and Dr. Vincent Seaman from the Bill & Melinda Gates Foundation demonstrated how GPS, Esri ArcGIS, and satellite imagery were used in northern Nigeria to map dense urban areas with unnamed streets and remote, rural settlements. Having these maps helps get vaccination teams where they need to go and keep track of where children have been vaccinated. Dangermond presented Seaman and Aylward with Esri's Making a Difference Award.

Managing a Major Port

GIS makes a difference in many other areas, including transportation. Six months ago, the Port of Rotterdam in the Netherlands implemented PortMaps using Esri ArcGIS, Microsoft SharePoint, and SAP. It's an enterprise mapping application used to manage information about a wide range of operations at the port, which handles more than 350 tons of cargo annually.

PortMaps' program manager Erwin Rademaker said the port could no longer expand physically, so to optimize operations, a world-class mapping system was developed to give all users at the port a single point of entry to all necessary information. "Nothing in the port moves without information," he said.

The system's components were Esri ArcGIS, SAP, and SharePoint. SAP was used for administrative and financial information and SharePoint for storing all documents and technical drawings. "And in the center, connecting everything with geographic information, there is ArcGIS," said Rademaker.

PortMaps is simple yet powerful. Only three clicks are needed to access content. "With one click *[on]* the map, a business manager is able to see where and when a lease is about to expire," he said. Asset managers can retrieve risk profiles of particular sections of the wharf, the deterioration profiles of the concrete or steel used in a wharf's construction, Rademaker said.

The secret to the success of the project, said Rademaker, was to make the system simple to use and focus on three major areas in the port: the land, the water, and the border in between the two. "After we did that, it was *[easy]* for us to transform 1,500 layers of information into 10 single core objects," he said. The children of port employees tested PortMaps before its launch. "We wanted a system so simple that even a child could use it," he said.

Brewing at Starbucks

GIS also powers an information system that helps Starbucks decide where to open a new store. That analysis is done in Atlas, the company's market planning and store development application, which is powered by Esri ArcGIS.

"Atlas has been and continues to be an incredible success story for us," said Laurence Norton, director of business intelligence strategy and

Starbucks uses ArcGIS to create information products such as a common operating picture for global safety and security at stores, said Laurence Norton, director of business intelligence strategy and solutions at Starbucks during the Plenary Session.

solutions at Starbucks, whose group provides business intelligence to internal business customers. "It's a large GIS application that includes workflow, analysis, and store performance."

One of its major uses is to pinpoint the best location for the next store Starbucks plans to open. Patrick O'Hagan, Starbucks' strategy manager for portfolio strategy and market planning, showed the audience how Atlas works. He demonstrated how Starbucks partner Penny Chen in Nanning, Guangxi, China, can use Atlas to help select future store locations. She can see on a map the local trade areas, retail clusters, demographics, traffic, and transportation nodes.

Chen can also see where new offices are being built—locations that often bring more customers. Referring to the map, O'Hagan said, "For instance, in this part of Nanning, three new office towers will be completed over the next two months."

After adding a new target area, Chen is provided with a workflow window in Atlas that helps her move the proposed new store site through the approval, permitting, and construction process to its eventual opening.

Starbucks also uses ArcGIS to analyze where its customers spend more money than average on coffee purchases as a way to decide where to install the high-end Clover Brewing System. Clover machines brew one cup of coffee at a time precisely controlling the temperature and brewing time. "The result is the best cup of coffee you will ever taste—hot, aromatic, and incredibly flavorful," Norton said.

Starbucks also uses ArcGIS to create information products such as a common operating picture for global safety and security at stores. The technology is being used to analyze "wine away from home" purchase patterns to find possible locations for the Starbucks Evenings menu, which will include beer and wine.

"As we look to roll out the Starbucks Evenings menu to more and more locations, we can target existing coffeehouses in areas with high spending patterns," Norton said.

Addresses and Awards

Penny Pritzker, the US Secretary of Commerce, gave a key presentation on data that included a discussion of the value of open data. Data from the US Department of Commerce agencies helps Americans in many ways. For example, data from NOAA is the basis of severe weather warnings.

As part of extending this commitment to what she called this "open data revolution," Pritzker announced that the Department of Commerce will hire its first chief data officer.

"Data is a key pillar of our department's open-for-business agenda," Pritzker told the audience. "For the first time, we have made it a department-wide, strategic priority to unleash more of our data to strengthen our economic growth; to make our data easier to access, understand, and use; and to maximize the return for businesses, entrepreneurs, government, taxpayers, and communities."

The Plenary Session also featured talks by Steve Misterek, GIS coordinator for the City of Minneapolis, Minnesota, who demonstrated the MapIT Minneapolis enterprise mapping platform. Victor Chua and Eugene Lau from the Urban Redevelopment Authority of Singapore showed how they used Esri CityEngine for 3D urban planning.

Dangermond gave the Enterprise Award to the Royal Dutch Shell Corporation and the President's Award to the City of Rancho Cucamonga in California for their outstanding accomplishments using GIS. These presentations and others, including Dangermond's plenary opening message, are available at video.esri.com

A Tribute to Roger Tomlinson

The day ended with a touching tribute to Dr. Roger Tomlinson, geographer, the "father of computerized GIS" and a good friend to the GIS community, who died in February 2014. The author of *Thinking About GIS: Geography Information System Planning for Managers*, Tomlinson always stressed the importance of knowing what you want to get out of a GIS before you design it.

Video clips from past interviews and presentations were playing including one filmed when he and Dangermond received Alexander Graham Bell Medals from the National Geographic Society in 2010. Paraphrasing a quote from Graham Bell, Tomlinson remarked at the ceremony, "I may be given credit for having blazed the trail in GIS, but when I look at the subsequent development, I feel the credit is due to others rather than just myself." In another clip, he said, "I'm never happier than when I'm surrounded by GIS people."

Join the New GeoNet Community

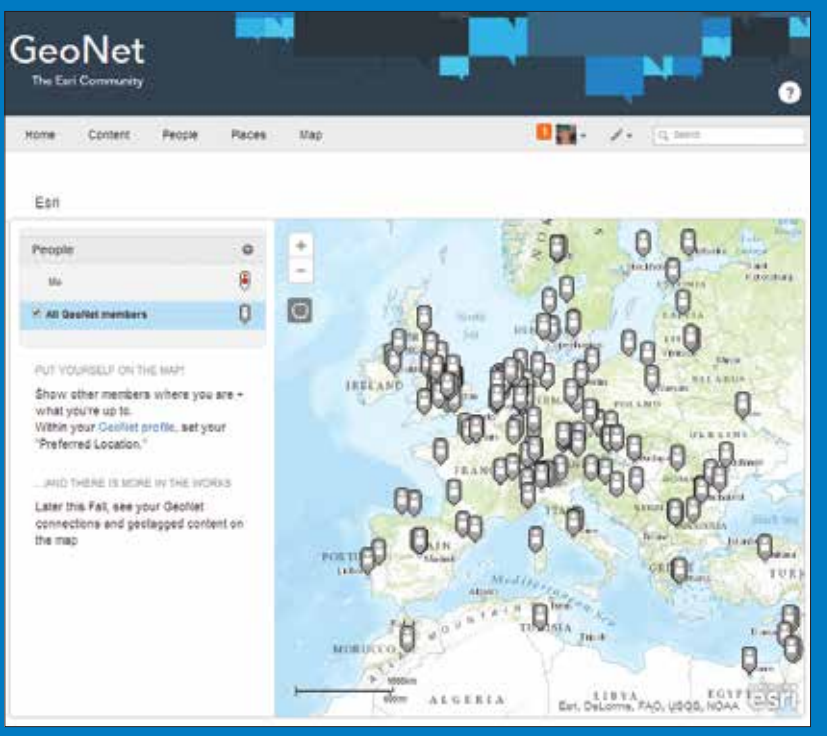
Much more than your forums in a new location, GeoNet is a way to help you do your job better. GeoNet is a community where you can create discussions, upload files, collaborate on documents, share videos, and write blog posts.

Esri has provided a general platform for the community with spaces focused on industries and products. Content items can be created within one of these spaces so others who are interested will receive notifications of new activity and can engage in the conversations.

If your interests fall outside those categories, you can create your own without making a formal request. Just create your group, give it a description, add tags, and define the membership level. The group is yours to manage and customize. GIS and E911, Facilities GIS User Group, ArcGIS Marketplace Apps, and Deutsch are just a few of the groups that have been formed.

Of course, GeoNet has a spatial component. You can put yourself on the map along with others in the GeoNet community. You can embed publicly shared maps within content as a thumbnail with a direct link to the live map, opening up a new channel to share and create conversations around your maps.

Get started witih GeoNet by simply logging in with your ArcGIS Online account. If you do not have an account, you can easily create one. Log on today and start searching for topics that interest you.



↑ Put yourself on the GeoNet map by joining this community of GIS users.

Four Guidelines for the New GIS Professional

The GIS platform helps you visualize, question, analyze, and interpret data to understand relationships, patterns, and trends. As a GIS professional, you make the GIS platform valuable and successful. You are the champion of geography-based decision making across your organization. You define and drive the adoption and application of spatial technologies.

First and foremost, GIS professionals have always been defined by a sense of purpose. Many started out as geographers who had a deep passion for the world around them and then became involved with GIS technology. GIS professionals bring a lot to an organization. They collaborate with their coworkers and with the larger GIS community. They believe in the value of geographically informed decision making and the ability of GIS to improve organizations around the world.

However, the GIS technology ecosystem is changing rapidly: cloud-based GIS, the widespread use of web mapping, the increasing adoption of open data, and the app revolution. What do these and other changes mean for the GIS professional?

These four strategies can ensure that a GIS professional not only keeps pace with these changes but remains at the forefront of this profession:

- Build a strong platform
- Extend the platform across the organization
- Leverage existing GIS investments
- Be active in the GIS community

Build Strong Platforms

Strong GIS platforms are resilient to change, provide obvious value to an organization, and are a springboard for future development. A strong platform starts with high-quality data that is created and maintained through robust data management procedures. GIS professionals leverage this quality data by building maps that communicate effectively. These maps can be delivered as apps that improve efficiency, enhance workflows, support decision making, and encourage collaboration and communication. The use of spatial analytics is applied to yield new insights and create greater understanding.

Extend the Platform

Because the ultimate audience for the GIS platform is the entire organization, it should be built so that it can be extended across the organization's departments. Architecture should be open and interoperable so it easily integrates cross-department data and other business systems.

The GIS professional, who is responsible for ensuring continuity of spatial information management across the entire organization, develops targeted information products and apps that extend the value of the platform investment. Building the platform with the enterprise in mind means that as the value of the geographic approach becomes more widely appreciated, other departments in the organization will be able to adopt GIS into their workflows with minimal difficulty and expense.

Leverage GIS Investments

Once a strong GIS platform is in place, the focus can shift to getting more people to take advantage of the valuable services, information, and expertise it makes available. A great place to start is by providing self-service mapping capabilities that are accessible to non-GIS users. These web maps and apps address specific needs and streamline processes. As more people become familiar with the value of geographic thinking in problem solving, the GIS professional becomes an internal advocate who can expose users to the platform's powerful functionality. Over time, the platform evolves to become a critical component of the organizational infrastructure—a powerful way of sharing data, collaborating, and performing analysis.

Be Active in the GIS Community

The GIS community is vibrant, thriving, caring, and supportive. It is a community of like-minded individuals dedicated to using the power of spatial thinking to build better organizations and communities. Opportunities for GIS professionals to participate in and become valuable members of this community include attending conferences, presenting papers, publishing academic papers, writing articles for mainstream media, sharing tradecraft (methods, workflows, models, code), making data available as open data and open services, and mentoring the next generation of GIS professional.

As a GIS professional contributing to the GIS community, you can help advance the adoption and use of GIS technology. You also gain valuable insights and learn best practices that you can implement in your own organization.

The Future of GIS Is in Your Hands

By any measure, this is an exciting time to be a GIS professional. New applications and a growing awareness of the power of GIS are accelerating the need for skilled people in this field. Web mapping and visualization have opened the world's eyes to the power of the spatial visualization of information and are transforming how people understand the world.

Despite substantial advances in GIS technology over the past few years, the fundamental job of the GIS professional remains more important and more in demand than ever. Your skills are enabling and driving the geospatial transformation taking place across the world. By focusing on building a strong platform, extending the platform across the organization, fully leveraging GIS investments, and being active in the GIS community, you and other GIS professionals will ensure that your organizations are taking full advantage of the power of geography.

GIS Helps Grameen Find Microlending Opportunities

NGO

↑ Bertha, Grameen America member, used her microloan to purchase ingredients in bulk, increasing production in her bakery.

Grameen America, Inc., uses Esri Business Analyst to identify areas of need, like Los Angeles, and help women, like Bertha, break out of poverty.

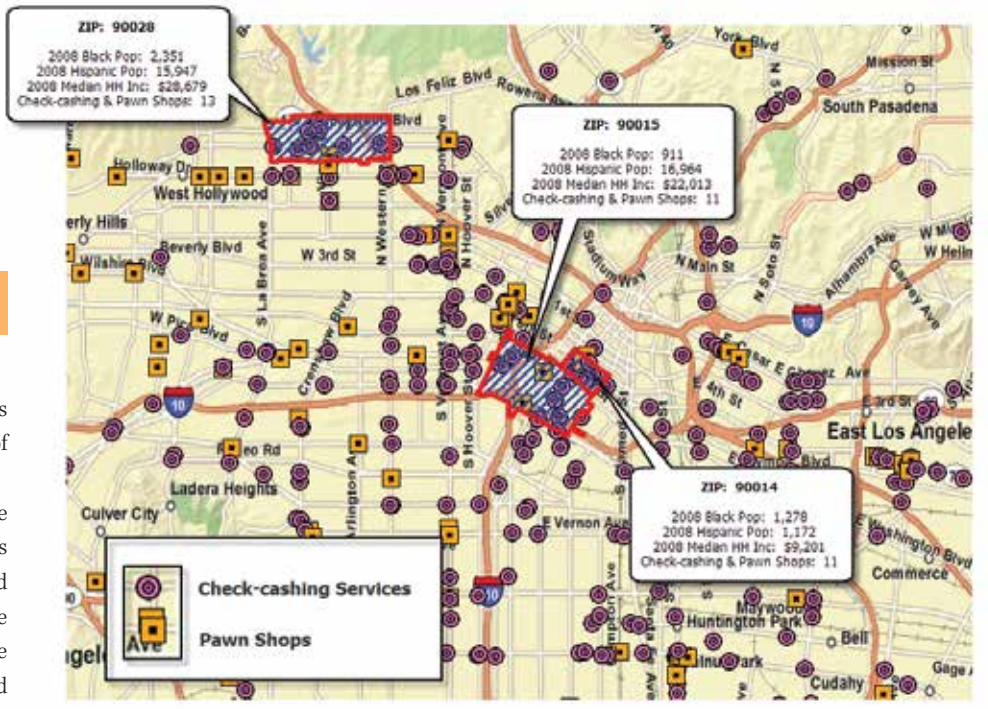
The nonprofit organization is dedicated to helping women who live in poverty build small businesses to create better lives for themselves and their families. Grameen America offers microloans, training, and support to create jobs that transform communities throughout the United States. Based on the Nobel Peace Prize-winning model of the Grameen Bank in Bangladesh, Grameen America has demonstrated that there is a tremendous need for access to credit and alternative financial services in the United States.

Bertha, a member at Grameen America's Los Angeles branch, works side by side with her husband in a bakery in the Boyle Heights neighborhood. By sharing a space with another baker, Bertha saved her business money. This also gave her all the equipment she needed, including industrial-sized ovens and large mixers. Despite these advantages, her production rate remained slow because she did not have enough ingredients on hand. With her first Grameen America microloan, she bought flour and sugar in bulk to increase production.

Today, she and her husband take turns traveling up to 90 miles outside Los Angeles to sell their cookies at Mexican fairs and farmers' markets. Her goal is to expand her business by opening more bakeries in high-demand markets outside the city.

Since opening in 2008, Grameen America has disbursed over $171 million to more than 32,000 women. According to the US Census Bureau's 2013 Current Population Survey, there are more than 46 million people living below the poverty line in this country. Of this group, approximately 19.4 million are located in principal cities of major metropolitan areas.

↑ Bertha's Mexican cookies are her best-selling item.



↑ Grameen America maps median household income, pawnshops, and check-cashing services to determine areas of greatest need for a branch location.

In just six years, Grameen America has expanded to 11 cities across the United States and Puerto Rico including New York City, Boston, Indianapolis, Omaha, Charlotte, Austin, Union City, Los Angeles, the San Francisco Bay area, San Jose, and San Juan. Branches are located in areas with high concentrations of people living below the federal poverty line who are in need of Grameen America's financial products and services.

Esri Business Analyst is used by many organizations to look closely at geodemographic information to better manage business processes such as expansion and localized marketing. In 2009, Grameen America joined the Esri nonprofit program, which helps conservation and humanitarian nonprofit organizations around the world acquire ArcGIS software and services.

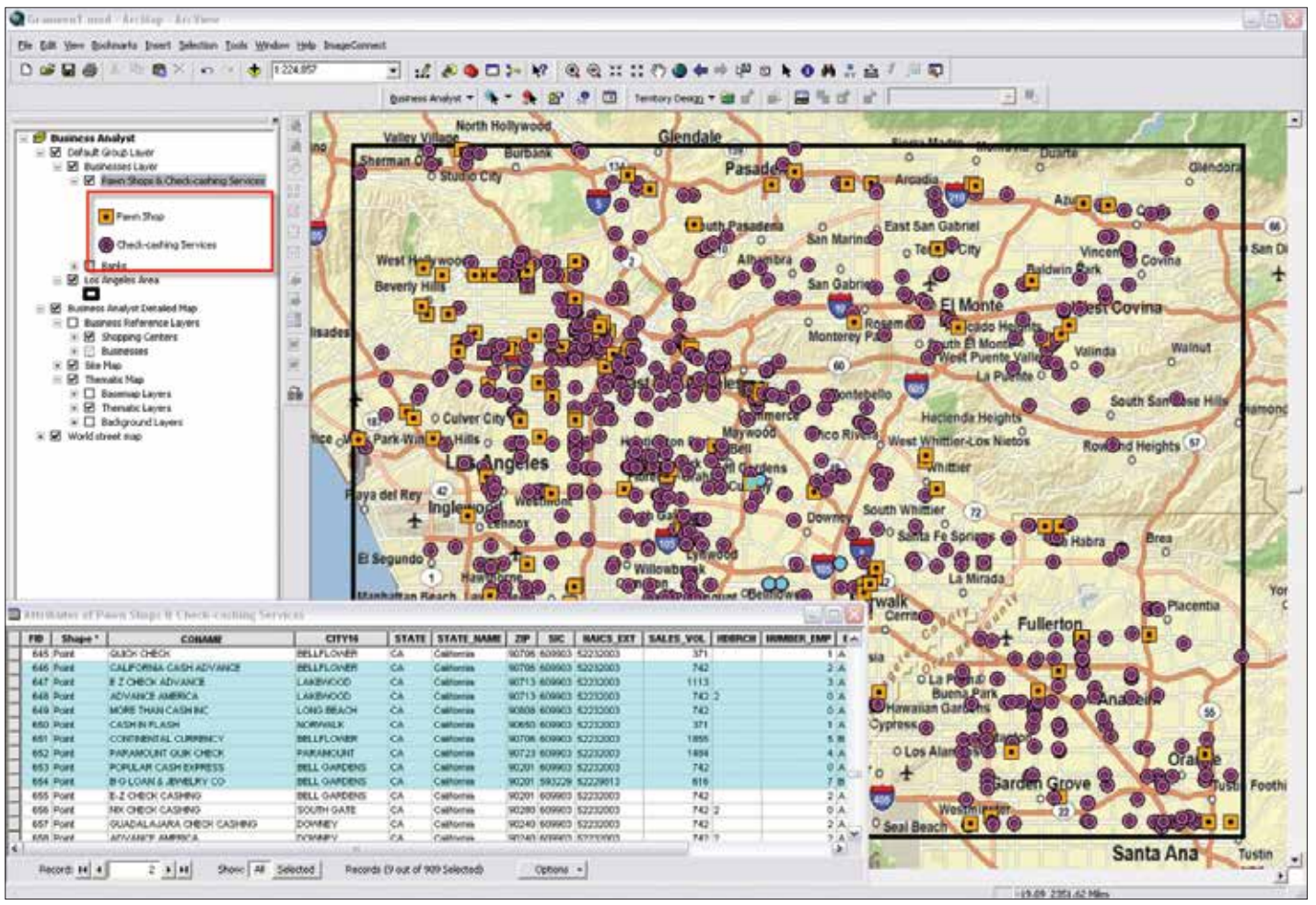
Esri worked closely with the Grameen America team to determine which demographic variables are indicators of successful markets. Using these indicators to identify ideal target markets, Grameen America has used Business Analyst to prioritize metropolitan areas for program expansion.

Esri has helped pinpoint specific neighborhoods that Grameen America should target upon market selection. "Now, as we look to enter new markets, we are able to more easily select which cities to prioritize for growth," said Katherine Rosenberg, executive vice president of Grameen America.

"We have also started using the software more frequently to identify potential locations within cities. As we grow, we can see a clearer picture of where our borrowers are coming from and can better understand the effects that new branches have on our borrower growth."

Today, Grameen America uses Business Analyst to build custom datasets that identify the high density populations the organization is trying to serve. "We were amazed at how easy it was to combine all of our different criteria to be able to see areas that had the highest concentration or the densest clusters," said Rosenberg.

Using Business Analyst, Grameen America has been able to harness the power of data collection and analysis to better serve communities across the country. "All people are entrepreneurs, but many don't have the opportunity to find that out," explained Muhammad Yunus, Grameen America founder and board chair professor. "All we need to get poor people out of poverty is to create an enabling environment."



↑ Map of pawnshops and check-cashing services in Los Angeles Metropolitan Service Area.

"Creating Our Future"

continued from cover

throughout your organizations as well as on the web to the world. This creates a framework where we can collaboratively work to address the complex challenges facing our world.

Web GIS is also leveraging advancing technologies—the world of measurement, the world of computing, and the world of networks—and layering on top of that infrastructure. This "nervous system of the planet" brings our world's information to life.

In addition, the app revolution is making this Web GIS, and all its content, available everywhere. Over time, anyone will be able to access this new medium of web services and web maps anytime, anywhere, on any device, bringing GIS to life in whole new ways and transforming how GIS professionals work.

Fundamental to this idea of creating the future is the concept of geodesign. Geodesign takes geographic information and links it to the design, decision-making, and planning process using collaboration. It does this by building the power of GIS into the process, allowing alternative plans to be visualized, compared, and evaluated. The end result is better, more informed decisions.

I was first introduced to this methodology almost 50 years ago by my professor, Carl Steinitz, and it set me on a course I've followed for my entire career. And it's much more than just a landscape architecture concept or a planning concept. Geodesign is equally important for businesspeople wanting to locate stores as it is for farmers who want to plant crops. In fact, geodesign has a role to play in almost every activity.

For the GIS professional, geodesign extends your work from the science side into the creative side—from the ordinary world to the extraordinary world. I would like everyone to think about becoming geodesigners. It's the right time for us all to move in this direction, because the technology is here now, and it can play an important role in helping us solve the world's problems. The mission of creating a better future depends heavily on GIS professionals. It is you who can envision what's possible, understand and embrace and fully leverage these new web GIS and geodesign tools, show leadership, collaborate and support designers and decision makers, and do the difficult work we have ahead of us.

Seeing the work you do, and knowing what I know about the technology and where it's going, this isn't just a possibility. I think it's actually inevitable. As GIS professionals, you are already imagining the future and working hard to create it.

You are the future.

Esri Supports ConnectED

continued from cover

courses reinforces the scientific method and provides students with an effective way to present their findings.

Problem solving, critical thinking, data analysis, communication, and collaboration are hallmarks of the work by GIS professionals. These are proficiencies sought by employers everywhere. By introducing ArcGIS Online, educators can help students build these skills, even from a very early age, in preparation for college and career. Map-based classroom activities and service learning projects are an engaging way to foster collaboration between students.

For the ConnectED Initiative, Esri has crafted pathways and resources to help educators take advantage of ArcGIS Online organizational accounts. Organizational accounts offer substantially greater capacity and more data, tools, integration with outside applications, analysis functions, and control of sharing than the free ArcGIS Online public account.

Educators and students can learn the fundamentals of the software quickly and then launch into new territories by collecting and serving data, analyzing that data in a more detailed manner, and integrating new content with that data. They can practice these skills on computers at school, tablets at home, and smartphones while on the go—anywhere they can connect to the Internet.

Esri has been committed to K–12 education for more than 20 years. It has offered special educational licenses to schools, districts, and states and conducted numerous classroom and conference presentations about the benefits of learning and applying geospatial technology. Since 2000, Esri's education industry team has staged the Esri Education GIS Conference in conjunction with the Esri User Conference. This four-day event attracts hundreds of participants in presentations and exhibits.

In June 2014, Esri conducted its sixth annual Teachers Teaching Teachers GIS. More than 300 educators and influencers have committed to share with colleagues their knowledge about using GIS in classroom activities at this educator institute.

In 2009, Esri teamed with the National Geographic Society to launch the GeoMentor Program, an initiative to connect GIS professionals with local educators to help them use geospatial technology. With the rising capabilities of ArcGIS Online and improved access to devices for learning, Esri is expanding the call for GIS users to help local educators engage students with GIS. The GIS Certification Institute is supporting this new charge by identifying the mentoring of schools as a way to earn initial or renewal credits toward GIS Professional (GISP) certification.

More information regarding Esri's participation in the ConnectED Initiative is available at connected.esri.com.

Other private sector companies that have committed to the initiative include Adobe Systems, Apple Inc., AT&T Inc., Autodesk Inc., Microsoft Corporation, O'Reilly Media, Prezi, Sprint Corporation, and Verizon Communications.

PRECISION TO A T

Even lines as thin as 0.018MM.

THE NEW EPSON® SURECOLOR® T-SERIES

- Extreme print accuracy at resolutions up to 2880 x 1440 dpi
- Produce a presentation-quality, color, D-size plot in 25 seconds*
- Advanced pigment ink technology for truly archival, full-color prints
- High-capacity ink cartridges up to 700 mL for low printing cost
- Single and Dual-roll models, with optional copy and scan capability

Epson SureColor T-Series

Starting at $2,995

EPSON®
EXCEED YOUR VISION

*Speeds are based upon print engine speed only. Total throughput times depend upon factors such as computer, file size, printer resolution, ink coverage, and networking. For the SC-T3270,fastest print speed for a D-size plot is 28 seconds. Prices are MSRP, before rebates. Please check with an Epson Professional Imaging Authorized Reseller for actual price as dealer prices may vary. EPSON and SureColor are registered trademarks and EPSON Exceed Your Vision is a registered logomark of Seiko Epson Corporation. Adobe and PostScript are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries. Copyright 2014 Epson America, Inc.

Adobe® PostScript® 3™

EPSON.COM/**PLOTTERINFO**

← Streams and rivers surged, overrunning banks and affecting bridges and pathways throughout Colorado in September 2013.

↓ Within days of the floods, LPC crews began repairing key infrastructure.

Managing Recovery Efforts with Mobile GIS after Colorado Floods

↓ Collector for ArcGIS helped all field crews know what had been inspected and where to focus repair efforts.

↑ Longmont Power & Communications staff used Collector for ArcGIS in the field to rapidly inspect and record damaged assets after the flood.

During September 2013, heavy rains and widespread flooding affected 17 counties and dozens of cities and towns in Colorado, causing $2 billion in damages as estimated by Eqecat, a catastrophe modeling firm.

Longmont Power & Communications (LPC), a department of the City of Longmont, Colorado, was hit particularly hard by the flooding. Its service territory of 49 square miles covers the towns of Longmont, Hygiene, and parts of Lyons. Flooding from Left Hand Creek and St. Vrain River damaged significant portions of the municipal utility's electric infrastructure and disrupted service for approximately 6,000 customers. While LPC was able to quickly restore power for most of the affected customers, 1,300 customers remained without power for approximately four days.

During previous disasters, crews used paper maps, inspection reports, and custom handheld devices to perform field inspections. To reduce duplication of work, updates were only made at the end of the day and required specific search lists to be developed before dispatching crews. Electrical engineer Patrick Good was part of the team responsible for restoring power to these customers and repairing damaged infrastructure.

"We realized that we were going to need a way to manage inspections so we could document the damage, estimate the cost of repairs, and monitor the status of repairs once we could access our assets," Good said. "We needed something we could quickly spin up that would help us with all of these tasks."

Although the City of Longmont had used ArcGIS for several years, LPC had only just begun using ArcGIS in July 2013. During a utility coordination meeting with Boulder County Emergency Operations Center personnel, Good saw a presentation featuring Collector for ArcGIS, a configurable app for smartphones and tablets that enables field data collection and syncs with online maps.

Soon after the meeting, Good worked with Lisa Shertz, the city's senior GIS analyst, to deploy Collector for ArcGIS with LPC's meter technician group for testing. After streamlining the data capture form, the app was distributed to lineworker crews who immediately used it to inspect high-voltage equipment. Using tablets with built-in cellular connections and smartphones, crews were able to locate assets on the map and report conditions back to the main office.

"Our linecrew foreman was really impressed by how detailed and clear the maps were and how easy the application was to navigate," said Good. "He's already asked for us to move our day-to-day system maps into Collector for use in the field."

Reports from the field were fed into an online map that instantly updated on all the crews' devices. This let field personnel see what had already been inspected and allowed them to perform their work in smaller groups. In just three days, with little oversight, crews were able to complete inspections of all damaged assets.

"With Collector and ArcGIS, we were able to leverage one GIS platform across many devices to quickly solve many different problems at a lower expense," Good said.

For more information, contact Patrick Good, electrical engineer, Longmont Power & Communications at Patrick.Good@ci.longmont.co.us.

Answers in an Emergency

ArcGIS supports Colorado flood response

During September 2013, weather systems from two tropical storms named Manuel and Ingrid combined with a slow-moving cold front to drench Colorado's Front Range with record rainfall. The Colorado Department of Public Safety was heavily impacted by the devastating floods. GIS technology provided a key mechanism for understanding the evolving nature of the floods and making informed decisions that safeguarded citizens and drove recovery efforts.

Areas throughout the state, especially those north of Denver, experienced rainfall amounts that matched or eclipsed their annual totals in the span of just a few days. Rivers, streams, and reservoirs in the region surged with the influx of precipitation. By September 12, widespread flooding stretched across nearly 2,000 square miles of the state. Storms and flooding claimed the lives of 10 people, drove more than 18,000 residents from their homes, and completely isolated mountain communities such as Lyons. Countless buildings, roadways, bridges, and critical infrastructure were damaged or destroyed, causing hundreds of millions of dollars in damages.

During any disaster, governments ranging from local towns all the way to the state and federal levels activate their emergency procedures. Efforts range from protecting lives and property and communicating with the public to documenting damage and developing and executing recovery plans.

The Colorado State Emergency Operations Center (SEOC), which had used ArcGIS extensively for situational awareness during the state's wildfire crisis in the summers of 2012 and 2013, turned to the technology again when the flooding struck. *[The SEOC, managed by the Colorado Department of Public Safety, Division of Homeland Security Emergency Management (DHSEM), is staffed by decision makers from 19 state agencies and several nongovernment organizations.]*

Tabatha Waldron, geospatial analyst for DHSEM, was responsible for providing maps and imagery to key decision makers and assisting local jurisdictions with their GIS and imagery needs. Using the entire ArcGIS platform, including an ArcGIS Online organizational account, Waldron's first task was to help decision makers understand the scope of the situation and where flooding and damage were occurring.

She used an ArcGIS Online Group to share information with the public, decision makers, and other SEOC staff. "Maps are the perfect tool to provide answers to these questions in a quick and visual way," Waldron said.

Waldron worked alongside her peers at SEOC as well as with local, state, federal, and private partners to collect data and create focused maps related to road closures, traffic control points, evacuation areas, damaged facilities, and geo-referenced aerial imagery. Taken together, these maps and data created a common operating platform that decision makers were able to access in support of response and recovery efforts. SEOC personnel used the maps to maintain situational awareness, and regional field managers used maps and imagery to make decisions that supported their local counterparts.

↑ Geospatial analyst Tabatha Waldron used an ArcGIS Online Group to share information with the public, decision makers, and other SEOC staff.

Photograph courtesy of Micki Trost, Colorado DHSEM PIO

"The maps let us see the effects and scope of the damage that Branches I and II were facing," said Paul Eller, South Central Regional Field Manager for the Colorado DHSEM. "This allowed us to plan accordingly so we didn't drain resources from our partners up north." *[Flooding was extensive so the entire involved area was divided into subareas called branches for organizational and management purposes.]*

Hundreds of response personnel accessed the maps to visualize impacted areas and orchestrate response efforts. Selected maps, such as road closures and shelter locations, were also shared with the public. The common operating platform offered by ArcGIS helped leadership understand the size, scope, and proximity of the crisis.

"The benefit of having access to the maps and information was invaluable to the EOC and operations staff," said Kevin Kuretich, Regional Field Manager for the Colorado DHSEM.

For more information, contact Tabatha Waldron, geospatial analyst, Colorado Department of Public Safety, Division of Homeland Security Emergency Management at tabatha.waldron@state.co.us.

↓ The flooding in September 2013 damaged or destroyed countless buildings, roadways, bridges, and critical infrastructure, causing hundreds of millions of dollars in damages.

Photograph courtesy of Micki Trost, Colorado DHSEM PIO

Tapestry Segmentation Targets the Best Customers

What do you want to know about the types of people you need to reach with your marketing efforts?

Of course you want basic information such as age, income, and household type. Beyond that, if you had more detailed information about the products and services they buy, the leisure activities they enjoy, and their other preferences, you could communicate with them more effectively.

The next generation of Esri's Tapestry Segmentation data can provide you with this valuable information. Tapestry lifestyle data helps you know more about your target audience so you can better find, reach, serve, and keep them.

The July 2014 release of Tapestry data captures current trends associated with the US population such as the increasing diversity of the population, reduced income and assets, and lower home values. It also portrays the steady shift in household types from traditional to nontraditional families and the aging of the population.

Tapestry has 67 segments, 14 LifeMode summary groups, and six Urbanization summary groups that reflect both the stability of gradual change in a maturing population and the impact of life-altering events like the Great Recession. Now you can see a consistent view of the entire American landscape—where important changes are taking place as well as areas where the population has stayed the same.

Notable changes to Tapestry include more segments for singles, more diverse segments, and more differentiation among the senior segments. Singles segments may be divided by affluence, location, and the presence of children. Racially and ethnically diverse neighborhoods are classified by segments in two new LifeMode summary groups. Segments in the Ethnic Enclaves group describe more established households of second or later generations; residents of neighborhoods in the Next Wave group are more recent arrivals.

The six segments in the Tapestry Senior Styles summary group vary from active, affluent seniors in Silver and Gold neighborhoods to older, low-income folks who live in Social Security Set areas.

Tapestry data is available across the ArcGIS platform in web maps, reports, infographics, and data enrichment. Tapestry data is also included with Esri Business Analyst, Esri Community Analyst, and Esri Maps for Office. To access Tapestry, you will need a trial or paid subscription to ArcGIS Online.

Professionals in emergency management, education, economic development, health, nonprofit, politics, public safety, and other similar entities can use Tapestry to reach populations for a wide variety of important reasons. How can Tapestry help you?

↑ See how Tapestry identifies the dominant segment in 55 US cities in this interactive map.

Esri's New Population Map Is the Most Detailed in the World

Esri is compiling a human geography database of demographics and statistics about all countries in the world and mapping this data using an innovative methodology. Sociodemographic data is a valuable asset for businesses, governments, and society. For example, this data can help public health officials responding to disease outbreaks target the most vulnerable populations for treatment. Describing and understanding the human geography of the world require tools to assimilate data in a statistically valid way that will allow for meaningful decision making.

Traditionally, people are counted in a census. But a census is time-consuming, costly, and does not collect the types of statistics at the level required to address today's complex societal issues. Advances in technology are changing the type, quantity, quality, and timeliness of information available. The ideal human geography database would include uniform social and demographic information about all human populations on the globe. It would include population, household, housing unit, business. and economic information that would allow determination of societal characteristics at any scale from macro to micro.

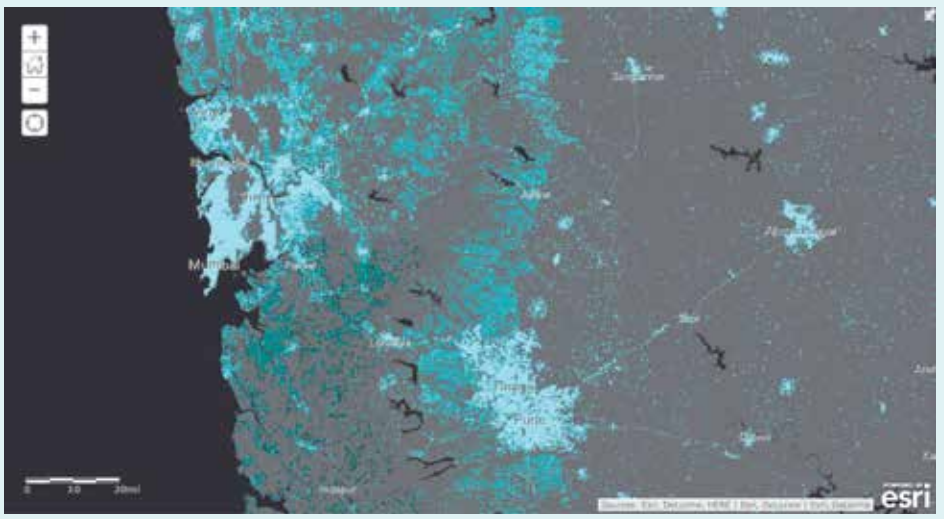
Esri's new database takes advantage of this new information to track and estimate populations to support better decision making by modeling a dasymetric surface. *[Dasymetric is a technique in which attribute data that is organized by a large or arbitrary area unit is more accurately distributed within that unit by the overlay of geographic boundaries that exclude, restrict, or confine the attribute in question.]*

This surface will allow comparative studies and accurate depiction of statistics of ad hoc areas. Modeled from imagery, road networks, and populated place locations, this surface is used to create an urbanization likelihood score. This score is normalized against statistical polygons and used to apportion the statistics to a more detailed geographic depiction. The point surface is modeled from 15-meter resolution imagery, detailed road intersections, and populated place locations. It is then instantiated at a nominal resolution of 250 meters.

The ArcGIS Online geoenrichment API can use the completed database to enrich points and polygons anywhere in the world. The global model is currently complete, and approximately 130 countries are currently being served as part of the ArcGIS Online services. For these countries, a detailed report can be requested that will show the demographics for any arbitrary geography such as a watershed, drive-time area, or an area affected by a disaster.

Additionally, the likelihood surface has been used to create a global population map by obtaining the latest census population data for the remaining areas of the world. These areas were compiled at first order administrative areas equivalent to states in the United States. Population figures were normalized to the United Nations 2013 country estimates.

For countries that are part of the geoenrichment dataset, the most detailed level of geography available was used to apportion the data to the grid. This entire global census geography dataset consists of approximately 1.6 million polygons, and the likelihood surface was then used to assign population to every landmass grid cell in the world. This detailed 2013 population map is a unique depiction of the population distribution that will be available on ArcGIS Online and can be used with ArcGIS Online accounts.



↑ Population maps created with the new human geography database are intended to be viewed from 1:1 million to global scale. Because each cell in the mosaic has an estimated population value, the estimated population for an area of severe drought can be queried using a polygon that describes that area.

Outage Management

Getting the Lights On Faster in North Carolina

Say "power outage" and most people think of storms. Of course, storms can cause power outages, but even during the best weather, linemen must manage outages caused by car crashes that damage poles, animals that tamper with lines, and other things that interrupt service. To maintain service to customers, linemen need to pinpoint the source of a problem, know where to go for a service call, and identify an asset in the field.

Union Power, an electric distribution cooperative headquartered in Monroe, North Carolina, serves more than 70,000 members in Union, Stanly, Cabarrus, Mecklenburg, and Rowan counties. It needed to give linemen and other staff maps that work with live and cached data in the field to help them pinpoint outages and deliver services.

Beginning in 2012, crews could access the Union Power operations dashboard in the operations center by using an air card (wireless broadband modem used for connecting to cellular networks) and ArcGIS Viewer for Flex running on ArcGIS for Server. Unfortunately, lots of things interfere with connectivity. Wireless providers often have dead zones, internal IT issues such as routine server maintenance can interrupt data services, and cell towers can be damaged during big storms, which means that the utility's linemen can't always get online.

Consequently, field crews have had to carry laptops into the field loaded with ArcReader files in case they couldn't get a cell signal on the air card. These ArcReader files had to be published by a GIS professional before a lineman could update data on a laptop. "We want our guys to be able to get around and work offline," said Todd Harrington, E&O System Administrator for Union Power. "In a worst-case scenario, they would have the version of the data they were able to upload when they left the office."

There were other issues with this approach. In many cases, laptops would go months between updates. If a laptop was stolen, Union Power had no way of getting the data off it. Although sensitive data was not kept on laptops, the utility didn't want any data accessed by unauthorized personnel.

Union Power recognized the inefficiencies in this system and knew it could be improved. It decided to work with Swova, an Esri partner and provider of GIS services, to build an iPad solution that would improve its processes and provide fast caching for the more than half a million features in its system. The solution, Offline Viewer, helps linemen locate job sites, see the work they need to do, and search for service orders and assets. It is also used by underground inspectors to see where lines are located. Now, if any device is lost or stolen, data can be removed from it remotely.

Offline Viewer shows live data when online and cached data when crews go offline. The viewer caches features such as meter locations, secondary and primary wires, transformers, switches, reclosures, fuses, and access points. Because crews have automatic vehicle location tracking their vehicles, engineers can use Offline Viewer to see where crews are located, which is especially handy before energizing a line.

While crews do not collect data in the field, they take photos and include notes with those photos. With Offline Viewer, photos are sent directly to the utility's GIS-based operations dashboard rather than being stored on iPads, which would require uploading to the operations dashboard later. Union Power stores GPS coordinates with asset data to allow for precise and accurate location of its assets. All assets are tagged with a six-digit tag number. Crews can search by name, meter, or tag number. When crews are in the field, the map zooms to their location so they can identify nearby assets.

The iPad app is directly tied to the operations dashboard in the operations center, and it contains most of the features from the dashboard. Union Power's operations dashboard was built using the Operations Dashboard for ArcGIS that comes with ArcGIS for Desktop. Consequently, if the GIS department wants to add more features to this configurable mobile app, staff can do that without writing any code.

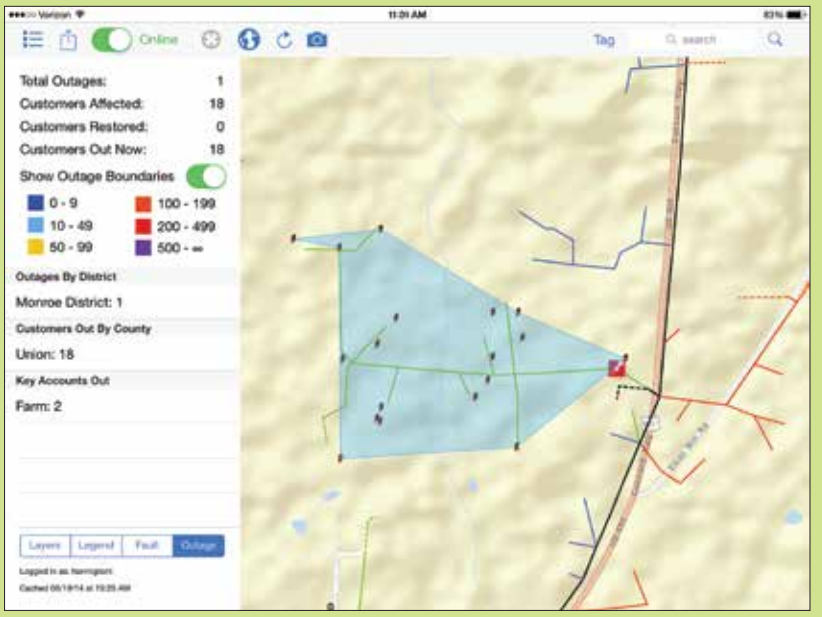
Giving linemen the ability to see the same data the operators see in the operations center is especially helpful during outages. Maps help them know how lines are fed and where the devices that need to be checked are located. The GIS model, based on work by Esri partner Futura Systems, Inc., runs connectivity and validation checks to ensure that the best quality geometric network is being used by the outage system, Milsoft Outage Management System.

The GIS model lets Union Power predict the origin of an outage. "The guys use it to check fuses and patrol the lines. We can track them throughout the process instead of calling each other to determine where crews are," said Harrington.

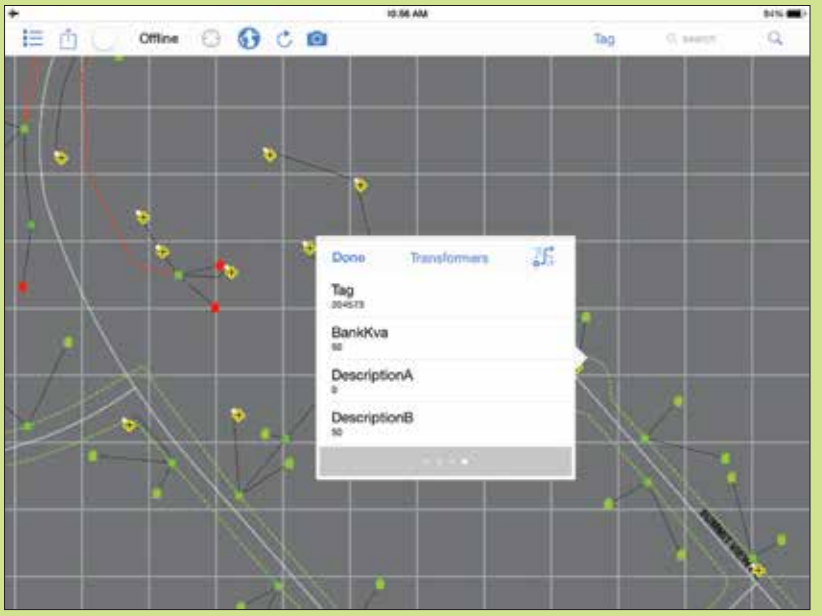
When troubleshooting outages, a fault current search in the application helps crews pinpoint problems so they don't have to drive the line to find clues—like a fallen tree on the line—to determine where the outage originated. Linemen like using the app. They aren't wasting time patrolling lines. Instead, crew members go to the substation and pull the readings off the relays to see fault current data on their iPad map. They get a range of sections of wire that meet that criteria, and this usually puts them near the problem.

"This helps shorten our restoration time, especially when the problem is not easy to see," said Harrington. "It gets the lights on a lot faster."

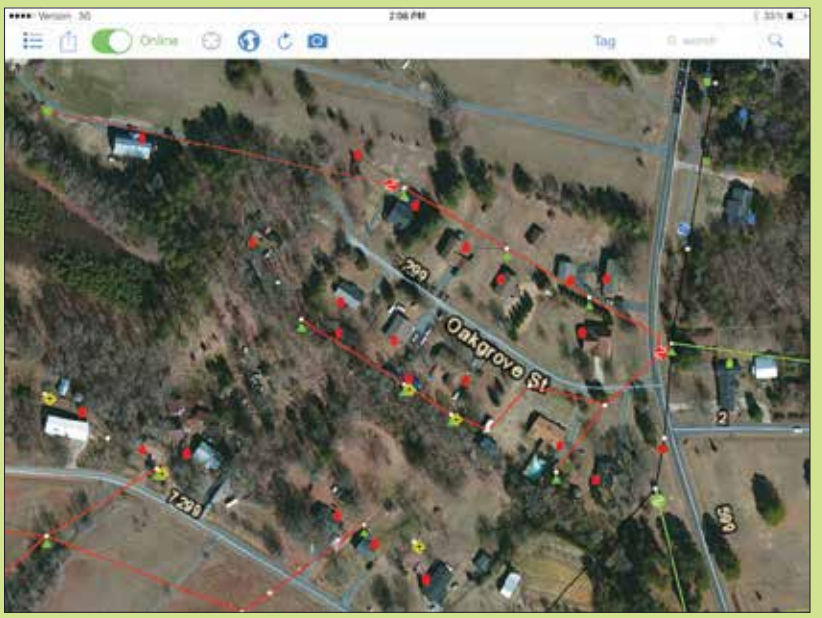
For more information, contact Todd Harrington, Union Power, at todd.harrington@union-power.com.



↑ Offline Viewer, working online during an outage, displays the affected area and customers and the status of the event.



↑ By simply sliding the switch on the upper left of the interface, workers can take the device offline and work using cached data.



↑ When linemen have connectivity, they can use aerial map services provided by Esri to get more contextual information.

ArcGIS for Local Government Solution Apps Transform Citizen Access

Leaders in Roanoke County, Virginia, developed a way to give staff and citizens easy access to information about local government using a geographic framework.

County GIS manager David Wray suggested replacing the existing ArcIMS site with one built using ArcGIS for Server and the ArcGIS for Local Government app templates. The new GIS Maps and Apps Gallery (gis.roanokecountyva.gov) provides one place where citizens and staff can find tax, government services, and election information. It hosts TaxView built with the Tax Parcel Viewer template, GovView using the My Government Services template, and VoterView adapted from the Election Polling Places template. These three apps can be used on a PC, mobile phone, or tablet.

"We wanted to build platform and device agnostic apps so they work regardless of which mobile devices or browsers someone uses. We want apps that everyone can access—this platform helps us do that," said Bill Hunter, Roanoke County director of communications and information technology.

Esri partner GISi customized the search to include autocomplete for addresses, parcels, and points of interest. Start typing "Jones," for example, and by the time you've typed in "jone" a list of possible matches appears. GISi also created an accordion view of information to allow menus to expand and collapse.

The data for these apps is in the ArcGIS for Local Government Information Model. "Putting our data into the model gives us the flexibility to develop apps we need when a business case arises," said Wray.

In GovView, citizens can see a personalized view of their government services. A search by name or address produces information on trash pickup day; nearby recycling facilities; and neighborhood recreation facilities, libraries, and police stations.

↑ TaxView shows property information for an address including total market value, sale date, trash pickup day, and nearby schools.

TaxView provides a wealth of property information. Residents and real estate agents can see deeded acreage, values, sales dates, assigned schools, and much more. They can also access a customized interactive property report and an Esri GeoEnrichment demographic and income report.

VoterView shows polling locations and hours as well as the current elected officials for local, state, and federal districts. "With GovView, TaxView, and VoterView, we tried to break out common, easy-to-use functions for casual users while maintaining OneView, a comprehensive solution for GIS power users, for staff," noted Gray Craig, web content manager for Roanoke County.

GISi developed OneView as a more comprehensive solution that offers a breadth of functionality in one application. OneView was configured to consume the same data sources and services that are delivered through other applications, creating a consistent and efficient overall solution. Its flexible interface lets staff and citizens explore a wide variety of data through more advanced visualization controls and query tools. The data includes real estate sales, land records, planning and zoning, schools, government services, and environmental and utilities information.

"The templates give you a jump start on building apps, so if you have a small budget and no developers in-house, you can take these apps and deploy them to share your content," said Wray.

For more information, contact David Wray, GIS manager, Roanoke County at dwray@roanokecountyva.gov.

MASTER'S DEGREE in GIS

"We expose students to theory and methods on how to conduct special analytics, use various GIS tools, and design GIS systems through hands-on experience. When students enter the field, they are fully prepared to implement and apply GIS solutions."

– Dr. Bermudez

Luis Bermudez, Ph.D., leverages his experience as Director of the Interoperability Certification, Open Geospatial Consortium (OGC) to empower UMBC students. By sharing his expertise on how to design databases, publish data via **web services**, and use **cloud computing**, Dr. Bermudez help students advance in the GIS community.

At OGC, Dr. Bermudez leads the planning and execution of Compliance and Testing Program activities, serves as system architect in interoperability program initiatives, and gives talks, tutorials and workshops worldwide about OGC technologies, **geospatial interoperability, sensor networks and geo-semantics**.

His work continues to help GIS professionals share data, leverage advanced technology, prototype situations, and establish critical requirements all while working within a given framework and structure of rules.

UMBC

AN HONORS UNIVERSITY IN MARYLAND

umbc.edu/gis

Crossing Borders

A column by Doug Richardson
Executive Director, Association of American Geographers

Supporting the Esri-ConnectED Initiative

Doug Richardson, with Michael Solem

With the remarkable announcement by President Barack Obama and Esri president Jack Dangermond of Esri's $1 billion gift of GIS software to support the US ConnectED educational initiative, the stage has now been set for truly transformative advancements in American schools and their ability to improve geographic and GIS literacy for all elementary and secondary students. *[ConnectED promotes Internet connectivity and educational technology.]*

It was a great pleasure to share the excitement and profound significance of Esri's gift to K–12 schools with Jack immediately following President Obama's public announcement in May of this year. I would like to thank Jack for including me in the glow of that moment and for the chance to discuss the enormous opportunities this presents for students everywhere and for the future of GIS.

Now, however, comes the big task of implementing support programs that can maximize the benefits and ensure the success of this extraordinary new development. We urge our colleagues from the geography, GIS, and education communities to join with us to implement integrated support programs for schools, teachers, and students as they receive their ArcGIS Online software licenses beginning this fall. These activities, of course, should be coordinated with Esri's own programs and should enhance and extend existing support networks.

Given the short time to prepare, we believe that support capacity that can "hit the ground running" with proven formal and informal GIS learning and teaching infrastructure and programs already in place will be key elements in enabling teachers and students to fully realize the educational, social, and economic impacts of Esri's investment in K–12 schools.

The Association of American Geographers (AAG) and its 10,000 members, through their substantial educational and organizational capacities, are strongly positioned and willing to assist Esri and the Obama Administration in attaining the vision of broad scale, fundamental improvements in the quality of science, technology, engineering, and mathematics (STEM) education by engaging teachers and students in the power and perspectives of geography, GIS, and geospatial technology. Such support will help students gain geographic perspectives and skills that will broaden opportunities in postsecondary education and better prepare them for a wider range of high paying and rewarding careers. This will further secure the capabilities and innovativeness of the nation's work force in an increasingly competitive and interdependent global economy.

We believe that the following four core areas of support activity are instrumental to ensuring the success of the Esri-ConnectED GIS-enabled teaching and learning initiative.

1. Teacher Professional Development

Improving the preparation of teachers is essential for ensuring that geospatial data and technology are widely adopted and implemented in STEM classrooms. Aspiring teachers will need comprehensive training and preparation in geographical, technological, and pedagogical knowledge areas so they enter the work force as highly capable geospatial educators. AAG, working in collaboration with leading STEM teacher education programs and organizations, has a national project ready for implementation that is designed to advance teacher preparation in three key ways:

- Creating web-based, easily accessed geospatial resources, materials, and tools (RMTs) that introduce teachers to fundamental geographic and spatial concepts for effective teaching with geospatial data and technologies. RMTs will be built using ArcGIS Online data and technologies to present compelling examples of geospatial problems and illustrate for teachers how to develop inquiry-based lessons that support STEM education standards in every state.
- Preparing teacher educators to use RMTs in their courses, workshops, and other professional development settings serving preservice STEM teachers. Emphasis will be placed on the interdisciplinary characteristics of RMTs for fostering the abilities of teachers to support spatial thinking skills and geographic inquiry in STEM classrooms.
- Conducting longitudinal research studies to evaluate the usefulness of RMTs for improving teacher preparation and spatial thinking in STEM education.

2. Curriculum Materials

Although Esri's provision of cloud-based geospatial data and technology will provide the necessary infrastructure for schools, we know from research that models of teaching and learning where questions and investigations drive learning are not easy for teachers to plan, implement, or evaluate. To assist this process, the AAG proposes to develop curriculum materials with the following features and characteristics.

To meet the professional and practical needs of a large community of STEM educators, the curriculum materials will be aligned with the most recent state and national standards for geography, science, social studies, and math. The AAG has been integrally involved in the development of these standards and has experience in implementing them.

The materials will teach new geospatial analytical and technical skills by engaging students in the practices of geographic inquiry. The materials will convey the importance of geographical knowledge and perspectives for addressing globally significant problems and issues, mirroring the content and design of the modules available through the AAG's companion website for the National Research Council's report Understanding the Changing Planet: Strategic Directions for the Geographical Sciences.

The materials will be web based, digital, and modular in format and supported by teacher guides and assessment resources. This has important advantages for educators. Access will be broad and suitable for use on desktop computers, laptops, and mobile devices, and the materials can be used to teach new geospatial concepts and evaluate learning while complementing traditional textbooks and educational resources already in use.

Existing AAG materials that incorporate technologies and activities for collaborative online international learning projects, such as those currently available through the AAG's Center for Global Geography Education, will be made available for ConnectED schools. Many of these modules already incorporate ArcGIS Online software and data and can be readily updated and adapted to suit a broader range of digital learning activities in STEM classrooms.

The curriculum materials and accompanying assessment resources will draw on the latest research on learning progressions stemming from a current AAG project funded by the National Science Foundation. That project, GeoProgressions, is investigating the ways young learners develop increasingly sophisticated understanding and comprehension of fundamental geographic and spatial concepts. The results of the research will be applied to create learning progressions for GIS, maps, geospatial technology, and spatial thinking across K–12 grade bands and STEM curriculum standards.

3. Mentoring Networks and Career Guidance

Another critical element of this support program will be supplementing Esri's own existing mentoring network with the highly diverse and talented AAG membership of more than 10,000 geographic scientists and professional educators. This represents a rich national resource from which schools can receive guidance on how to most effectively build a robust learning program for GIS education. Many AAG members specialize in GIS education, including online geospatial education, and are actively involved in schools through programs such as Advanced Placement Human Geography and the Geographic Alliance Network.

This mentoring program also will provide schools with career guidance and counseling, drawing on a considerable array of educational and outreach resources developed in recent years by the AAG. The AAG will also partner with organizations such as the National Council for Geographic Education to supply schools with specialized expertise on GIS education and pedagogy.

4. Informal Education

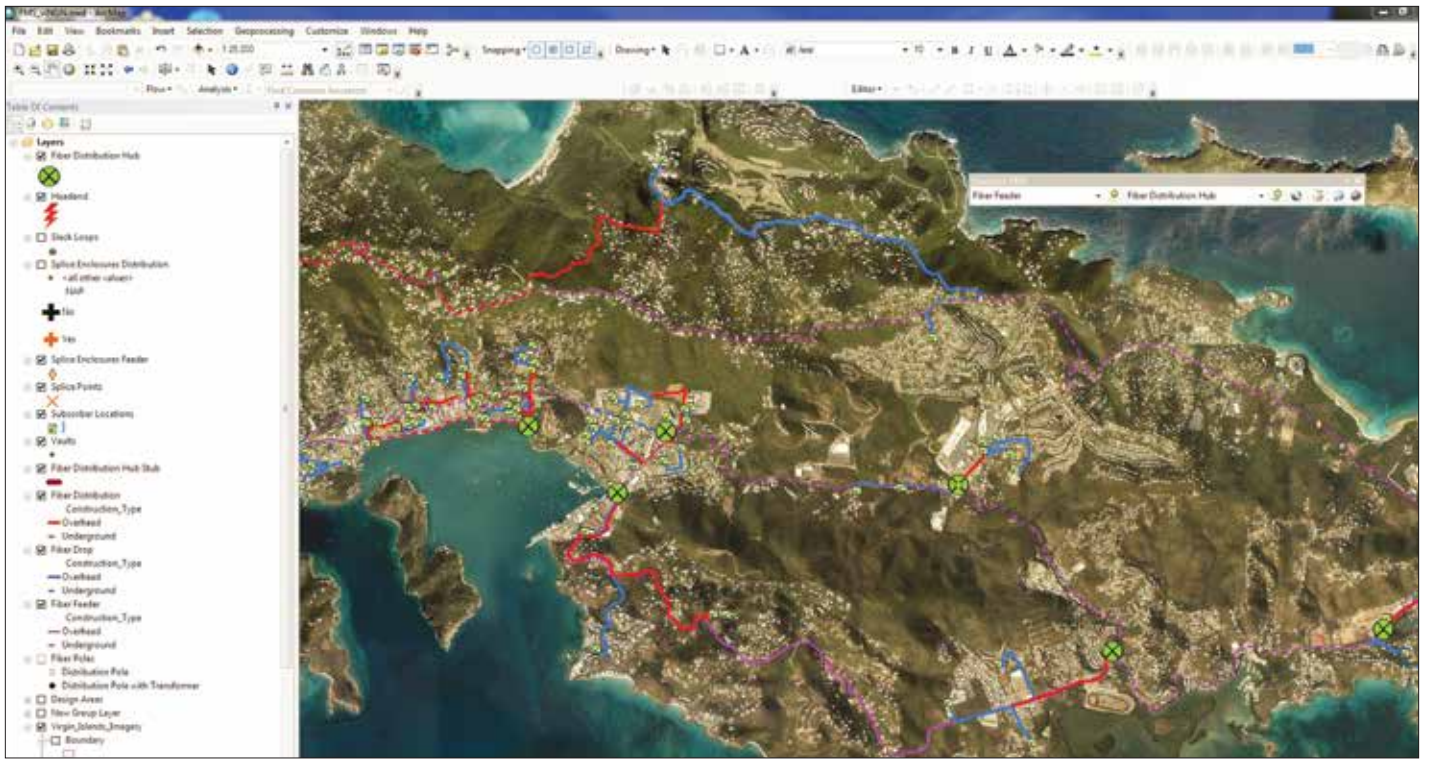
The fourth pillar of a proposed support program focuses on the considerable potential of engaging teachers, students, and parents in geographic learning with geospatial technologies through informal, extracurricular activities. For 15 years, the AAG has led the My Community, Our Earth: Geographic Learning for Sustainable Development (MyCOE) program in partnership with dozens of private and public sponsors, including Esri.

Through the MyCOE model, the AAG can further support Esri's initiative for GIS in schools in the following ways:

- Lead a teacher-training program using the road-tested and proven MyCOE workshop model.
- Build international school partnerships and networks that connect US students with their peers in different countries for collaborative projects in sustainable development.
- Provide schools with ready-made geospatial activities and kits for after-school learning projects supporting geographic investigations into local community issues.
- Utilize the in-place, ready-to-go MyCOE Infrastructure to provide immediate online programmatic and project-oriented support for K–12 students and teachers as they adopt ArcGIS Online for project work in their own communities.

The MyCOE existing infrastructure can rapidly be scaled up to address the needs of the recipients of Esri's extraordinary gift to the schools all across the US.

In conclusion, we at the AAG stand ready to assist as needed to ensure the success and maximize the value of this extraordinary donation to the approximately 115,000 K–12 schools throughout the US. We are honored to support this remarkable gift by Esri and invite those throughout the geography, GIS, and education communities to join together to seize this unique opportunity to strengthen geography and GIS education in the K–12 classrooms of our nation.



← Designing the Virgin Islands Next Generation Network (viNGN) fiber network using ArcGIS for Desktop.

GIS Enables Fiber Management and Everything Else

Although separated by almost 1,500 miles, the City of Wilson, North Carolina, and St. Thomas in the US Virgin Islands use the GIS-based solutions to bring high bandwidth service to homes or businesses.

The Bigger Network Management Picture

City of Wilson is proud to call itself North Carolina's First Gigabit City. It offers ultrahigh-speed Internet, voice, and video at affordable rates to its residents. Greenlight Community Broadband (Greenlight), North Carolina's community-owned Fiber to the Home (FTTH) network, makes this possible.

According to Will Aycock, general manager at Greenlight, "Our whole operation is about two things—customer service and efficiency." Aycock noticed that the number of service trucks dispatched was at an all-time high. Greenlight needed a way to monitor all daily work orders.

Aycock, a former GIS coordinator who was familiar with Esri technology, knew that he needed a way to make it easier to group field service calls geographically so field technicians could work more efficiently. For mapping and data integration, Greenlight chose Overture GIS, which uses ArcGIS for Server, ArcGIS for Desktop, and ArcGIS Online.

Overture GIS provides comprehensive network and the real-time status of all service calls. All service calls and vehicle tracking data are displayed on a map, and service calls can be grouped by region to optimize routing and reduce travel time. Subscribers and their services are also displayed on a map so sales trends can be tracked at the neighborhood, city, and region levels. This information helps decision makers and benefits sales and marketing teams.

The web application and business intelligence solution transformed Greenlight's telecom data warehouse into a full-blown command center and monitoring system. At the core is Esri GIS technology, which Greenlight relies on to tap into any existing data, streamline processes, build custom reports, display critical data via a dashboard for the leadership teams, manage its work force, and increase efficiency across all departments.

Connecting an Island to the World

The Virgin Islands Next Generation Network (viNGN), headquartered in St. Thomas, was established in 2010 to provide all Virgin Islands residents with fast, reliable Internet service. This network's goal is to connect the Virgin Islands to the rest of the world.

viNGN manages a territory-wide high-speed middle mile fiber-optic network *[portion of the network between the greater Internet and the last mile or direct connection to the customer]* that delivers broadband service. It was looking for a fiber management system (FMS) that could be used to not only engineer, map, and maintain a fiber network but also handle inventory and work order management subsystems. It would be a single platform solution that could prevent costly data conversions in the future.

The Esri-based technology fulfilled viNGN's operational objective of integrating base fiber design drawings previously created in ArcMap into the system and enabling fiber assignment review. Overture FMS, integrated with viNGN's OSS/BSS database from ETI Software, supported viNGN's optical-based Carrier Ethernet network. viNGN can now import new customer records and export fiber assignment queries to the OSS/BSS solution, eliminating dual entry and costly data conversions.

At the heart of this technology lies Esri's ArcGIS for Desktop. The tool utilizes existing ArcGIS technology and incorporates an easy-to-use interface so engineers and managers can create new design areas and edit existing infrastructure. Because viNGN uses an industry-standard geodatabase model, engineers and managers can manage, track, and view outside plant data.

Working with viNGN and an Esri toolset, the project team digitized the existing fiber network CAD data for the three US Virgin Islands using Overture FMS. By incorporating data contained in the splice matrixes and the naming schema recommended for the geodatabase, the viNGN network can now be viewed and managed in an organized and logical manner.

Since viNGN already had Esri licenses for ArcGIS for Server and ArcGIS for Desktop, the team's next task was to travel on-site and train the viNGN personnel. Three days of training and system configuration ensured success moving forward. As viNGN expands to provide more services to the islands, it will continue to improve efficiency, make better management decisions, and optimize performance and revenue.

Managing Networks Geographically

Bringing fiber networks to the home or premises is becoming a reality across the globe. Communities, cities, and countries are investing in their economic and social future by bringing fiber networks closer to the end user. Managing these networks in a logical and geographic manner brings business intelligence to them.

For more information, contact David Holdstock, CEO, Geographic Technologies Group (davidh@geotg.com) or Brad Hine, product manager, ETI Software Solutions (bhine@etisoftware.com).

↑ When the network needs to be expanded, users can design new fiber network infrastructure for the City of Wilson, North Carolina.

↑ The Eastlake neighborhood in Oakland, California, was selected for its mix of building types and ethnically and economically diverse population. The neighborhood had one building with an existing intensive green roof and five buildings with rooftop solar water heaters.

↑ Prototypes were assigned to buildings based on three criteria: roof-loading capacity, roof material, and building code access requirements.

↓ Flat-roofed building types varied in design and use and included retail shops, apartment buildings, and big-box retail locations.

Harnessing the Potential of Urban Rooftops

By David Early and Sarah Sutton, PlaceWorks

Bay Localize, located in Oakland, California, sees urban rooftops as a potential source of food, water, and energy that will make cities more resilient and sustainable. That is the goal of its Rooftops Resources Project.

An Oakland-based nonprofit organization, Bay Localize actively engages Bay Area communities, fostering partnerships and working with numerous cities and agencies in building equitable, resilient communities by confronting the challenges of climate instability, rising energy costs, and recession by equipping local leaders with flexible tools, models, and policies.

Bay Localize contacted the Berkeley, California, office of PlaceWorks (formerly Design, Community & Environment) for help in developing a methodology for assessing the capacity of urban rooftops for growing food, capturing rainwater, and generating clean, renewable energy. PlaceWorks is a private planning and design consultancy with offices throughout California, working with public, private, and nonprofit clients. PlaceWorks has a robust GIS practice and is an Esri Silver Tier partner.

PlaceWorks used ArcGIS for Desktop to develop an interactive research, analysis, and planning tool that assesses rooftop resource opportunities. The PlaceWorks model assesses urban rooftops as locations for green roofs that can host hydroponic gardens and photovoltaic panels and enable rainwater harvesting. This model estimates the area that can be dedicated to each use, as well as the water, energy, and food that could be produced. The methodology also identifies the potential for multiple uses on a single rooftop.

The ArcGIS-based methodology developed by PlaceWorks includes several modules. The first step was a visual analysis of all buildings in the project area using aerial photographic data for automatic detection of buildings and rooftops with ArcMap, the Esri World Imagery basemap, and Google Maps Street View. Each building's roof shape was identified (e.g., flat, gabled, sloped). The aspect of all sloped roofs was noted, and the Solar Radiation tool in the ArcGIS Spatial Analyst extension was used to assess the available solar gain.

Next, a library of data layers was created showing building use, construction type, roof access, roofing material, structural integrity, and the available yard space for accommodating water cisterns. These attributes were assessed in the field by trained volunteers or staff and entered using handheld devices.

PlaceWorks runs a specialized GIS model built with ModelBuilder in ArcMap that leverages a set of algorithms to correlate the solar gain characteristics against the building and site characteristics of each building to classify its rooftop's potential. Once classified, the structural loading capacity of each building is factored in to identify new uses that would be appropriate for that rooftop.

Once these rooftops are identified, a second model quantifies the water, energy, and food outputs that could be expected. The ArcGIS Spatial Analyst extension is used to directly calculate gallons of water, kilowatt hours of electricity, and pounds of vegetables that could be produced on each rooftop.

There are four key factors—roof type, roof access, weight, space for cisterns—that limit rooftop potential and are reflected in the model's methodology.

Roof type—Pitched roofs generally preclude food production though they still allow for rainwater harvesting and electrical generation (provided they have an appropriate aspect).

Roof access—Developing intensive green roofs and/or hydroponics to grow and harvest produce requires stair or elevator access.

Weight—Most rooftops cannot support the loading of a green roof to grow produce or even herbs. Hydroponics, however, has a lower weight coefficient and can be accommodated on many more roofs.

Space for cisterns—Rainwater harvesting can only occur where adequate yard space is available to accommodate a cistern. The model assumes rainwater harvesting is possible only if a location can accommodate a 1,000-gallon cistern.

Working with Bay Localize, PlaceWorks tested this methodology in the Eastlake neighborhood in Oakland. This neighborhood contains a diverse mix of building types and an ethnically and economically diverse population of about 7,000 people. The neighborhood, approximately one square mile, has a total of 748 buildings.

PlaceWorks identified 10 buildings with the potential to accommodate green roof vegetable gardens, 18 rooftops that could accommodate hydroponic gardens, 668 rooftops that could accommodate photovoltaic installations, and 623 buildings with roofs that could be used to harvest rainwater. Utilizing these rooftops could produce

- 1.9 million gallons of irrigation water/year from rainwater harvesting that could supply the outdoor irrigation needs of about 212 households.
- 11.6 million kilowatt-hours (kWh) per year of solar produced electricity with 8.5 megawatts of capacity *[measure of the system operating at full capacity],* which could supply approximately 25 percent of the energy demand of the area.
- 124 metric tons of leafy green and deep yellow vegetables annually from rooftop gardens. This produce could supply the US Department of Agriculture's recommended intake of these vegetables for about 8,500 people, which is more than the number of people who live in this neighborhood.

For this analysis of rooftop resources, ArcGIS is a robust tool for data management, mapping, and analysis. Without ArcGIS, it would be virtually impossible to calculate the complex interrelationships among the many variables, and as a result, some of the complexities of the project would have been lost.

The PlaceWorks study received several awards from planning and design organizations including the American Society of Landscape Architects (ASLA) Northern California Chapter; the American Planning Association (APA) California Chapter APA Award for Outstanding Grassroots Achievement; and the Association of Environmental Planners in recognition of the unique process, thorough research, and duplicatable model. Bay Localize followed this study with a second report entitled *Use Your Roof,* building from the information developed in the Rooftops Study, and launched the Green Your City initiative to demonstrate how cities can meet basic needs of food, water, and energy, locally and sustainably.

About the Authors

David Early, AICP, founding principal at PlaceWorks, has more than 25 years of experience in planning and design. He holds master's degrees in architecture and city planning and has extensive knowledge of GIS planning concepts. He has overseen the application of GIS in a number of major projects.

Sarah Sutton, ASLA, LEED AP, is a principal of landscape architecture and sustainable design at PlaceWorks. She was the principal in charge of the study, Tapping the Potential of Urban Rooftops, for Bay Localize and is currently overseeing several urban greening studies and design projects throughout California.

Crows Don't Walk

Mapping realistic walksheds in Denver

By analyzing network-data-based routes where people can actually walk, Denver's Community Planning and Development (CPD) Department GIS staff provided planners with better information to design communities that promote the use of public transportation.

As the population of the Denver Metropolitan Area continues to grow, improving transportation infrastructure and mobility options becomes key to the region's success. Commitment to transit has been demonstrated through the Regional Transportation District's FasTracks program, which has more than a hundred miles of new commuter rail and light-rail planned, under construction, and completed.

As this expanded system is being constructed and stations are established, Transit Oriented Development (TOD) has become a high priority for the City and County of Denver. Denver's CPD has taken a lead by maintaining a TOD Strategic Plan and adopting numerous small area plans specific to individual stations.

TOD is a mixed-use residential and commercial development designed to maximize access to public transportation. With this approach, the development of the area around a transit station is focused on that station. Ideally, the area contains high-density development and a mix of land uses. People can live, work, and move around the area without being dependent on automobiles. A TOD area should provide a high-quality pedestrian experience with intuitive connections. The station area should be walkable and sustainable. In creating the station walkshed, it is assumed that the distance people will walk to get to a transit station is about a half mile for light-rail and commuter rail and a quarter mile for buses.

In the past, CPD has mapped TOD walksheds "as the crow flies." An area mapped using this approach may contain places that are not necessarily accessible to pedestrians. For the 2014 Strategic Plan Update, planners wanted to produce more accurate representations of the transit station area walksheds. To accomplish this, CPD GIS staff used the ArcGIS Network Analyst extension to map a half-mile distance against a walk network that incorporated off-street trails and pedestrian bridges and took into account barriers such as highways, rivers, and railroads.

Mapping walksheds began with preparation of the walk network that the analysis would be run against. The street network was modified to exclude highways and highway ramps where people do not walk. Pedestrian bridges and off-street trails were added as well as planned connections and network intersections. The dataset was then populated with attributes for distance, walk speeds, and time traveled to allow the software to map all possible half-mile routes traveling away from each station in any direction. Once all possible walk routes were identified, the software created a polygon connecting the half-mile routes and generating the walkshed or accessible walkable area.

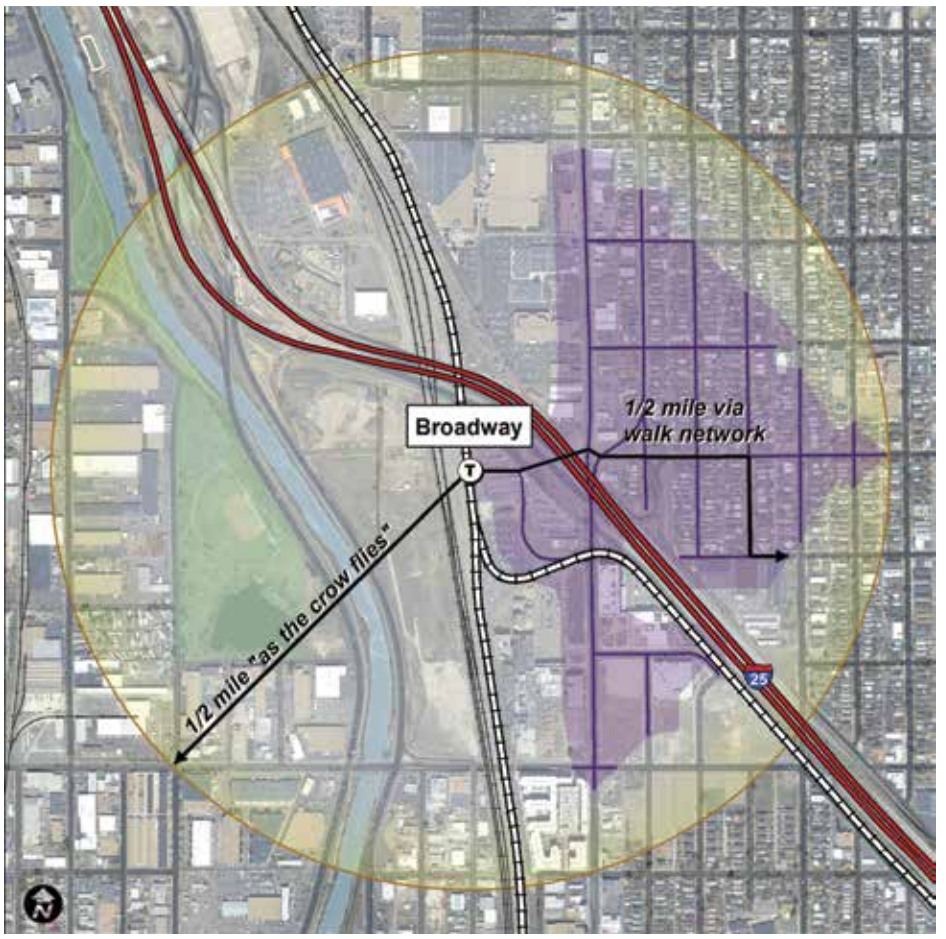
One of the main challenges facing CPD is that much of the transit system was planned or developed fairly recently, long after the city was established. Available land is limited by existing development and property ownership. New tracks are being built along interstate highway rights-of-way and freight railroads, which results in many barriers that compromise pedestrian station access.

Mapping the half-mile walksheds gives planners a way to better assess connectivity and evaluate where potential infrastructure improvements would be most beneficial. It is no surprise that the most complete walksheds are located in traditional urban street grids that have few disruptions or those areas with strategically located pedestrian connections. Grids and areas with well-planned connections maximize the service area and generate the highest potential ridership.

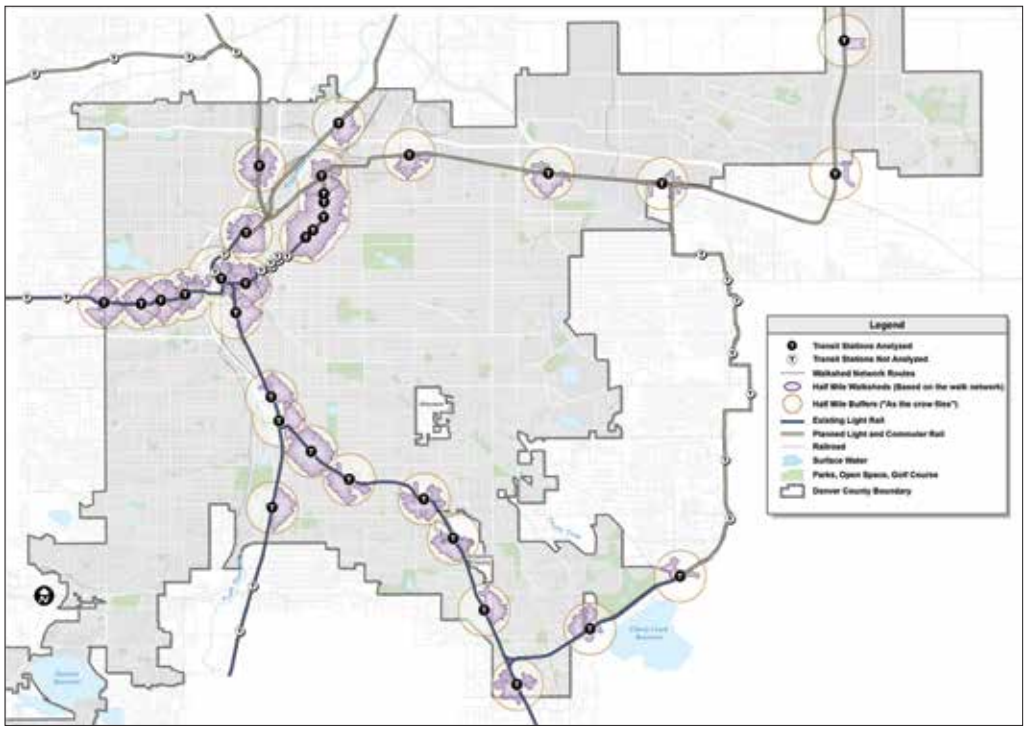
Comparing walksheds to the as the crow flies buffers reveals a loss from previously assumed potential ridership and service areas. For example, an analysis of Louisiana-Pearl Station area, one of the most complete networks, identified 160 acres and 633 living units that are not actually accessible within the walkshed but are shown within the original half-mile buffer. Across the board, a half-mile buffer yields a 502-acre station area, while the average walkshed size for stations analyzed is only 198 acres.

Since Denver city planners have more accurately mapped the TOD station areas, they have been able to refine station area research and analysis. Once mapped, the walksheds were utilized to collect TOD-related data to evaluate market readiness and group stations according to varying levels of development potential. Now, a more realistic and efficient approach can be applied to stations with the greatest opportunity for near-term development and TOD implementation. All these efforts not only promote the successful development of each transit station but also ultimately help manage increased population growth, maximize mobility, and create vibrant and desirable transit communities.

To learn more about the TOD Strategic Plan, visit www.DenverGov.org/TOD. For more information, contact Andrea Santoro, GIS analyst, at andrea.santoro@denvergov.org or Steven Chester, city planner, at steven.chester@denvergov.org.



↑ When highways and other barriers that impede pedestrians are taken into account, the actual walkshed for the Broadway station is much smaller than the area produced by "as the crow flies" calculations.



↑ Realistically mapping half-mile walksheds, taking into account pedestrian barriers, lets planners better assess connectivity and the value of potential infrastructure improvements.

Ready-to-Use Apps

Explorer for ArcGIS is now available on Mac, and the new iOS version of Explorer for ArcGIS supports time-aware maps. It has been localized in multiple languages. Collector for ArcGIS lets you search for features in a map and switch between offline basemaps. The browser version of Operations Dashboard for ArcGIS now supports feature actions on multiple features and map services as data sources. In addition to improvements to the user experience, Activity Dashboard for ArcGIS now has several new reports that provide details about usage and credit utilization. Find these reports on the Items and Users tabs.

ArcGIS Open Data

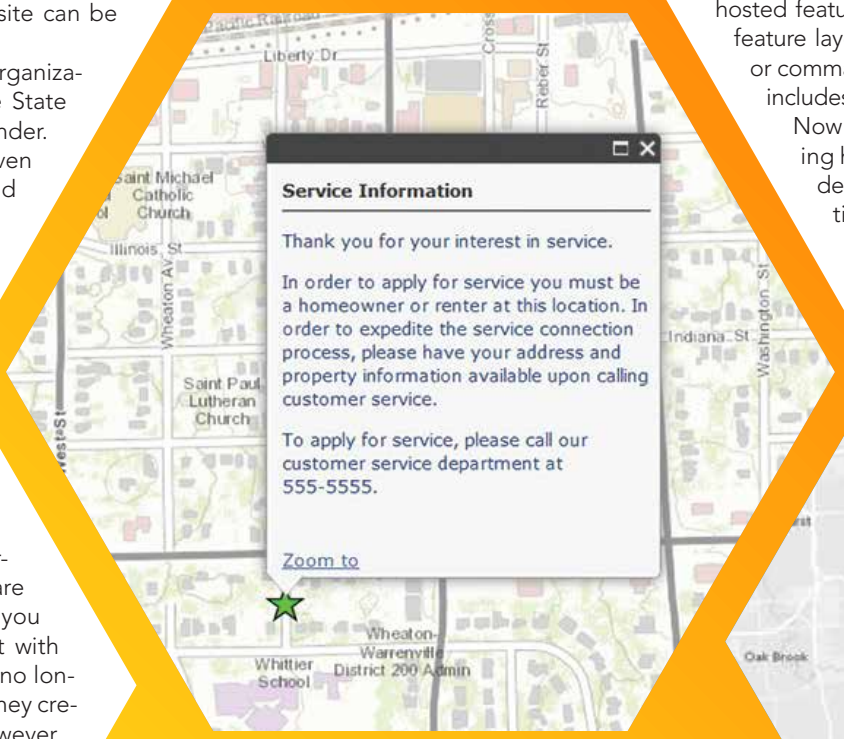
ArcGIS Open Data functionality, previously in beta, was officially released and localized in 24 languages. With the Open Data feature in ArcGIS Online, you can use the ArcGIS platform to provide the public with open access to your authoritative data. It leverages services you've already published and provides a home page layout you can quickly customize, so setting up your Open Data site can be done in as little as 10 minutes.

During beta, more than 750 user organizations enabled Open Data including the State of Wyoming's GeoHub (geohubpathfinder.uwyo.opendata.arcgis.com/), Data Driven Detroit (d3.d3.opendata.arcgis.com), and the State of Maryland's iMap GIS Data Catalog (imap.maryland.opendata.arcgis.com).

Hosted Features and Tiles

Attachments added to hosted feature layers after July 2, 2014, are now stored as files instead of features, which reduces storage costs for your organization. You can now publish the contents of a file geodatabase as a hosted feature layer. Exporting hosted features was enhanced. Now individual layers from a hosted feature layer can be exported as a file geodatabase, a shapefile, or comma-separated value (CSV) files. File geodatabase export includes all the tables and attachments in the layer.

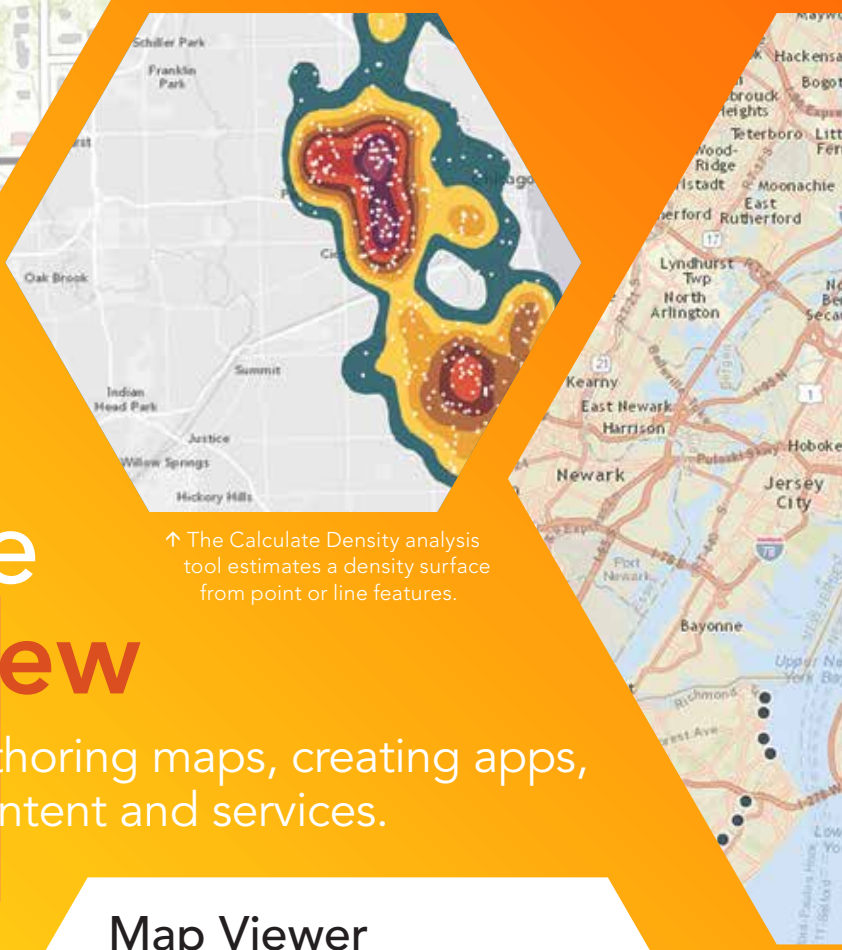
Now when you publish a hosted tile layer from an existing hosted feature layer, you can use a tiling scheme defined in any existing ArcGIS for Server based tile layer instead of the default Web Mercator that is used by ArcGIS Online basemaps.



↑ With the GeoForm configurable app template, you can edit feature data in a form instead of a pop-up window.

Other Changes

Existing and new Esri accounts (formerly known as Esri Global accounts) are automatically ArcGIS public accounts so you no longer need to register the account with ArcGIS Online. ArcGIS Online members no longer need to agree to terms of use when they create an account or join ArcGIS Online. However, the person activating the subscription or trial and public account users will still need to agree to the terms. The Invite Users button has been renamed Invite Members and the wording for inviting members rewritten.



↑ The Calculate Density analysis tool estimates a density surface from point or line features.

ArcGIS Online What's New

The July 2014 update added improvements for authoring maps, creating apps, and administering ArcGIS Online as well as new content and services.

App Templates

With the new Map Journal configurable Story Map app template, you can present a map-based narrative organized into a set of journal entries. This creates compelling multimedia stories that combine text, graphics, and maps, and is especially good for maps that have lots of text and details.

Use this new configurable Local Perspective app template for highlighting features from a map based on user-selected locations or addresses. You can include demographics and lifestyle data and weather information and enable driving directions.

The new GeoForm configurable app template lets you edit feature data in a form rather than a pop-up window. This template is available in the Early Adopter Templates group in ArcGIS Online.

The Information Lookup and Impact Summary app templates have been moved from the Early Adopter Templates group to the Esri-featured configurable app gallery.

The Basic Viewer app template has been renamed. Now called the Classic Viewer, it is still available in the gallery and the Esri default map viewer template gallery.

Existing templates are being modernized with updated styles and more adaptable designs for mobile devices. In the July release, Classic Viewer, Simple Map Viewer, and Filter were redesigned and now support feature search.

Map Viewer

You can now create a presentation based on your map contents. A presentation is a collection of slides that can show specific locations, layers, pop-up windows, basemaps, and titles. Each presentation slide is a dynamic map that you can pan, zoom, and interact with. And it's also a great way to share your maps with others.

Create labels for features in a layer by selecting one or more attributes to display for each layer (e.g., name or type of feature). Labels are automatically placed on or near the features they describe. You can control text size, color, style, and alignment.

The new option for walking directions takes into account attributes that affect routing for pedestrians.

Configure feature searches on the feature service layers in your map using the map viewer's search. For example, you can enable search on a parcel layer so others can find specific parcels using the assessor's parcel number (APN). When someone enters the APN into the search box, the map zooms to the matching parcel and displays a pop-up window.

You can also configure pop-up windows to show related data in your map layers. Related data is displayed within the pop-up window in a chart or in a table at the bottom of the map. When you create data relationships in ArcGIS for Desktop, you can publish the data to ArcGIS Online or ArcGIS for Server (version 10.1 or later).

ArcGIS Administration and Security

The page where you can configure roles has been redesigned to improve the usability and make it easier for administrators to manage custom roles. Administrators now see the number of members assigned to each role and have more direct access to view information, edit, and delete custom roles. Custom roles now include privileges for using demographics, geocoding, GeoEnrichment, network analysis, spatial analysis, and ArcGIS Marketplace.

Esri's new web site trust.arcgis.com is your one-stop resource for all security, privacy, and compliance information. It is now easy for you to get current information. The site provides transparency that inspires customer confidence. It includes centralized information for security updates, best practices, system availability, and status history.

ArcGIS Online is now security accredited and authorized for government use under the Federal Information Security Management Act (FISMA). FISMA Low accreditation ensures ArcGIS Online has been rigorously reviewed by a third-party assessor for alignment with stringent security requirements as provided by the National Institute of Standards and Technology (NIST), providing assurance for even commercial and international organizations.

As part of the ArcGIS Online privacy compliance with TRUSTe Certified Privacy Seal and US-EU/Swiss Safe Harbor, password requirements have been strengthened. Passwords must be at least eight characters long and contain at least one letter and one number. Passwords continue to be case sensitive. ArcGIS Online now supports identity provider (IDP) initiated enterprise logins in addition to service provider (SAP) initiated enterprise logins. You can now sign in with your enterprise login to apps purchased from ArcGIS Marketplace.

Analysis Tools

Tools for performing spatial analysis, which adds valuable insights into your data, are available through the map viewer and—for developers—through the API.

With the Calculate Density tool, estimate a density surface from point or line features. This tool returns areas classified by calculated density values such as crime incidents or risk of forest fires.

The new Interpolate Points tool lets you predict values at new locations based on measurements from a collection of points. For example, it can be used to predict pollution levels at locations that don't have pollution measurement sensors.

With the new Plan Routes tool, determine the most efficient way to route a fleet of vehicles that make multiple stops.

A new data browser helps you search and select the data categories and variables using the Enrich Layers tool. Search for a variable by typing a keyword in the search box. The tool automatically sets the region based on your input data and keeps track of the number of variables selected.

Twenty new countries have been added to the Enrich Layers tool.

Results for the Summarize Data tool now include charts. If you choose a field to group statistics, the results layer includes pop-up windows that show charts displaying related data as one-to-many relationships of the fields.

The Create Drive-Time Areas tool now offers three travel modes: walking, driving a car, and driving a truck that will show the areas that can be reached within a given time or distance using any of these transportation modes.

← Create dynamic presentations that let you easily share maps.

ArcGIS Content Updates

Living Atlas of the World is a rich catalog of thousands of maps, intelligent map layers, imagery, tools, live feeds layers, elevation services, and apps. Esri, its partners, and ArcGIS users around the world are contributing to this collection. Explore the Living Atlas in ArcGIS Online by going to the Ready-to-Use Maps page on arcgis.com. You can also access the Living Atlas through the latest version of Explorer for ArcGIS or by going to the Living Atlas web application at goto.arcgisonline.com/maps/gallery.

National Geographic recently published an initial set of historical and reference maps from its extensive map archive that includes a mix of global and regional maps that span more than a century. The maps are high-resolution, georeferenced image tiles of maps originally published by National Geographic in its magazine or retail wall maps.

More than 175,000 historical topographic maps from the US Geological Survey (USGS) are also now available on ArcGIS Online. For over 130 years, the USGS has prepared these detailed maps to accurately show the complex geography of the nation. You can browse the National Geographic and USGS maps in the Living Atlas of the World.

The World Imagery map was updated with: SPOT, Pléiades, and DigitalGlobe imagery. SPOT imagery was added across Canada, the Nordic countries, Eastern Europe, the Middle East, and a few locations in Eastern Asia. The 2.5-meter resolution imagery is provided at the larger scales ~1:36 kilometer (k) to ~1:9 k. SPOT imagery will be published at larger scales for many other parts of the world in coming months.

Pléiades imagery was released for over 26 cities in the initial release. This submeter high-resolution imagery offers a more recent collection—within the last 18 months. Additional imagery covering approximately 350 urban areas globally will be released in the coming months. Both Pléiades and SPOT are products of CNES/Airbus Defence and Space.

Content from DigitalGlobe includes imagery updates for Abuja, Nigeria; Beirut, Lebanon; Brno, Czech Republic; Göteborg, Sweden; Port-au-Prince, Haiti; Recife, Brazil; Seoul, South Korea; Tunis, Tunisia; and a number of other locations around the world.

TerraColor 15 meter (m) imagery is now displayed globally, from ~1:591 m to ~1:577 k. Between ~1:288 k and ~1:72 k, the primary source is SPOTMaps 2.5-meter imagery where available, with other imagery at these scales from TerraColor.

Other updates to the World Imagery basemap include new community contributions from Bay County, Florida; Bismarck, North Dakota; Lawrence, Kansas; Erlangen and Hamburg, Germany; Quesnel, British Columbia, and a number of other Canadian cities. Updated content was provided for the State of Vermont; Langley, British Columbia, Canada; and many other communities.

Esri also recently published a new image layer featuring 1 m resolution, multispectral imagery for the continental United States, made available by the US Department of Agriculture Farm Service Agency. The National Agriculture Imagery Program (NAIP) acquires aerial imagery during the agricultural growing season in the continental United States.

The latest update to the World Street Map expands both content and coverage for North America. Commercial data was updated for North America. In the United States, for the first time, data from more than 100 communities received through the Community Maps Program was added. The Community Maps Program has expanded to include contributions to other basemaps in addition to the World Topographic Map.

New community contributions to the World Topographic Map for the US include King County, Washington; Crook County, Oregon; Los Angeles and Anaheim, California; Sparks, Nevada; Mesa and Queen Creek, Arizona; Mile High City, City of Aspen, and Pitkin County, Colorado; Teton County, Idaho and Wyoming; Oswego, Illinois; Plano and Montgomery County, Texas; Shelby County, Tennessee; Tampa, Florida; the City of Goldsboro, North Carolina; Milford, Connecticut; and others. Contributions from the international community include content for Denmark; the Island of Bermuda; Berlin, Germany; Vienna, Austria; Alberta, British Columbia, and Sudbury, Ontario, Canada; and others.

The Ocean Basemap now consists of two layers: a base layer with the hydrographic and terrestrial cartography and a separate reference layer that contains the reference information and labels, such as soundings, subsurface feature names, and administrative boundaries. As part of the Community Maps Program, OceanWise provided 6 arc-second, or approximately 180 m resolution data, for all of the British Isles.

The new Artic Ocean Basemap was released as a beta version in early July and is publicly available. It uses the Alaska Polar Stereographic projection (WKID 5936) and is cached from 1:451,295,122 down to 1:881,435. A beta version of Arctic Imagery in the same projection was also released.

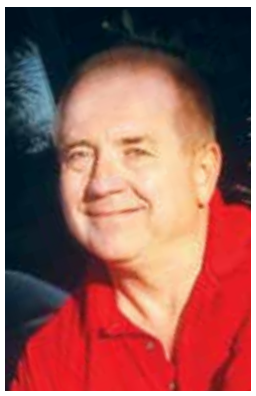
For a list of all contributions, visit esri.com/contributors.

New to ArcGIS Online? Try It Today.

If your organization doesn't have an ArcGIS Online subscription yet, sign up for a free 30-day trial. You can invite up to five named users to participate in the trial, and you get 200 service credits. You also get a number of productivity apps as part of your trial, including Collector for ArcGIS, Operations Dashboard for ArcGIS, and Esri Maps for Office. Once your trial is over, purchase a subscription and continue to use all the features and services in the same ArcGIS Online subscription account. To sign up for the trial, go to **esri.com/agoleval**.

A Cartographer's Life in Relief

GIS Hero



↑ Jeffery S. Nighbert has been instrumental in modernizing BLM's GIS system and has generously shared his cartographic expertise with others at conferences and workshops.

"Immersed in GIS all day, every day."

That is how Jeffery S. Nighbert, senior technical specialist for GIS at the Bureau of Land Management (BLM) describes his job. He handles the tough GIS assignments at BLM.

To GIS practitioners, however, he is best known as a cartographer who produces stunningly beautiful relief maps that bring the landscape to life with rich, saturated colors.

Although his gorgeous maps depicting areas in the Pacific Northwest have long associated him with that region, his roots are in New Mexico. He was born and raised in Albuquerque and also spent a few years in Santa Fe. The Southwest is also where he attended college and received both his bachelor's and master's degrees from the University of New Mexico.

A critical part of Nighbert's education was not formal but familial. His mother taught him to paint with oils, developing the artistic skills and sensibilities that would serve him well in his career. His brothers introduced him to hiking and camping in the wild. This encouraged Nighbert to explore the world around him and appreciate the beauty of nature.

His parent's gift of a Time Life atlas of the world sparked an interest in geography and cartography. He was enthralled by the beautiful shaded relief maps and photographs of distant places in that atlas. He spent hours reading, studying, and admiring it. "I guess that set me on the path to becoming a geographer or at least help me to appreciate beautiful maps," Nighbert said.

His first federal job was as a forest draftsman at the Gila National Forest in Silver City, New Mexico, but Nighbert says his career really began when he transferred to the BLM and began working as a cartographer. His landscape and life again changed when he transferred to the BLM office in Portland, Oregon. He still lives in Portland with his wife, Gail, and daughters, Jennifer and Amanda.

When he began working at the BLM, cartography was not accomplished with bits but with nibs. He spent his days creating maps using manual methods: pen and ink and Leroy lettering. He even made maps using scribe coat and peel coat techniques that painstakingly produced handmade negative images of great delicacy. Despite his mastery of these involved techniques, his favorite map from that period—one of southwestern New Mexico showing the distribution of Apache tribes and Mimbres Indians—was produced with nothing more than pencil and paper.

With the advent of GIS and use of computers for mapmaking, Nighbert transitioned to digital methods. As someone who tests and evaluates new technology before it's released to the mainstream BLM infrastructure, Nighbert has had a major impact on GIS use at BLM. John Sharrard, Esri GIS solutions engineer who has known Nighbert for more than 23 years, attests to his contributions to the advancement of the use of GIS at BLM. "Jeff has been instrumental in modernizing BLM's GIS system over the years. He has been one of those 'early adopters' whenever we introduce some new facet of technology," said Sharrard.

Nighbert's artistry as a cartographer is widely appreciated and his technical expertise respected. "Jeff's cartographic efforts have really stood out from the crowd (particularly his work in terrain modeling)," said Sharrard. "He has consistently produced beautiful, production-quality maps."

Of the numerous awards in cartography he has won, Nighbert feels most proud of a map of the Interior Columbia Basin Project he made in collaboration with Carolyn McCarthy, Steve Salas, and Tuyen Ta. That map won the Best Cartographic Presentation Award at the 1995 ESRI User Conference and appeared on the cover of the 11th volume of the *ESRI Map Book* in 1996.

His work is not only appealing but inspiring to other cartographers. Dr. Aileen R. Buckley, a professional cartographer at Esri who has known Nighbert and his work for many years noted that, "Jeff has a truly imaginative and artistic mind. This is evident in his work, from bump mapping (texturing a raster to give the impression of different types of vegetation) to painted relief (colorizing the terrain to give it a more realistic appearance) to applying the concept of the moon illusion (the large appearance of the moon when it is near the horizon) to the representation of mountains."

Videos about his work have been featured in six Plenary Sessions—more than any other user—making him something of an Esri User Conference rock star. His many entries to the map contest live on. One can find maps of his early works adorning walls in the hallways of the software development buildings at Esri.

In addition to his day job producing wonderful maps for the BLM, he has also done an excellent job of documenting and sharing the cartographic techniques that he has developed with others.

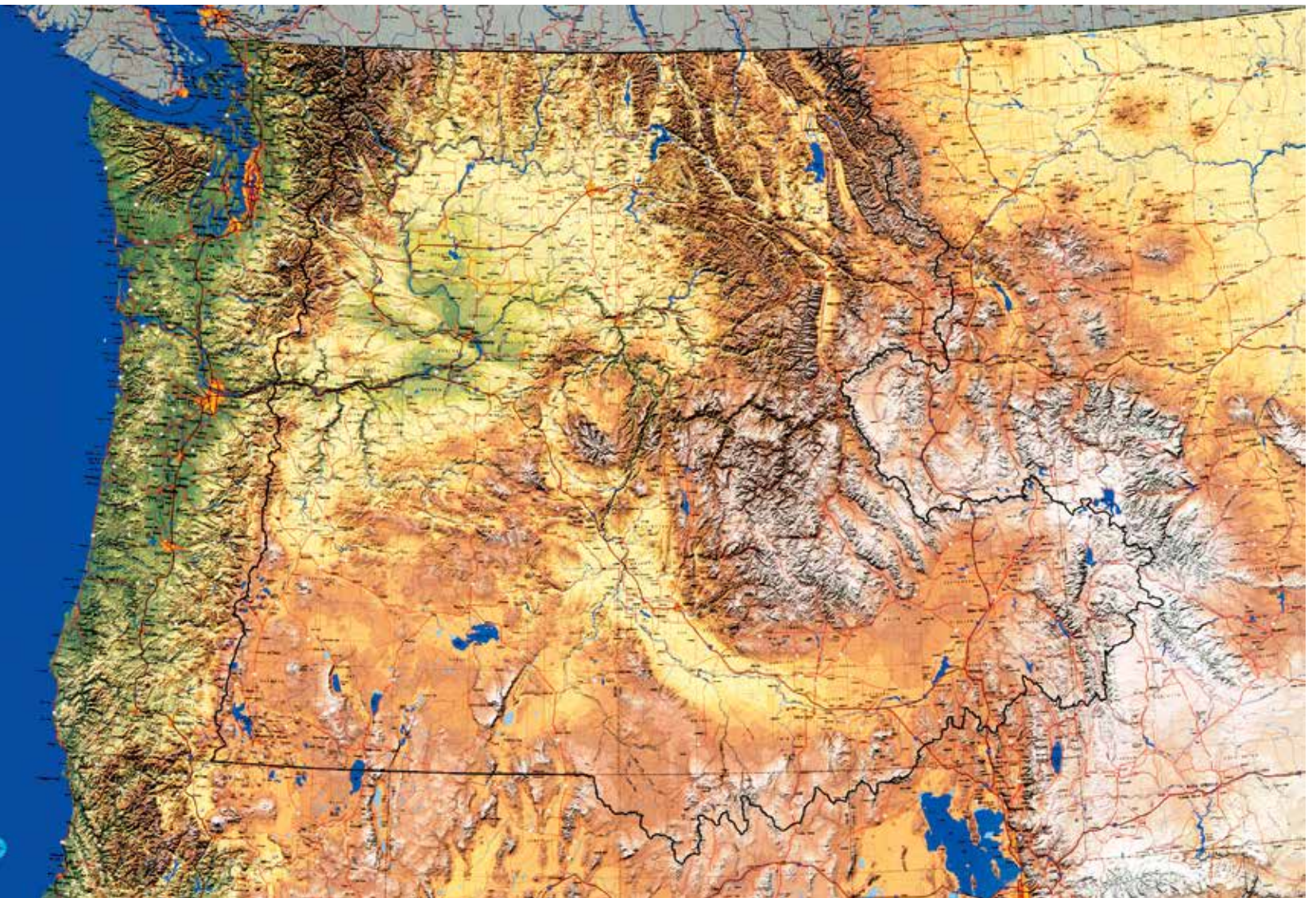
"As a person, I love geography. I love working with the people of geography," said Nighbert. "They are my friends, they are my peers, they are my kin. So I share myself and my work with them gladly. It is something I am proud of."

And share he has. He is beloved by the GIS community for generously contributing his knowledge, insights, and talents through presentations, papers, articles, and blog posts on cartographic technique.

"Jeff is also motivated altruistically to share his work with others," said Buckley. She explained he has been working with Esri to convert his ideas and snippets of code from work he has presented at Esri International User Conferences into a usable set of tools for everyone.

He is excited about current developments in GIS and eagerly embraces the transformation of GIS into a platform technology. In an interview during the 2014 Esri User Conference, he expressed his anticipation of ArcGIS Pro and the innovations that are extending GIS to mobile devices and the web. His energy and enthusiasm are infectious. "Platform is going to be the future," he said. "It will let people in the field build their own information base. That's going to change the world."

Although he continues as an "impact player" in GIS, he has had time to reflect. "When I look back across my career, I have to feel good about the work I have done and the work people of geography have done, for we have built a city where there was none!"



← One of the many beautiful maps Nighbert has worked on. This map the Interior Columbia Basin Project won the Best Cartographic Presentation Award at the 1995 ESRI User Conference and appeared on the cover of the 11th volume of the *ESRI Map Book* in 1996.

↑ During the Tellus Project, the survey plane flew survey lines across the six counties for a total distance of 63,000 kilometers.

Managing and Mapping Irish Border Counties

Tellus Border, an ambitious project that surveyed the rocks, soil, and water in six border counties in the Republic of Ireland between 2011 and 2012, will help environmental management and support sustainable development of natural resources. GIS was used to plan and manage the survey and map as well as make survey data available once the survey was complete.

Data from the six counties—Donegal, Sligo, Leitrim, Cavan, Monaghan, and Louth—combined with data collected during a previous project in Northern Ireland has created the first ever cross-border environmental maps.

The five million euro mapping project was funded jointly by the European Union (EU); the Department of Environment, Community and Local Government in the Republic of Ireland; and the Department of the Environment in Northern Ireland.

A true cross-border initiative, it is being carried out by representatives from the Geological Survey of Ireland, the Geological Survey of Northern Ireland, Queen's University Belfast, and Dundalk Institute of Technology. The project's leaders realized that GIS would play a vital role and used Esri software owned by the Department of Communications, Energy and Natural Resources (DCENR) in the Republic of Ireland. The team used ArcGIS for Desktop and ArcGIS for Server throughout the project.

The project team had to plan data collection for an area of more than 12,000 square kilometers (km^2) and identify 3,500 sites for soil, water, sediment, and vegetation samples. GIS was used to plan the sites of the soil and water survey points so that truly representative samples, evenly spread across all six counties, could be obtained.

The project would require the survey plane to fly lines across the six counties for a total distance of 63,000 km (or the equivalent of one and a half times around the world). Also, landowners had to be notified when the survey plane would fly over their properties so that livestock that might be distressed by the noise could be moved. "GIS was vitally important in helping us to see which landowners to contact and when," said Shane Carey, GIS and data manager for the Tellus Border project.

When the survey was completed, ArcGIS was used to make sense of the huge volumes of data and present information visually on maps, a format that was easily interpreted. "ArcGIS enabled us to stitch together data from Northern Ireland and the Republic of Ireland and create a true cross-border resource," said Mairéad Glennon, the assistant project manager.

This data also needed to be collated and analyzed. The team collected over 50 million geophysical measurements from both airborne survey and land sampling. They also analyzed soil, stream water, and stream sediments for more than 50 geochemical elements, which resulted in 750,000 geochemical analyses. This information had to be interpreted and presented in a meaningful way so it could be used by a wide range of organizations.

A pivotal part of the Tellus Border project was development of an online GIS viewer capable of displaying all of the survey results on interactive maps. The team used the ArcGIS Viewer for Flex app for this viewer. DCENR developer Steve O'Brien also created customized tools such as a 3D viewer using Away3D (an open-source, real-time 3D engine for the Flash platform). Anyone—government agencies, commercial businesses, research groups, environmental organizations, landowners, and the public—can use this web viewer for free to view the geophysical and geochemical maps along with a digital terrain model and basemap. Data is also available as a Web Map Service (WMS) through a REST endpoint and as downloadable Microsoft Excel, KML for Google Earth, and ArcGIS raster files. Maps and data are available at www.tellusborder.eu.

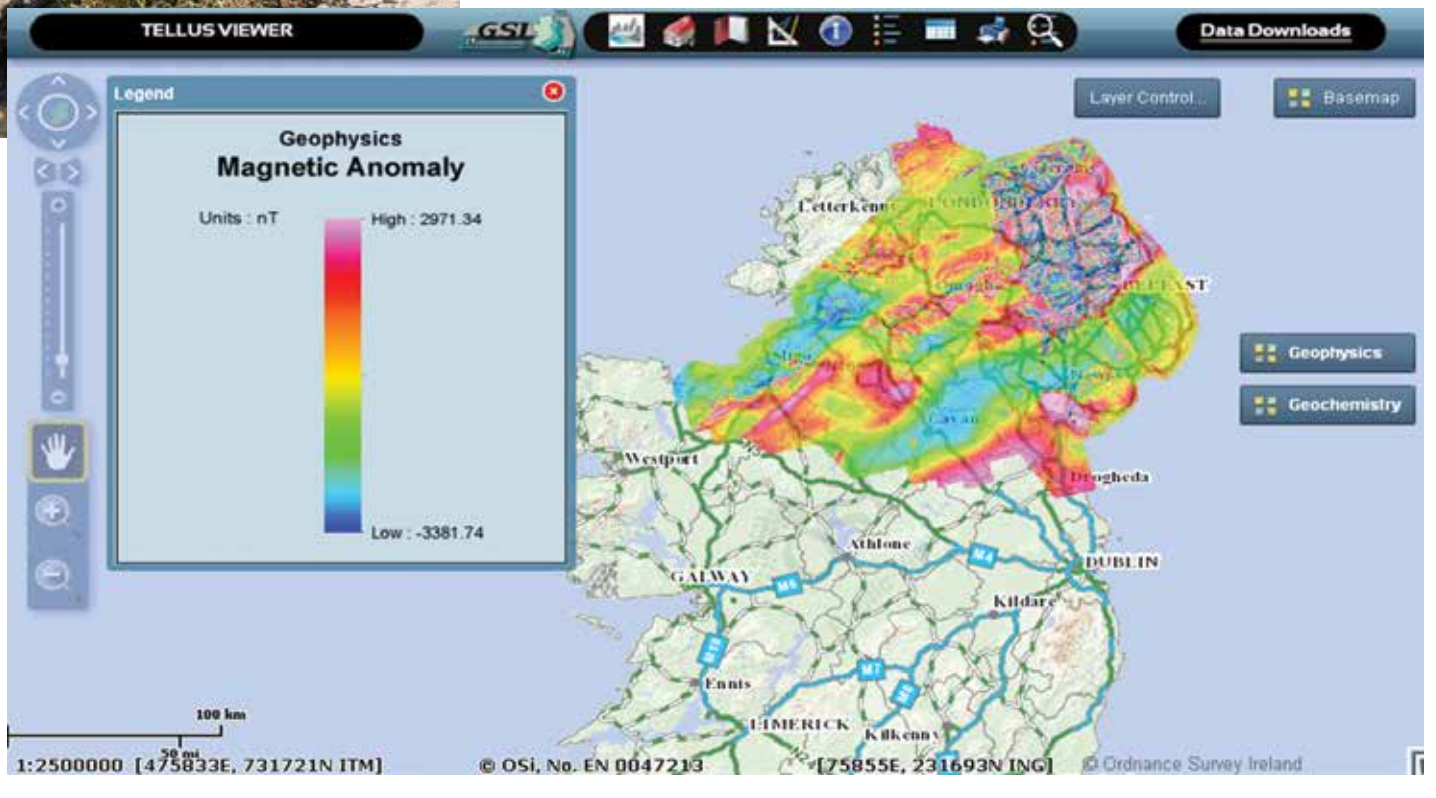
Now, the Tellus Border data is being employed in a myriad of ways to improve the management of the environment and the development of agriculture. For example, farmers can use the survey information to see the chemical status of their land and make decisions about suitable supplements for crops and livestock. By correcting trace element deficiencies and excesses in their soil, they have the potential to increase yields.

Prospecting companies are using the Tellus Border data to help them identify the locations of potentially valuable mineral deposits. There has been a marked increase in the number of exploration licenses granted in the region since the project began and, if successful, these mining activities could provide a welcome boost to local and national economies.

Data from the Tellus Border project is also expected to help improve public health initiatives. Tellus Border is working with the Radiological Protection Institute of Ireland to increase the accuracy of radon risk maps using the new airborne geophysical information. The new maps will assist in the management of high radon risk areas and help protect the public from the naturally occurring gas.

"Being able to present our data online in a map-based format makes it accessible and meaningful for many different groups of people," said Glennon.

↑ Soil, stream water, and stream sediments for more than 50 geochemical elements were collected.



→ Tellus Viewer, the online GIS viewer developed by project staff, displays survey results in interactive maps.

Preserving Biodiversity

Bulgaria creates GIS for managing protected areas

In August 2013, the Bulgarian Ministry of Environment and Water (MEW) began using a unified GIS for the sustainable and transparent management of more the than 37,400 square kilometers of the country that are protected by Natura 2000.

What Is Natura 2000?

Created to ensure the long-term survival of Europe's most valuable and threatened species and habitats, Natura 2000, the centerpiece of the European Union's (EU) nature and biodiversity policy, is based on a broader concept of conservation and sustainable use of natural resources. It is a policy that holds that people and wildlife can coexist in harmony. Therefore, the EU-wide network of protected areas is not limited to nature reserves.

Natura 2000 is also a testimony to the commitment of all EU member states to work for biodiversity conservation. It is based on two key EU agreements related to the environmental preservation and biodiversity—the Birds Directive and the Habitats Directive. These two directives are also incorporated into Bulgarian law through the Biodiversity Act. Bulgaria has some of the largest Natura 2000 areas in Europe. Nearly 34 percent of its territory is part of this network.

The GIS for Natura, the first-of-its-kind GIS, centralizes scattered and inconsistent information about protected areas, assessments of compatibility, related registers, and documents. Besides powerful back-office GIS functionality, which supports preservation, planning, and management of the ecological network, the system also includes a public web application.

The unified GIS makes management of these protected areas more effective, transparent, and verifiable. Vesela Savova, project manager in MEW, noted that, "Moreover, we made a big step towards meeting the requirements of a number of EU directives in this field."

Conserving Biodiversity

The ministry's priorities include the development of management plans for protected areas, control of compliance regimes in those areas, assessments of the compatibility of investment projects, maintenance of public registers, and reporting to the European Commission based on a number of directives.

In carrying out these responsibilities, MEW faces many challenges. Different parts of the ministry collect data in different ways. The resultant data is heterogeneous, sometimes inconsistent, and often redundant. It also varies in precision, coordinate system, and format.

Lack of a single database for Bulgaria's portion of the Natura 2000 ecological network hinders the work of experts and coordination between different administrative units, business, and nongovermental organizations (NGOs). It also hampers implementation of the ministry's commitments to the European Commission, including the INSPIRE Directive.

MEW launched a project called the Development and Deployment of the Unified Information System for the Protected Areas of Natura 2000 Ecological Network to meet these challenges. It was funded under the European Operational Programme Environment. After a tender procedure, Esri Bulgaria Ltd. was selected to develop and implement the system as leading party in the Consortium NATURA-GIS.

From Scattered to Unified

To achieve the project's objectives, Esri Bulgaria's team initially made a business analysis of MEW's processes regarding management of protected areas and assessment of investment project compatibility. It also studied and analyzed all data available from different administrative units and the coordination between those units.

Based on this analysis, Esri Bulgaria designed a GIS for the protected areas. The GIS creates and maintains a single centralized database and powerful functionality, via desktop and the web, that uses Esri software: ArcGIS for Server, ArcGIS for Desktop, ArcGIS for INSPIRE, FME, and various extensions. Terabytes of data were processed, validated, verified, and integrated into the system. A total of 988 layers were incorporated into the geodatabase. A specific geodatabase with harmonized data was built and published via a special geoportal based on Esri Geoportal Server to meet the EU INSPIRE Directive.

The four functional modules—the GIS, the Register of Protected Areas, the Register of Procedures for Compatibility Assessment, and the Web Application—were developed as part of the system to meet MEWS identified needs.

GIS Module

The GIS module provides rich GIS functionality and enables MEW's experts to identify protected habitats, species, and objects on a dynamic web map, as well as edit the associated spatial and attribute data, perform analyses, and review relevant documents. To meet the needs of different system users, the module provides a set of thematic maps that include, among others, a topographic map, an orthophoto map, and a hydrographic map.

Register of Protected Areas Module

The Register of Protected Areas module provides rich capabilities for entering, editing, maintaining, querying, analyzing, and managing data for protected areas. In this module, users can generate, edit, and export standardized Natura 2000 forms pursuant to EU legislation. The module also provides rich capabilities for working with metadata.

Register of Procedures for Compatibility Assessment

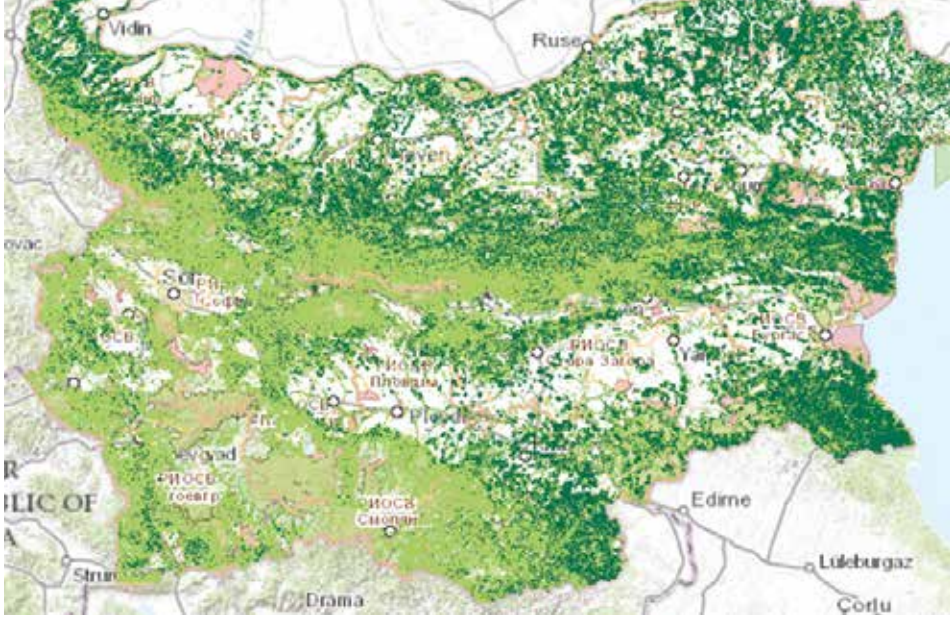
By using the Register of Procedures for Compatibility Assessment, users are able to enter, store, analyze, and manage all the information and documentation related to these procedures. Users can enter the location of compatibility assessments and perform various geospatial and statistical analyses with them and then export the results in the multiple formats supported by the system.

Web Application

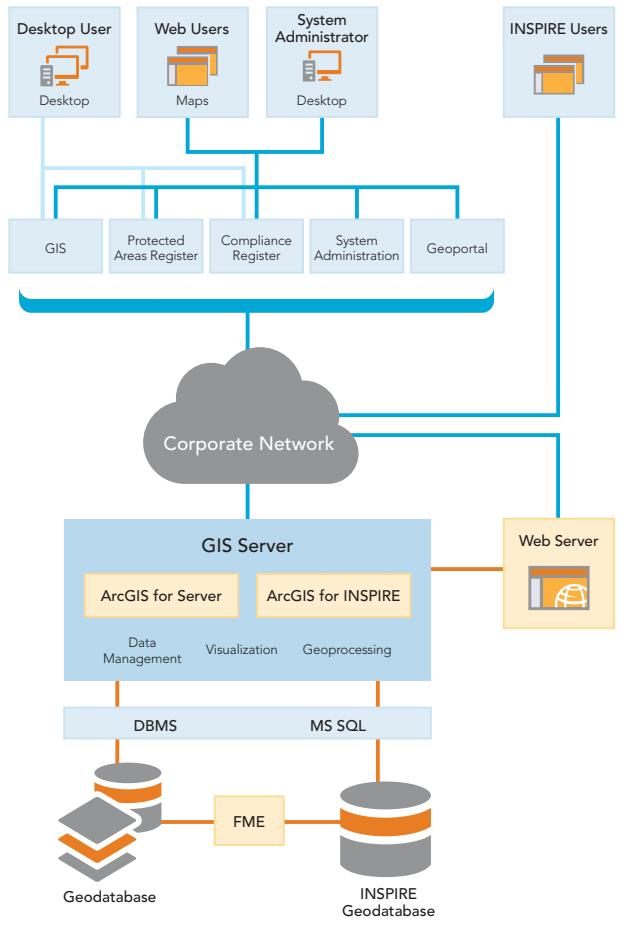
The web application (natura2000.moew.government.bg), provides public access to current information about the spatial scope, location, and functional status of protected areas and various documents associated with them. Users can search protected areas by terms such as name, ID, and type and filter the results by different criteria. This ensures transparency in the conduct of the administrative procedures.

Integration with Other Information Systems

In accordance with identified needs, the GIS for protected areas was integrated with other ministry information systems, including the Register of protected areas in the Executive Environment Agency, the Biodiversity information system, and the information system for permits issuing and water management. In addition, the geodatabase Register of Procedures for Compatibility Assessment liaise with the public Register of Procedures for the Environmental Impact Assessment of the Executive Environment Agency.



↑ A geospatial analysis of the distribution of the stag beetle, a protected species, made by using the GIS module.



↑ The public web application provides public access to current information about the spatial scope, location, and functional status of protected areas and various documents associated with them.

IT Project of the Year

Computerworld Bulgaria awarded the Ministry of Environment and Water the IT Project of the Year in the category National IT Projects Implemented in Government Administration for the GIS for Natura 2000.

When Mihail Mihailov, director of Protected Areas, Department of MEW, accepted the award, he said, "The award proves that when the ministry took the decision to build GIS for Natura 2000, it was on the right track."

"GIS for Natura 2000 solves strategic national objectives for protection of nature areas and puts Bulgaria in the forefront of countries that have successfully implemented the recommendations of the EU's environment directives," said Evgenia Karadjova, CEO of Esri Bulgaria.

For more information, contact Vesela Savova, project manager, Ministry of Environment and Water at v.savova@moew.government.bg; Anastasia Chotrova, GIS expert, Esri Bulgaria at marketing@esribulgaria.com; or Yanko Govedarov, team lead, Esri Bulgaria at marketing@esribulgaria.com.

An Alternative Approach to Geospatial Graduate Education

By Suzanne Perlitsh Wechsler, Associate Professor, Department of Geography
California State University, Long Beach (CSULB)

Geospatial practitioners are fiercely aware of the importance of maintaining skills and, hence, relevance in a rapidly changing and developing field. Academics, who are responsible for adequately preparing and training members of the geospatial workforce, are similarly challenged with the need to maintain and keep up with the technology, revising courses, and modifying curriculum.

As a geospatial academic for more than 15 years, I have been part of many shifts in the GIS education landscape. Just a decade ago, GIS was typically accessible only as an upper division course, and practitioners cut their teeth in the workplace. Today, students are graduating with degrees and certificates in a variety of geospatially-related specializations. Geospatial technology is continually changing and adapting to the fast-paced nature of our field, while academic programs are constantly challenged to keep up with this pace and accommodate.

There is only so much that a curriculum can pack in at the lower division level: Basic training in the core geographic concepts required for responsible use of the technology and exposure to geospatial components (GIS, remote sensing, cartography, programming, and database) is feasible. While we are able to produce well-trained individuals at this level, the need and desire for more enhanced analytical and technical training at the graduate level has become evident. This has necessitated a paradigm shift in the way we deliver geospatial content at the university level.

More than ever, effective geospatial education requires consistent feedback from the workforce to ensure that training is up to date and adequate. It must go beyond the core concepts and integrate the specific needs of industry and local government. To do this requires a program and curriculum that is informed by and infused with the needs of the workforce.

This has required me to step outside my particular comfort zone and expose what we do in the classroom to professional scrutiny. The result is a different approach to master's level education in GIS. Our Master of Science in Geographic Information Science (MSGISci) is a new one-year, 30-unit degree program carefully tailored to the needs of working professionals and developed to further core goals and standards of geospatial practice.

The curriculum was framed in consultation with an industry advisory board as well as the Department of Labor's Geospatial Technology Competency Model (GTCM) (www.careeronestop.org/CompetencyModel/competency-models/geospatial-technology.aspx), an invaluable resource that, as David DiBiase *[Esri director of education]* believes, is a must read for educators and students, employers, and employees. The GTCM provides a mechanism for identifying not only the requisite skills for our newly designed graduate courses but also standards for learning outcomes and resources for their assessment.

Our program was developed in the spirit of a professional science master's (www.sciencemasters.com/). This movement in graduate education seeks to combine scientific training with MBA-style course work to provide students with workplace skills typically unavailable in traditional graduate programs. We include three online/hybrid business-style courses: Professional Ethics, Project Management, and Human Resources Management.

The maturity of GIS as a profession is evidenced by the development and institution of our code of ethics and rules of conduct. These serve as a guideline and resource for workplace decision making and as a cornerstone of our required ethics course. Students learn standards of professional practice and codes of ethics that guide responsible conduct in business, governmental organizations, and workplace settings, in general, and apply these to specific geospatial case studies.

Techniques for managing projects from their inception to completion are covered in the course on project management. Students gain an understanding of complexities associated with managing project costs, time, resources, quality, and risks, while the fundamentals of leadership, teamwork, motivation, and organizational strategy are introduced in the course on leadership and management.

Our approach requires scalability in the curriculum. Our training must adjust to a cohort that has varied skill levels, backgrounds, and experiences. This is the sort of situation students may experience in the workplace. In each course, students have the opportunity to expand their training to suit their individual interests and goals.

For example, in the applied GIS course, guest speakers from industry and local government enhance the content by providing insight and exposure to the varied geospatial applications. Students have the flexibility to explore an area of specific interest through an applied project that serves as a potential pilot project for their culminating applied thesis project. Hands-on lab training is integrated with exploration of geospatial concepts such as the modifiable areal unit problem, applied ethics, and spatial statistics.

The applied remote-sensing course brings state-of-the-art concepts and technology into the hands of the students. Students are exposed to a variety of sensors and data collection platforms associated with unmanned aerial vehicles (UAVs). The continually evolving and exciting developments in the burgeoning drone industry are followed with strict attention to Federal Aviation Administration (FAA) rules and requirements. Fast-paced industry developments are followed while students learn how to collect, process, and extract meaningful information from remotely sensed data.

In cartographic visualization, students learn advanced theory and techniques for presentation cartography including communication, visualization, animation, and color. The database class gives students experience planning and configuring an enterprise GIS. This exposes them to the functionality of the geodatabase and use of a relational database management system for storing geospatial data and provides an introduction to web application development for data dissemination.

In the programming class, students who have no coding background and those who have substantial experience explore the use of code to solve specific spatial problems through customization and application development. The program culminates with an applied thesis project that integrates core competencies developed through the curriculum.

The MSGISci program is new. Our first cohort gradated in summer 2014, and our second cohort is in full swing. Assessment is ongoing, and we expect that feedback will continue to inform curriculum development and change. We are confident that this approach to geospatial graduate education will support the goals and standards of geospatial practitioners. For more information, contact Dr. Suzanne Wechsler, MSGISci program director at suzanne.wechsler@csulb.edu or visit beachgis.com.

Popular Data Viewer Ported to ArcGIS for Server

The updated version of data viewer built by British Columbia (BC) provides better access to the trove of authoritative geographic data maintained by the Canadian province.

In 2003, the province created a spatial data infrastructure (SDI) composed of the BC Geographic Warehouse, where the data is stored, and online applications allow the public, government staff, and businesses to query and download the government data. Over the last decade, the government of the province has digitally mapped the region's varied geography, creating a storehouse of geographic data to inform the public and improve decision making in the public services sector.

User traffic and data supplier participation have increased consistently every year. To meet the growing and changing demands of users, the province recently collaborated with Esri, Vivid Solutions, and Latitude Geographics to improve the SDI. Using Esri's ArcGIS for Server, the SDI provides more than 3,400 user-configurable data layers that are viewable in dozens of specific mapping applications.

iMapBC 1.0

When Esri pioneered web GIS with the release of ArcIMS more than a decade ago, it changed how people worked with maps. Rather than working with data downloaded from a website in a desktop system, data could be viewed and interacted with in a web browser. This ensured the user was working with the most current data available.

The new technology excited government staff in the natural resource sector who managed enterprise and public access to the province's geographic data. Leveraging Esri's technology, the province created iMapBC, an online web-mapping application that made the thousands of geographic data layers in the warehouse available. With iMapBC, users could select data layers to view, analyze, share, and print in custom maps.

Extending ArcGIS for Server

By 2012, iMapBC was ready for an overhaul to meet users' rising expectations for online mapping. The initial plan was to migrate over to Esri's faster ArcGIS for Server, but there was a problem. Although ArcGIS for Server,was faster and had many design improvements, it lacked the dynamic layer support that users required.

"The ability to manage layer configuration independent of the map service was key for an organization the size of DataBC," said Chris Spicer, access team lead at DataBC, the provincial program launched in 2011 that manages the SDI.

The BC team discoverd that Esri was eager to work with them on a test case for implementing dynamic layer capability into ArcGIS for Server.

Over the next year, Spicer and team came to Esri headquarters in Redlands, California, where they actively participated in the evolution of ArcGIS for Server. Together, the project team and the province created a layer catalog for its 3,400 geographic datasets that would be the source of the data in the new iMapBC's user interface. Using a server object extension, the interface displays a list of layers that users can add to client applications. Rather than preloading all 3,400 layers and taxing the province's server resources and slowing performance, the users can configure the data they want to display in their maps in the catalog.

In addition to this custom capability, ArcGIS for Server also has improved security features over the previous version of iMapBC. ArcGIS for Server updated the look of iMapBC. The new version uses the familiar ribbon interface, which contains all the tools of the previous version and more without crowding the interface.

iMapBC 2.0 Deployed

The new version of iMapBC provides ministry clients, government staff, and public users with the same data but better performance. Many users, both inside and outside government, depend on iMapBC for information to help accomplish daily tasks and make informed decisions in areas such as land tenure, transportation, public safety, and emergency response.

Development continues. DataBC is exploring new avenues for deploying web services and making ArcGIS tools and resources available to its constituents and stakeholders.

"We're extremely happy with the look and performance of the system," said Spicer. "It retains all the functionality that made it a hit with our clients and exceeds the goals of the DataBC initiative to optimize the way we work with large volumes of information."

↑ Thousands of data layers from the BC Geographic Warehouse are viewable in dozens of specific mapping applications.

GIS Public Health Pioneer Inducted into URISA GIS Hall of Fame

Dr. Charles (Chuck) M. Croner, retired geographer, survey statistician, and editor at the US Centers for Disease Control and Prevention (CDC) was inducted into Urban and Regional Information Systems Association (URISA) GIS Hall of Fame during the 2014 GIS-Pro Annual Conference held in New Orleans, Louisiana, in September.

The GIS Hall of Fame honors persons and organizations that have made significant and original contributions to the development and application of GIS concepts, tools, or resources, or to the GIS profession.

Croner majored in geography and received his bachelor's degree from Towson University and his master's and doctoral degrees from Michigan State University. He studied statistics at Harvard University. Prior to graduate school, Croner served as an infantry officer as a captain and helicopter navigator in the US Marine Corps. "The military served to advance my geographic foundations, both through formal land and air navigation instruction, and instill in me an indispensable perspective of mapping in dynamic time and space.

Although only several professional geographers were employed at the CDC in 1972, Croner positioned the CDC as a leading agency in GIS and public health. "I believed CDC's outstanding reputation for medical intervention, including lifesaving vaccines and the prevention of costly infectious and chronic diseases, could benefit further from the inclusion of geography into the emerging multidisciplinary CDC approach to public health science. The timing could not have been better."

Croner was the founding editor of the bimonthly digital newsletter *Public Health GIS News and Information*. Published from 1994–2006, it helped establish the CDC as the lead agency and focal point for the timely dissemination of GIS and public health-related developments worldwide.

Although it was initially designed for CDC staff, its readership grew to include most state and local public health departments in the United States as well as an extensive international audience. Through the newsletter, the role of geography at CDC reached nationally and across the globe. The newsletter was recognized by Esri with a Service Award in 2007.

Croner was the first Department of Health and Human Services (HHS) representative to the Federal Geographic Data Committee (FGDC), where he served with distinction and guided HHS to member status. He is responsible for the successful development of federal GIS interagency agreements with the US Bureau of Census, the US Geological Survey (USGS) and the US Department of Housing and Urban Development to leverage geospatial investments; create the first long-term collaborative small area GIS study of minority health between CDC and Cleveland's Center for Community Solutions (CCS); and contribute to the planning and instruction of the USGS Historically Black Colleges and Universities (HBCU) Summer Faculty GIS Workshops program. He was tasked by the CDC to help design CDC's first Enterprise GIS Roadmap.

At the CDC, Croner also created the first GIS Awareness Week, the Cartography and GIS Guest Lecture Series, the Public Health GIS Users Group, and the Internet GIS Guest Lecture Series. Croner received many awards from government, academia, and the CDC, especially for his work with GIS and minority public health disparities.

Visit URISA's GIS Hall of Fame (www.urisa.org/awards/urisa-gis-hall-of-fame) to learn about the accomplishments of all inductees.

URISA Hall of Fame Inductees

2005	Edgar Horwood, Ian McHarg, Roger Tomlinson, Jack Dangermond, Nancy Tosta, and the Harvard Lab
2006	Gary Hunter
2007	Don Cooke and Michael Goodchild
2009	Will Craig and Carl Reed
2010	C. Dana Tomlin
2011	William Huxhold and Barry Wellar
2012	National Aeronautics and Space Administration, Natural Resources Canada, Statistics Canada, United States Census Bureau, and United States Geological Survey
2014	Charles Croner

What Has GIS Done for Me Lately?

By Shondra Helen Hogan, GISP

GIS. Who would have ever thought those three letters would bring so many people together to create so many solutions. Geographical Information Systems. If I had a penny for each time I was asked, What is GIS? I could take another trip to London for free.

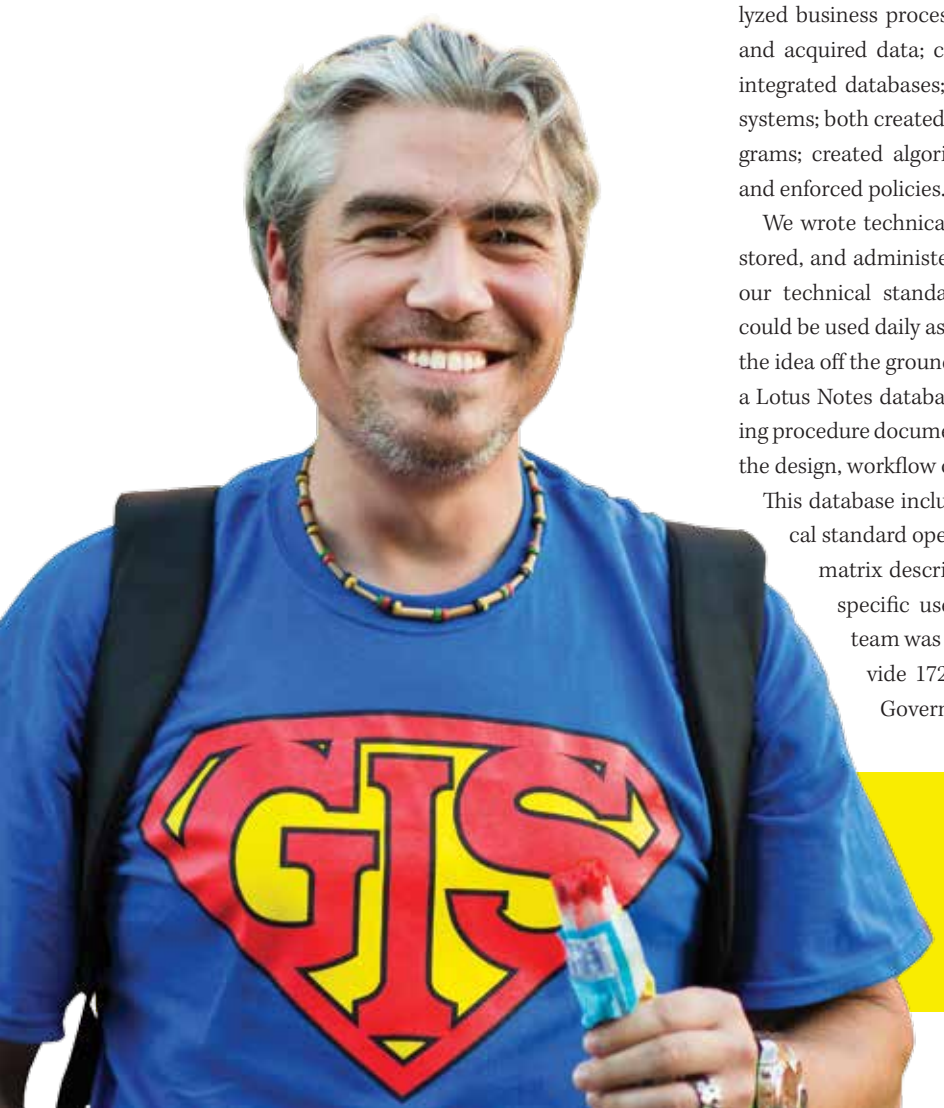
Of course, the way I describe GIS now is much different than the textbook definition I learned as a newbie. Now I can relate GIS to anything.

GIS is a perfect career for someone who is studious, helpful, resourceful, dynamic, and genious. (*Genious* is a word derived from genuine and generous. It describes the GIS professional who has true passion and strives to be the best.)

As professionals, we are constantly seeking out ways to enrich the lives of others through developing the latest killer app or maximizing the return on investment. We chair boards, develop standards, begin grassroots organizations, connect people, volunteer, mentor, and never say *no.* We learn to develop plans and form committees. While we are just being ourselves, we are also gaining personal and professional relationships becoming known as a subject matter experts (SMEs). We earn specialized credentials and advance our careers—all because of GIS. Think about what GIS has done for you lately?

Yes, GIS let me apply my specialized skills but more importantly to learn. I'm still learning and plan to continue learning and applying those lessons. Like everyone else in this industry, I've worn many hats during my 10-year tenure in IT and GIS. I have been happy to be entrusted to wear those hats because I am absolutely passionate about GIS. GIS gave me a chance to apply my skills and help others. GIS has been the most rewarding career of my life. I am honored to say how thankful I am to be a part of this field.

You should look back over your own career, either by pulling out your "about me" book or by creating a road map of your successes, and celebrate the positive contributions you have made to your community and your world. Look back at how far you have come, where you are, and look forward to where you want to be.



During a URISA Conference held in Portland, Oregon, in 2008 I met Jack Dangermond. Wow. He is to GIS what Mr. Gates is to Microsoft. Meeting Mr. Dangermond truly was a professional highlight of my career.

I didn't know how GIS is the common thread that brings the world and people together until I left the conference and returned to Columbus. This epiphany came while working alongside another Hazus practitioner, Terry Jackson (GISP). We were trying to solve a problem with our Hazus software installation. At some point, we were talking about where our career had taken us and who we had met. I learned that Terry and I had many of the same colleagues and friends and he had also met Jack. Small world. Terry knew Jack while he worked for Esri. He went on to describe the wonderful experiences he had while working with Esri. He shared how Jack and his wife went out of their way to personally helped him by driving their spare car into the desert while he was stranded, once upon a time.

Among many things, Terry is an archaeologist. I wondered later, if archaeologists really ever get stranded? I said that because of our profession, we are not separated by geography or jurisdictional boundaries. Others often know us by our reputations and contributions to the community and profession. We are remembered for what we do for our world and for others. GIS builds relationships. We are all interconnected through this amazing profession of ours.

Our roles change and evolve during our GIS careers. I grew from a technician to an interim GIS coordinator to a team leader and project manager to a GIS supervisor and a Hazus-MH professional and Hazus-MH practitioner—all while working for the same organization, Columbus Consolidated Government.

A list of just a few things that our GIS team has done for the City of Columbus, Georgia, include growing our division; saving the city more money than the average annual budget for the division; developing strategic action plans and road maps; starting executive steering committees, working groups, user groups, and newsletters; holding GIS Day events; internal and external training; and volunteering. We've administered budgets, analyzed business processes, created lots of workflows; developed and acquired data; created thousands of maps; designed and integrated databases; created models; implemented geospatial systems; both created and broke services; wrote scripts and programs; created algorithms; improved addressing; and created and enforced policies. We've had some wins and some losses.

We wrote technical documents that needed to be managed, stored, and administered. My manager and I decided to design our technical standard operating procedures database so it could be used daily as a vital component to our workflow. To get the idea off the ground, I worked with IT. We began by designing a Lotus Notes database to store our technical standard operating procedure documents. Storage wasn't the primary purpose of the design, workflow organization and management was.

This database included scheduled tasks based on the technical standard operating procedure. The database included a matrix describing our core responsibilities. We created specific user requirements to serve our needs. Our team was surprised to learn that collectively, we provide 172 GIS services to Columbus Consolidated Government throughout the year on a daily, weekly, monthly, quarterly, or yearly basis. With so many tasks, this became a great workflow tool to organize and manage our growing list of tasks.

The functionality included reminders embedded in our calendar system. A user profile was created for each GIS user. Calendar entries were used to schedule each task. An e-mail notification was sent a few days prior to the date due. Part of the design included notification of a designated backup person who could complete the task in the event the person originally tasked was out of the office. Once the database was designed, the only thing remaining was uploading the documents into the database. It is clunky but effective and efficient. We strive to save time and think outside the box using what we have to do more with less.

GIS has enhanced public safety, fire EMS, 911 services, taxation, public works, and all city services by creating behind the scenes benefits for the 190,000 residents; 50 departments; 44 boards, commissions, and authorities; and 167 Columbus Consolidated Government business units.

But most of all, I know what GIS has done for me lately. It's allowed me the privilege of keeping someone safe, providing fairer taxation developing solutions, making folks smile, of making a difference in the lives of others and in my life. That is the best feeling of all.

My journey hasn't ended in Columbus. It has taken me from Columbus Consolidated Government to a new chapter of my career as the GIS technology manager for the Troup County, Georgia.

Thank you, Esri for your vision and the Columbus Consolidated Government.

"What has GIS done for you lately"?

About the Author

Shondra Helen Hogan is a GIS Professional (GISP) with more than eight years of experience in this field who holds a degree in business administration. Hogan is a GIS Corps volunteer for URISA. She has served as a project manager on behalf of the State of Alabama's Emergency Operations Center, the American Red Cross, and the State of Alabama's citizens alongside a worldwide team following the aftermath of violent tornadoes on April 27, 2011, that devastated the southeast United States. The team developed a crowdsourcing application designed to identify road closures, fallen power lines, shelters, and essentially match every need reported with a solution.

An avid volunteer in her community, she has served as vice chairman of the Executive Advisory Board of the Mayor's Committee for Persons with Disabilities since 2011 and served as chairman of Columbus's Accessibility Guide Subcommittee for two years. In 2011, the Executive Advisory Board honored her as Committee Member of the Year.

In 2009, she was given a proclamation from Mayor Jim Wetherington for her outstanding service and contributions to the community. She is a member of Georgia's Urban Regional Information Systems Association and Columbus's Community Emergency Response Team. She is also an alumna of Columbus's Citizen's Law Enforcement Academy and the University of Georgia Carl Vinson Institute of Government. For more information about designing simple workflows, process improvement, or business analysis, contact Hogan at shogan@troupco.org or shondrahelen@icloud.com or at 706.761.6899.

The Relevance of Cartography

A Cartographer's Perspective

A column by Georg Gartner
President of the International Cartographic Association

Challenges to Cartography

Modern cartography is everything we do in our daily life as a cartographer or GI scientist to produce maps or—to be more precise—to design cartographic communication processes.

The role of the map has changed. Maps used to be artifacts. They had to look beautiful and be well designed. They had to store information for a long time because that information was needed for a long time. In modern cartography, the map has an increasing number of functions. Besides being an artifact, a modern map is also an interface that gives people access to information stored in the map and—beyond the map—in databases.

The map therefore functions as a table that structures information through spatial attributes. If a modern map is an interface that gives access to structured information, then the concept of modern cartography in one phrase would be "efficient communication of geospatial information."

That's why a modern cartographer needs to be an interdisciplinary professional. For a cartographer, it is most important to know about computer sciences, as well as GIS, photogrammetry, remote sensing, geodesy, design, art, modelling, and analysis techniques. A cartographer must be able to adopt new technologies.

All these fields influence the end product of the cartographer. This triangle formed by art, research, and technology makes the best cartographic products. The modern cartographer is in the middle—better yet at the heart—of that triangle. He is skilled, trained, and able to deal with geodata, design principles, and the newest technologies.

Unfortunately there are fewer and fewer cartographers who have this mix of skills. Rather, there are experts in geodata handling who lack design skills. There are programmers who lack a profound understanding of geo. This is caused by the lack of dedicated cartographic education as well as due focus on particular skills.

The challenge cartography faces: while maps are more prominent than ever, cartography is losing ground in institutions. Those who have been involved in cartography for a while have witnessed transitions not only in what we do and how we do it but also especially how we talk about it. Instead of talking about cartography, we use terms such as GIS, geomatics, geoinformation science, geovisualisation, visual analytics, and geospatial information management—to name just a few. Those terms have a short history that dates to the adoption of computers for making maps. Maybe you have experienced difficulty in describing a "geo-spatial-visual something," but maps and cartography are universal terms that everyone recognizes.

Maps are big news right now. Influenced by companies like Google, Apple, and Microsoft, maps have become a must-have on smartphones and web applications. They are very attractive to many, and *map* is a term with contemporary, relevant, and attractive associations.

However, it seems the term *cartography* is seen differently especially by experts, specialists, and those closely related to the field. Maybe this is because it seems that a different name is needed because the job we do with maps has changed. Different technologies and methods are used, which demand new and often very complex competences, so how can I use the same term?

Isn't a new name needed that reflects these changed competences and technologies? Shouldn't this name indicate I am doing something modern, complex, and contemporary that will be respected, appreciated, and recognized? If I am to call myself a cartographer or say I am involved in cartography, will I receive the same respect, appreciation, and recognition, or will I be associated with something old-fashioned and outdated? There are many rationales for the use of certain terms, and all have relevance. However, it seems that the term *cartography* is avoided, especially by cartographers. Many activities now associated with other terms could easily simply be called cartography.

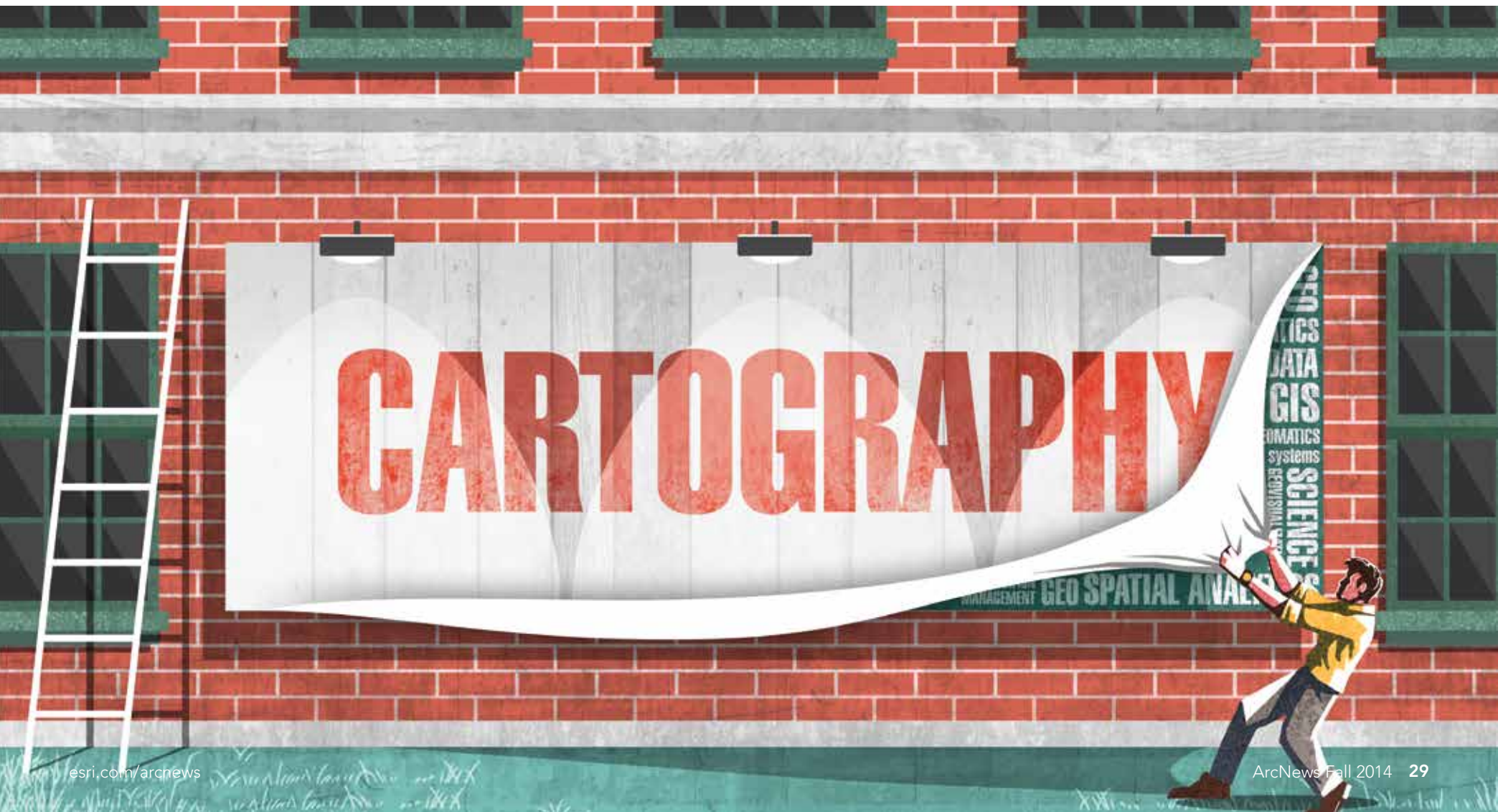
In communication science, we use the theory of semiotics to explain communication processes. In this model, syntactical, semantic, and pragmatic dimensions are used. Unlike semantics, which examines meaning that is conventional or coded in a given language, pragmatics studies how the transmission of meaning depends not only on structural and linguistic knowledge of the speaker and listener but also on the context of the utterance. In this respect, pragmatics explains how language users are able to overcome apparent ambiguity, since meaning relies on the manner, place, time, and other characteristics of an utterance.

If this is true, then how we use and understand terms is always an ongoing process. Use and understanding can be influenced. This applies to the terms *map* and *cartography* as well. Therefore, it is in the interest of those who use and love maps and appreciate the art and science of making maps to contribute to this process, which fits into the ongoing renaissance of maps and mapmaking.

For more information, contact Georg Gartner at georg.gartner@tuwien.ac.at or president@icaci.org or visit www.icaci.org.

About the Author

Georg Gartner is a full professor of cartography at the Vienna University of Technology. He holds graduate qualifications in geography and cartography from the University of Vienna and received his PhD and his habilitation from the Vienna University of Technology. He was awarded a Fulbright grant to the University of Nebraska at Omaha in 1997 and a research visiting fellowship to the Royal Melbourne Institute of Technology in 2000, to South China Normal University in 2006, and to the University of Nottingham in 2009. He is a responsible organizer of the International Symposia on Location Based Services and editor of the book series *Lecture Notes on Geoinformation and Cartography* published by Springer. He is also editor of the *Journal on LBS* by Taylor & Francis. He serves as president of the International Cartographic Association.



Partner Offerings

Esri has relationships with more than 1,800 partners globally. These companies provide customer-focused geoenabled solutions. They have extensive experience providing GIS solutions and services across Esri's core industries. Partner-provided solutions and services range from custom-built applications to complete system implementations of ArcGIS. For a list of Esri partners and descriptions of their offerings, visit www.esri.com/partners.

Local Government

39 DEGREES NORTH
39dn.com
Enterprise GIS (eGIS)

The eGIS platform is a premium cloud-based solution that integrates spatial and nonspatial data from multiple sources. eGIS is fully scalable and allows users to activate different modules that provide solutions for things such as COGO editing, work order management, property comparables, and watershed drainage analysis. In the near future, eGIS modules will be available from ArcGIS Marketplace for use with ArcGIS Online data. eGIS is a diverse ecosystem of robust tools that can be tailored to fit any solution by using as few or many modules as necessary.

GIS Services

Geographic Business Solutions Ltd.
www.gbs.co.nz
Supercharge Program for ArcGIS Online

The GBS Supercharge program for ArcGIS Online is all about working with clients to get the most out of their ArcGIS Online subscriptions or installations of Portal for ArcGIS. GBS combines the client's organizational knowledge of business process with GBS' knowledge of ArcGIS Online and Portal for ArcGIS to identify opportunities for harnessing the power of location analytics to drive operational efficiency and business growth. Activities that can be done through the GBS Supercharge program include

- Developing reusable ArcGIS Online/Portal for ArcGIS templates tailored to business needs
- Developing purpose-built ArcGIS Online/Portal for ArcGIS applications
- Creating a custom landing page using the ArcGIS REST API that helps customers distribute mapping content internally or externally
- Developing tablet or smartphone applications that leverage the power of ArcGIS Online/Portal for ArcGIS
- Assistance setting up and running location analytics and sourcing specialist datasets to drive analysis
- Implementing Portal for ArcGIS
- Integrating ArcGIS Online/Portal for ArcGIS and other systems, such as Microsoft Office products, Microsoft SharePoint, IBM Cognos, MicroStrategy, and SAP

Public Safety

New World Systems
www.NewWorldSystems.com
Aegis Public Safety Software

New World's suite of Aegis Public Safety Software solutions offer unmatched application integration across disciplines for law enforcement, fire, and EMS. With extensive input from a customer base of more than 1,000 agencies, New World continues to enhance and further integrate computer-aided dispatch (CAD), records, mobile, corrections, information sharing, analytics, and dashboard solutions. New World's reliable, scalable, and easy-to-use Aegis CAD offers public safety agencies state-of-the-art GIS capabilities for proximity- and resource-based dispatching leveraging ArcGIS for Server Advanced Enterprise and ArcGIS Runtime products.

Water, Wastewater, Stormwater

Innovyze
www.innovyze.com
InfoMaster Sewer and InfoMaster Water

InfoMaster is a complete ArcGIS-based asset integrity management and capital planning software for water and wastewater networks. It leverages existing GIS and IT investments with advanced modeling and sophisticated predictive analytics to give utilities a cost-effective business intelligence and data collection platform for more informed, action-oriented decision making. With versions designed for the desktop, web, and iOS mobile devices, InfoMaster enables day-to-day operational management and long-term network planning for users throughout the organization.

Energy

OSIsoft, LLC
www.osisoft.com
PI Integrator for Esri ArcGIS

PI Integrator for Esri ArcGIS combines the visualization and analytics of the ArcGIS platform with the real-time data infrastructure delivered by the OSIsoft PI System giving enterprises a new way to understand and share critical data. By taking into account physical location, operational data becomes more complete, has more context, and provides new levels of understanding throughout a business. The PI Integrator for Esri ArcGIS is the easiest and most scalable way to analyze assets and events in both space and time.

Start-up Apps Improve Emergency Management

Emergency response planners and managers have long used the ArcGIS platform to understand disaster events, improve response, and create disaster plans. The following innovative companies are using the ArcGIS platform to create new web apps that help responders save lives and property.

D4H

d4h.org

Response agencies use the D4H emergency response team app to monitor and track equipment, assets, and personnel. It ensures that all response team members and contractors have up-to-date information about an incident. A Canadian company's oil sands emergency response team uses the D4H app to keep track of equipment as well as record personal injuries and individual incidents. A hospital emergency response team (HERT) in South Carolina uses D4H for inspection and repair of its equipment. The D4H app is also a useful tool for managing response team training and certifications. It monitors team reactions to obstacles and obstructions and the team's ability to meet objectives. Managers can see responder skill information, who is qualified to do what so they can stay on top of training schedules and manage profile information.

FireWhat Inc.

FireWhat.com

In April 2013, FireWhat Inc. purchased Wildlandfire.com and revamped it by fully integrating it with ArcGIS Online. This makes available a new level of defensive emergency response. The website gives users direct access to the nation's largest database of real-time fire information. The web map shows real-time location and details about current wildfires in the United States. In addition, users can access authoritative datasets such as meteorological observations, radar imagery, and real-time weather patterns. FireWhat GIS apps map emergency incidents and track responders and assets in and out of the field. Users work with FireWhat tools to report, receive, and relay information. For instance, emergency personnel use the app's Initial Attack tool to quickly capture essential information, put it into ArcGIS, and relay a report on conditions.

Valarm

Valarm.net

Real-time sensor networks have opened new vistas for emergency management and law enforcement. Valarm is a sensor and monitoring solutions company. The Valarm app is an Android mobile app and integrated suite of web-based tools that can track almost anything via GPS. In addition, it facilitates rapid deployment of real-time, ad hoc, mobile sensor networks for remote environmental monitoring, mobile data acquisition, and asset/vehicle tracking. It maps vehicle speeds from a GPS sensor or ride-roughness data from an accelerometer. The Valarm Command Center shows the real-time locations of all of an organization's active devices. Users can view the fleet and other assets as they travel, in real-time, including direction, speed, and current traffic situation. By configuring a sensor in a given way, consumers can use Valarm to monitor property or track lost or stolen property.

A Treasure Trove of Geospatial Data

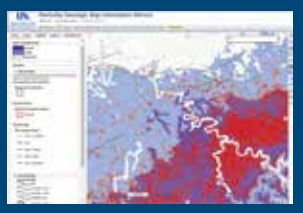
These three organizations are using ArcGIS for Server to make maps, GIS data, and other materials readily available for use in web applications and analysis.

↑ USGS National Geologic Mapping Database

USGS National Geologic Mapping Database

ngmdb.usgs.gov/ngmdb/ngmdb_home.html

The United States Geological Survey delivers the entire digitized geological mapping record of the United States in a portal called The National Geologic Mapping Database (NGMDB). Maps, GIS data, and educational materials, such as journal articles, can all be accessed and downloaded at NGMDB.



↑ Kentucky Geologic Map Information Service

Kentucky Geologic Map Information Service

kgs.uky.edu/kgsmap/kgsgeoserver/viewer.asp

Created by the Kentucky Geological Survey, the Kentucky Geological Map Information Service is an interactive map that provides detailed geologic information along with water, oil, gas, and coal data for the Commonwealth of Kentucky.

↑ iMap—DataBC

iMap—DataBC

maps.gov.bc.ca/ess/sv/imapbc

British Columbia created iMapBC to provide the public and government personnel thousands of map datasets hosted in the BC Geographic Warehouse. Visitors can view all data in an interactive mapping environment, compile map layers of interest, and upload map data.

APUC Set for January 2015 in Hong Kong

Esri GIS users from across the Asia-Pacific region will converge on the Hong Kong Convention and Exhibition Centre for the 10th Esri Asia Pacific User Conference (APUC) January 27–28, 2015.

The hundreds of attendees expected for the conference will learn how the latest developments in GIS technology are being applied in their region and learn new techniques and best practices. Hosted by Esri China (Hong Kong) Limited, Esri's official distributor in Hong Kong, the Esri APUC will bring the best of the Esri User Conference in San Diego to the Asia-Pacific region. Attendees can learn about Esri's vision for the future at the Plenary Session and explore state-of-the-art technology at the GIS Solutions EXPO.

For two days, GIS users of all experience levels and interests can participate in workshops and seminars and listen to presentations by Esri staff and GIS professionals. Key industry tracks include utilities, AEC, and urban design; transportation; public security and safety; defense and intelligence; maritime and port security; mapping and charting; and emergency response.

Attendees can discover how to best leverage current GIS investments and resources, showcase their work in user presentations, network with peers, and stay current on crucial industry issues. Preconference workshops and a senior executive track, showcasing some of the regional lighthouse projects and best practices, will also be offered.

"Hong Kong is a very special place—an international business, trade and financial hub," said Zoe Zhang, business development manager for the Greater China Region at Esri. "Hong Kong is the gateway to China, the world's second largest economy. Surrounded by GIS-advanced countries such as China, Japan, Korea, and Singapore, Hong Kong is the perfect location to get firsthand GIS knowledge with an Asian twist."

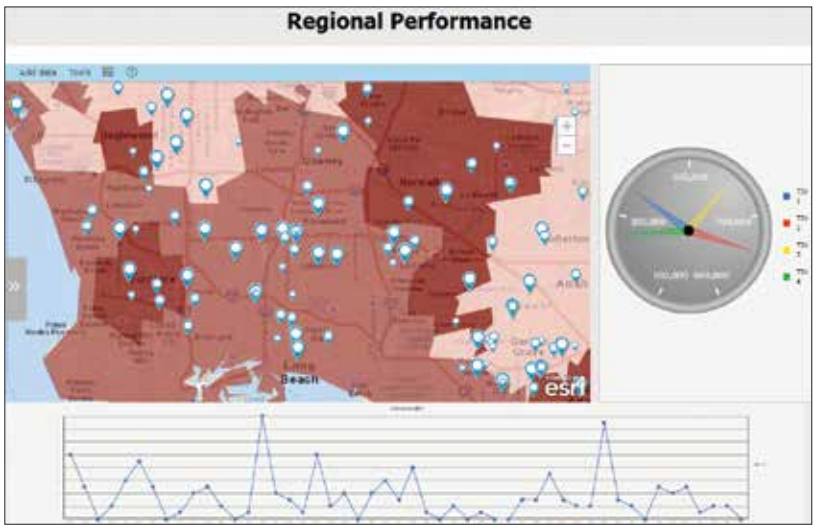
Visit www.esri.com/apuc for more information.

Free Apps with ArcGIS Subscriptions

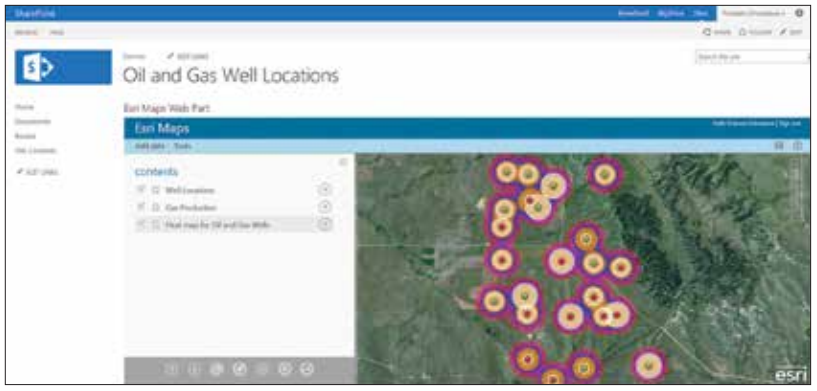
All of Esri's Location Analytics apps are now available at no extra cost with an ArcGIS Online or Portal for ArcGIS subscription. If your organization uses business intelligence (BI) or customer relationship management (CRM) systems or productivity systems such as Microsoft Office, your organization can now easily tap into the ArcGIS platform from within them.

Esri Location Analytics app users can

- Perform self-service mapping and spatial analysis in just a few clicks.
- Access an amazing library of map layers from Esri and from other ArcGIS Online users, including Esri's exclusive demographics and lifestyle datasets.
- Create location-enriched information products, including interactive maps and infographics that can be shared with colleagues for more insightful decision making.



↑ Esri Maps for MicroStrategy is one of the location analytics apps that is available at no cost with ArcGIS Online or Portal for ArcGIS subscriptions.



↑ Esri Maps for SharePoint makes ArcGIS functionality available from Microsoft SharePoint.

The following apps are available to qualified subscribers at no extra cost:

- Esri Maps for Office
- Esri Maps for SharePoint
- Esri Maps for IBM Cognos
- Esri Maps for MicroStrategy
- Esri Maps for SAP BusinessObjects
- Esri Maps for Dynamics CRM
- (Esri Maps for Salesforce will be available later this year)

To install and configure the apps, you must be an administrator of an ArcGIS Online paid or trial subscription or Portal for ArcGIS. US customers with questions can contact Esri Customer Service or call 1-800-447-9778. Non-US customers can contact their local Esri representative. You will also need administrative access to the business system you're using (e.g., Office, SharePoint, Cognos, MicroStrategy, BusinessObjects, Dynamics CRM). For more information on configuration and system requirements, see doc.arcgis.com/en/location-analytics. If you'd like Esri to install and configure the solution for you, contact your local Esri representative. For a list of additional apps available with ArcGIS Online, visit ArcGIS Marketplace.

New Training and Certification Offerings from Esri

Training

Tap into a Repository of Expert Knowledge

Launched in 2001, live training seminars remain a hugely popular (and free) method for busy GIS professionals to stay up to date with the latest ArcGIS products and technology topics. In one hour, an Esri expert delivers a real-time presentation that includes multiple software demonstrations and question and answer sessions. The seminar archive is maintained as a free resource for anyone who wants to stay current with ArcGIS, learn tips and tricks, and find inspiration for new GIS projects. Access the archive at esri.com/lts.

A People-Centric Approach

Aligning workforce knowledge and skills with a big-picture mission, strategic objectives, and day-to-day execution is an effective method for motivating individual performance, enhancing team productivity, and driving organizational success. Esri training consultants are available to guide organizations through a three-phase planning process that results in a GIS work force development plan. The plan documents essential role-based knowledge and skills, as well as the strategic alignment of the organization's GIS program and the value of the people who support, manage, and create information products using GIS technology. Learn more about work force development planning at esri.com/workforce-plans.

Courses to Go Pro

ArcGIS Pro is a new, highly anticipated desktop application included with ArcGIS 10.3 for Desktop. Two new courses, one instructor-led and the other a web course, will prepare experienced ArcGIS for Desktop users to become productive with this app right away. Students will get hands-on experience with the new capabilities and project-driven tasks built into ArcGIS Pro. View course details by searching for ArcGIS Pro at esri.com/coursecatalog. Introduction to ArcGIS Pro (instructor-led course) provides a comprehensive overview of the software's new capabilities and streamlined methods for completing GIS projects. ArcGIS Pro Essentials (web course coming soon) is a quick-start guide to the ArcGIS Pro contextual, ribbon-based interface and the major tools it provides for visualizing, editing, analyzing, and sharing GIS maps and data.

Certification

Exam Plans for ArcGIS 10.3

The certification team, with the assistance of Esri subject matter experts, began a detailed survey of the existing exams to determine if new versions should be created for ArcGIS 10.3. At this time, 10.3 exams for ArcGIS for Desktop Associate and ArcGIS for Desktop Professional are planned. Final determinations will be made for the other exams in 2015. For the latest information about certification, please visit esri.com/certification.

NATIONAL GEOGRAPHIC

Geo Learning

A column by Daniel C. Edelson
Vice President for Education,
National Geographic Society

The Importance of Teaching Children to Read Maps

For most adults, it is hard to imagine there was a time when we couldn't read a map. For most of us, making sense of a map is as automatic as re-creating a scene in our minds from the dots on the page that make up a photograph.

Of course we were not born able to make meaning from either photos or maps, but that doesn't make it any easier to project back to the time when photos and maps were just colors and shapes on a piece of paper (or a screen—for younger adults).

In fact, the ability to "read" a map, even a very simple one, is a skill that must be learned and can require considerable time and effort. Although nearly everyone acquires the basic map reading skills by the time they have completed the primary grades, that does not diminish the magnitude of these accomplishments for young learners.

Also like reading and basic math, learning to read a map is a foundational skill that is an essential prerequisite for subsequently developing a wide range of knowledge and skills. A brief review of the media that children see in their schools, homes, and communities reveals how frequently maps are used to convey important information and relationships. In the most recent National Assessment of Educational Progress in Geography (conducted in 2010), 58 percent of fourth grade teachers reported that they use maps or globes in their instruction at least once a week.

For this reason, a delay in learning to read maps or a lack of proficiency in reading maps can be an obstacle to academic and intellectual progress. The 2010 National Assessment of Geography revealed that only 21 percent of fourth graders in the United States were performing at grade level in an assessment that included basic map skills, among other geography content and skills. This number drops below 10 percent for students identified as African-American or Hispanic.

Unfortunately, map skills are not taught as consistently across the country as they should be. Nor do many primary grade teachers have the instructional materials or know how to teach map skills. For that reason, National Geographic's Network of Alliances for Geographic Education recently launched an initiative to improve the teaching of map skills in the early grades. Led by Brenda Barr and Kim Hulse at National Geographic, this initiative is designed to provide teachers with the knowledge, skills, and materials they need to teach their students.

The starting point for this initiative was a review of research on children's spatial reasoning and map interpretation skills commissioned by the National Geographic Education Foundation. This review, conducted by Drs. Audrey and Lindsey Mohan, collected information about the concepts and skills that children in different age ranges can master, common challenges to understanding, and misconceptions that children in those age ranges are likely to experience. These research findings have implications for teaching and selecting maps and other instructional materials.

For example, one of the findings was that students in grades 2 through 4 are able to make the transition from map symbols that are iconic or representative of objects in the world to abstract symbols. However, research also cautioned that students in this age range are still likely to make errors in interpretation and are likely to need explicit guidance about the meaning of symbols. For that reason, the instructional guidance cautions that students should be provided with maps that display a limited amount of information to help them focus on the information that is provided.

The fundamental lesson of this research is consistent with research on skill acquisition across the curriculum: children should be presented with challenging tasks that demand that they learn new skills but do not overwhelm them with challenges that are too numerous or complex. They should also be provided with enough assistance to identify and correct errors and given enough opportunities to practice skills across a range of challenges sufficient for them to achieve full mastery.

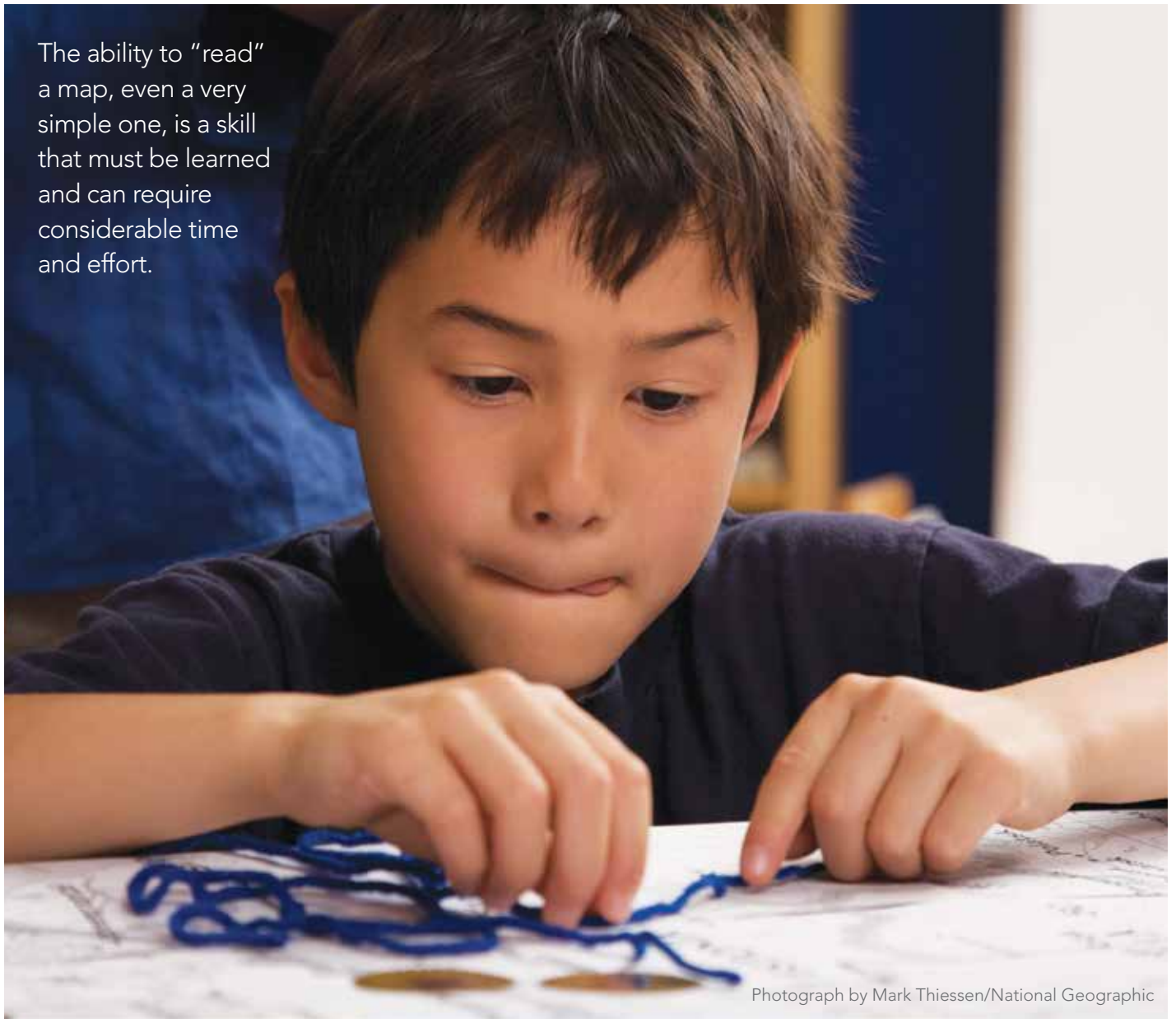
This specific research helps teachers understand in advance what their students will find challenging, select appropriate tasks, and guide students to overcome specific difficulties or misconceptions. Essentially, this research helps teachers understand what most of us have so much trouble understanding—what looking at a map is like for someone who has not yet mastered one or more aspects of map reading. Research on teaching across many subjects has shown that teachers are much more effective when they have this information.

Imagine a second grader who is struggling to master the difficult task of determining relative direction on a map. For most of us, it is hard to imagine confusing something being on the left side of a map with something being on the left side of a location in the world. The Alliance Network materials being developed can help the teacher anticipate this confusion and diagnose the reason that our second grader is consistently making mistakes when giving directions based on a map. The teacher would also know what kinds of explanations, examples, and additional tasks to provide to help a student overcome this common misconception.

While these materials and resources could make a big difference in educational outcomes for students, the Network of Alliances for Geographic Education and their partners at the National Council for Geographic Education, the American Geographical Society, and the Association of American Geographers face an enormous challenge in getting them to teachers.

Training teachers could also improve geographic education. We see great potential in Esri's GeoMentor program to teach map reading skills. We encourage GIS professionals to spend some time reviewing the opportunities to get involved in with local schools on the Esri GeoMentor program website, the materials for teaching basic map skills on the National Geographic Education website, and then reach out to educators in their communities.

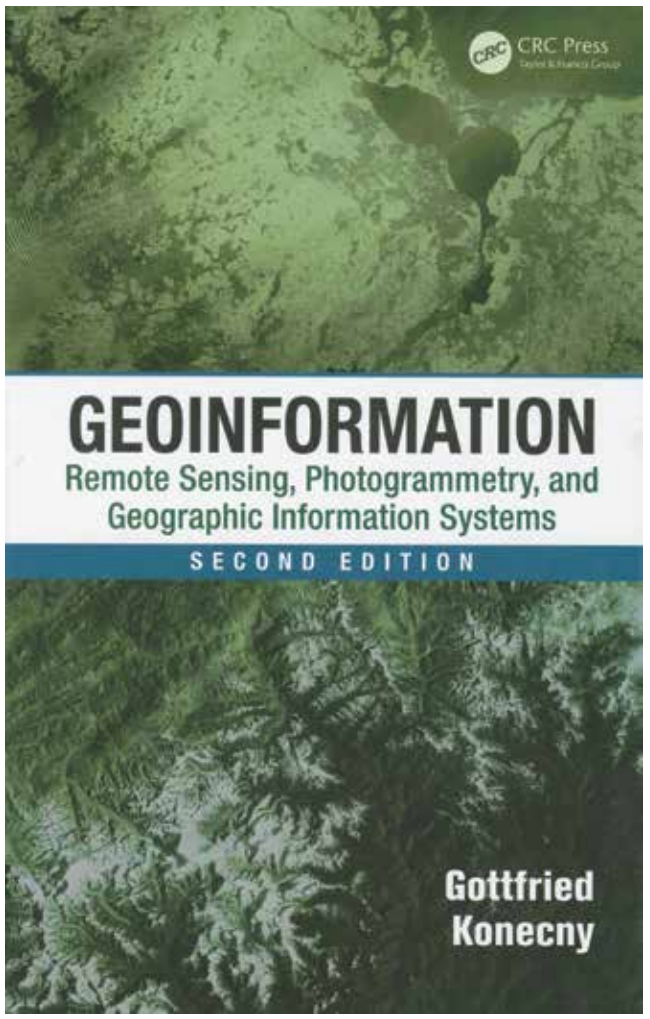
For more information about the Esri GeoMentor program, visit edcommunity.esri.com/educational-roles/GeoMentors. For more information about National Geographic's Elementary Mapping initiative, visit NatGeoEd.org/elementary-map-skills. Follow Daniel Edelson on Twitter at @NatGeoEdelson.



The ability to "read" a map, even a very simple one, is a skill that must be learned and can require considerable time and effort.

Photograph by Mark Thiessen/National Geographic

Understanding the Integrated Discipline of Geoinformation



Gottfried Konecny gives readers a comprehensive overview of the evolving field of geoinformation in *Geoinformation: Remote Sensing, Photogrammetry and Geographic Information Systems,* Second Edition. This book recognizes the transformation of the discipline-oriented technologies of geodesy, surveying, photogrammetry, and cartography into the "methodolgy-oriented integrated discipline of geoinformation."

In addition to providing fundamental information about how remote sensing, photogrammetry, and GIS work together, Konecny outlines the history of their development. He discusses the theoretical principles that underpin them. He furnishes extensive examples of how applications using remote sensing, photogrammetry, and GIS increase understanding of the world and improve decision making.

With nearly 70 years of experience in the field, Konecny is uniquely qualified to write this book. In 1945, he began working in surveying, photogrammetry, and mapping and is one of the leading authorities in the field of geoinformation. He is emeritus professor at Leibniz University of Hannover in Germany and the former president of the International Society of Photogrammetry and Remote Sensing. He holds honorary doctor of science degrees from the University of Tucman, Argentina; the University of New Brunswick, Canada; Anna University in Chennel, India; and MIIGAiK, Moscow, Russian Federation, as well as numerous awards and distinctions from universities and professional organizations around the world.

The second edition was updated to reflect technology advances in remote sensing, photogrammetry, and GIS that have occurred in the intervening 12 years since the publication of the first edition. The examples of the use of remote sensing in the study of meteorology and climatology, oceanography, environment, nonrenewable and renewable resources, and natural hazards are new with this edition. The GIS section has been greatly expanded also.

With its emphasis on the fundamentals of geospatial technology and its current applications, *Geoinformation: Remote Sensing, Photogrammetry, and Geographic Information Systems,* Second Edition, is an excellent resource for students and professionals involved in any area of geoinformation. CRC Press, 2014, 472 pp., ISBN: 978-1420068566

Making Shawnee Police Nimble and Responsive

A suite of GIS-based solutions helps the police department in Shawnee, Kansas, gather, analyze, and share crime data to support its mission to keep the community safe.

With nearly 90 sworn officers, the department serves a city of just over 63,000. Shawnee is part of the greater Kansas City metropolitan area, which covers several counties on both the Kansas and Missouri sides of the state line.

"We began using GIS when we established a Crime Analysis Unit," said Greg Collins, research and analysis manager for the Shawnee Police Department. "Back then, crime analysis was a relatively new concept in this area, but the chief at the time, Charles Clark saw the potential in using data to help keep our community safe. Chief Clark brought in crime analyst Susan Smith to get our unit off the ground."

The Shawnee Police Department acquired a suite of solutions from Esri partner BAIR Analytics that eliminated paper- and text-file methods for managing crime data and automated data management. The ArcGIS-based platform consists of Automated Tactical Analysis of Crime (ATAC), ATAC Regional Analysis and Information Data Sharing (ATACRAIDS), and Regional Analysis and Information Data Sharing (RAIDSOnline). The solutions provide powerful crime pattern analysis; predictive analytics; crime mapping, reporting, and intelligence analysis; and a secure online dashboard that enables national crime data sharing.

Officers use ATACRAIDS to monitor their districts and special assignments such as providing enhanced school safety. "We use GIS capabilities for crime reports," said Collins. "Without them, we could not provide the amount of data, on demand, in an intuitive format. When we have to react to a crime series, we can assemble and distribute data much faster to get the needed information to our officers. It makes us more nimble and responsive."

The solutions automate processes that were previously done manually such as generating weekly command reports. Commanders use these reports to create strategic plans and tactical responses such as instituting a specialized task force to fight car theft or adding patrols to a neighborhood following a spike in burglaries.

ATAC, a desktop- or workstation-based analytics solution used for many of these projects, is updated daily. Commanders get reports showing crime variables and available assets and staff for response in a fast, efficient manner.

Weekly analysis, using location analytics, compares current year-to-date (YTD) data with YTD data for the previous five years. ATACRAIDS produces maps and quick statistics for weekly command staff meetings. The dashboard lets staff use more than 200 analytic features. Crime hot spot maps and custom predictive analytics are created with one click against any data on the map, even if it spans multiple jurisdictions. Using the dashboard, the department can download regional data for further analysis. More than 50,000 reports currently in the Crime Analysis Unit (CAU) database are accessible using ATAC and ATACRAIDS.

"The database is updated daily so that when a request comes in or analysis needs to be done, the data is there ready to go," said Collins. "The visual query feature is outstanding for being able to quickly narrow down the data as needed. Then quick statistics are produced with one click."

Officers can use simple GIS-based tools to view trends, patterns, and forecasts. The ATAC solution runs simple queries that yield immediate answers and eliminate information requests that would take hours. Because queries are map-based, a visual query can immediately filter the data down to the few items that meet the request's criteria.

The platform helps with drive operations and patrol and traffic data. It is the main database for Data Driven Approaches for Crime and Traffic Safety (DDACTS) analysis and uses several saved queries to gather the exact data. The geocoding feature allows data to be exported into Excel so that it can be used in ArcGIS. Specific maps are then created to show DDACTS areas and changes in the DDACTS hot spots. This data is used to determine DDACTS times and areas.

Supervisory staff use the analytics and mapping capabilities to determine areas of deployment for focused attention on a given shift. Data is readily available to map where crimes most frequently occur and when those crimes are occurring.

The Shawnee Police Department opens up data to the public using data-rich web maps that are easily understood but protect victim privacy. Data is also available to the public and media via simple web services. Using RAIDSOnline, the media can create its own maps with the data provided.

Today regional data sharing is recognized by law enforcement as a higher priority for both fighting crime as well as supporting national and homeland security. Because the Shawnee Police Department uses the BAIR solutions, anyone with a user name and password can view the data uploaded to the geospatial platform on a daily basis. Data changed in ATAC will be updated in ATACRAIDS, giving other agencies a current overview of what is occurring in nearby jurisdications.

For more information, contact Greg Collins, research and analysis manager for the Shawnee Police Department at GCollins@cityofshawnee.org.

Well-Traveled Esri T-shirts

1 Joseph Simora, senior GIS analyst for the York County Planning Commission, wore his Esri T-shirt to the Groundhog Day Celebration of Octoraro Orphie in Southern Lancaster County in Pennsylvania.

2 Ray Postolovski, US topo production manager with the US Geological Survey's Denver, Colorado, office wore his Esri shirt while sailing the Sea of Galilee off the shores of Tiberias, Israel. On this trip, he visited Egypt, Jordan, Israel, and the State of Palestine.

3 Mariyana Kostov, GIS manager for the River Valley Regional Commission in Americus, Georgia, sent this photo of her son wearing his Esri T-shirt in the city of Veliko Tarnovo in Bulgaria.

4 Tom Miller, GIS manager for the City of Shawnee, Oklahoma, poses with an olive press stone found at the Khirbet el-Maqatir archaeological dig in the West Bank of Israel. In May 2014, Miller joined 50 other volunteers who worked with Associates for Biblical Research at the site.

5 Eva Hinojosa of the El Paso Electric Company wore her Esri T-shirt while groundtruthing a customer's job in rattlesnake country near the town of Organ, New Mexico.

6 Peggy Staske, an engineering information technician for the City of Urbana, Illinois, traveled to Costa Rica with her husband and posed in her Esri T-shirt at the Arenal Volcano in La Fortuna, Alajuela, Costa Rica.

Esri Corporate Headquarters

380 New York Street
Redlands, CA 92373-8100 USA
Tel.: 909-793-2853
E-mail: info@esri.com
Web: esri.com

Esri Technical Support
Tel.: 888-377-4575
E-mail: support@esri.com
Web: esri.com/support

Esri Desktop Order Center and Software Information
Tel.: 1-800-447-9778
(USA only)

Esri Store
Web: esri.com/store

Esri Developer Network
Web: edn.esri.com

Esri Customer Service
Toll Free
Tel.: 888-377-4575
E-mail: service@esri.com
Web: esri.com/customerservice
Customer Care Portal: customers.esri.com

Esri US Regional Offices

Boston
Middleton, MA
Tel.: 978-777-4543

California
Redlands, CA
Tel.: 909-793-2853, ext. 1-1906

Charlotte
Charlotte, NC
Tel.: 704-541-9810

Denver
Broomfield, CO
Tel.: 303-449-7779

Minneapolis
St. Paul, MN
Tel.: 651-454-0600

Olympia
Olympia, WA
Tel.: 360-754-4727

Philadelphia
Chesterbrook, PA
Tel.: 610-644-3374

San Antonio
San Antonio, TX
Tel.: 210-499-1044

St. Louis
St. Charles, MO
Tel.: 636-949-6620

Federal Office
Washington, DC
Vienna, VA
Tel.: 703-506-9515

For additional information about Esri US regional offices, visit esri.com/usa.

Esri Distributors Worldwide

Esri Australia Pty. Ltd.
Brisbane
Tel.: 617-3218-4100
E-mail: connect@esriaustralia.com.au
Web: www.esriaustralia.com.au

Esri BeLux N.V.
Wemmel, Belgium
Tel.: 32-2-460-7480
E-mail: info@esribelux.com
Web: www.esribelux.com

Esri Bulgaria Ltd.
Sofia
Tel.: 359-2-964-0850
E-mail: info@esribulgaria.com
Web: www.esribulgaria.com

Esri Canada Limited
Toronto, Ontario
Tel.: 416-441-6035
E-mail: info@esri.ca
Web: www.esri.ca

Esri Chile S.A.
Santiago
Tel.: 56-2-481-9000
E-mail: info@esri.cl
Web: www.esri.cl

Esri China Information Technology Co. Limited
Beijing
Tel.: 86-10-5763-2288
E-mail: info@esrichina.com.cn
Web: www.esrichina.com.cn

Esri China (Hong Kong) Limited
Hong Kong
Tel.: 852-2730-6883
E-mail: info@esrichina.hk
Web: www.esrichina.hk

Esri Colombia SAS
Bogotá, D.C.
Tel.: 571-638-7272
E-mail: hgutierrez@prosis.com

Esri Eastern Africa Limited
Nairobi, Kenya
Tel.: 254-20-271-3630
E-mail: sales@esriea.co.ke
Web: www.esriea.co.ke

Esri Finland Oy
Espoo
Tel.: 358-207-435-435
E-mail: info@esri.fi
Web: www.esri.fi

Esri France S.A.
Meudon
Tel.: 33-1-46-23-6060
E-mail: info@esrifrance.fr
Web: www.esrifrance.fr

Esri Deutschland GmbH
Kranzberg
Tel.: 49-89-207005-1200
E-mail: info@esri.de
Web: www.esri.de

NIIT GIS Limited (Esri India)
Gurgaon
Tel.: 91-124-4002702
E-mail: info@esriindia.com
Web: www.esriindia.com

Esri Italia Sp.A.
Rome
Tel.: 39-06-406-961
E-mail: info@esriitalia.it
Web: www.esriitalia.it

Esri Japan Corporation
Tokyo
Tel.: 81-3-3222-3941
E-mail: esri_general@esrij.com
Web: www.esrij.com

Esri Korea, Inc.
Seoul
Tel.: 82-2-2086-1900
E-mail: info@esrikr.com
Web: www.esrikr.com

Esri Lebanon sal
Beirut
Tel.: 961-1-843843
E-mail: info@esrilebanon.com
Web: www.esrilebanon.com

Esri Muscat Co LLC
Muscat, Oman
Tel.: 968-24693723
E-mail: info@esrimuscat.com
Web: www.esrimuscat.com

Esri Nederland B.V.
Rotterdam
Tel.: 31-10-217-0700
E-mail: gisinfo@esri.nl
Web: www.esri.nl

Esri Northeast Africa
Cairo, Egypt
Tel.: 202-2271-9350
E-mail: info@esrinea.com
Web: www.esrinea.com

Esri Panama, S.A.
Panama City
Tel.: 507-297-4063
E-mail: atrejos@esri.com

Esri Polska sp. z o.o.
Warsaw
Tel.: 48-22-390-4700
E-mail: esri@esri.pl
Web: www.esri.pl

Esri Portugal—Sistemas e Informação Geográfica, S.A.
Lisbon
Tel.: 351-2-1-781-6640
E-mail: market@esri-portugal.pt
Web: www.esri-portugal.pt

Esri Romania S.R.L.
Bucharest
Tel.: 40-21-231-1422
E-mail: esri@esriro.ro
Web: www.esriro.ro

Limited Liability Company ESRI CIS
Moscow, Russia
Tel.: 7-495-988-3481
E-mail: market@esri-cis.ru
Web: www.esri-cis.ru

Esri Saudi Arabia Ltd
Riyadh, Saudi Arabia
Tel.: 966-1-416-2600
E-mail: info@esrisaudiarabia.com
Web: www.esrisaudiarabia.com

Esri South Africa (Pty) Ltd.
Midrand
Tel.: 27-11-238-6300
E-mail: info@esri-southafrica.com
Web: www.esri-southafrica.com

Esri Southern Africa
Grand Bay, Mauritius
Tel.: 27-11-238-6300
E-mail: info@esri-southernafrica.com
Web: www.esri-southernafrica.com

Esri South Asia Pte. Ltd.
Singapore
Tel.: 65-6742-8622
E-mail: connect@esrisingapore.com.sg
Web: www.esrisa.com

Esri España Geosistemas S.A.
Madrid
Tel.: 34-91-559-4375
E-mail: informacion@esri.es
Web: www.esri.es

Esri Sverige AB
Gävle, Sweden
Tel.: 46-771-984800
E-mail: info@esri.se
Web: www.esri.se

Esri (Thailand) Co. Ltd.
Bangkok
Tel.: 66-2-678-0707
E-mail: krairop.l@cdg.co.th
Web: www.esrith.com

Esri Bilgi Sistemleri Muhendislik ve Egitim, Ltd.
Ankara, Turkey
Tel.: 90-312-233-5050
E-mail: mtankut@esriturkey.com.tr
Web: www.esriturkey.com.tr

Esri (UK) Ltd.
Aylesbury
Tel.: 44-1296-745-500
E-mail: info@esriuk.com
Web: www.esriuk.com

Esri Ukraine Ltd.
Kiev
Tel.: 380-44-502-4121
E-mail: info@esri.ua
Web: www.esri.ua

Grupo Esri de Venezuela, C.A.
Caracas
Tel.: 58-212-285-9394
E-mail: esriven@esriven.com
Web: www.esriven.com

Esri has more than 80 distributors in other countries around the world. For more information, contact Esri (tel.: 909-793-2853, ext. 1-1235; fax: 909-307-3070) or visit esri.com/distributors.

Career Opportunities

Esri is actively recruiting smart people with all levels of experience who get the job done. These positions represent openings at our headquarters in Redlands, California, as well as our regional offices, and offer you a great opportunity to work with the best in our profession. We provide exceptional benefits, competitive salaries, profit sharing, a collaborative team environment, and much more. Join Esri and make a difference. Visit esri.com/careers.

Software Development and ArcGIS Product Development

Software Developer, Imagery—Create next generation imaging, mapping, and apps for defense and intelligence communities to meet the needs of state and federal agencies, military, and private industry.

JavaScript App Product Engineer—Design and support Esri's dynamic and engaging Operations Dashboard for ArcGIS web application, which allows users to monitor, track, and report events driven by real-time data.

Location Analytics JavaScript Product Engineer—Transform the way organizations work by designing, developing, analyzing, documenting, releasing, and supporting location analytics within the Esri location platform.

Licensing and Copy Protection Product Engineer—Develop and implement the overall vision and strategy for licensing and creating copy protection tools and workflows within Esri products.

GIS Services

Technical Analyst, Application Developer—Interface with customers to provide design, prototyping, and development support for implementing Esri software solutions to make their GIS programs successful.

Program Manager—Direct skilled professionals who are tackling complex geospatial problems for clients around the world. Coordinate the deployment of Esri software solutions and empower organizations through projects that demonstrate the potential of ArcGIS.

Educational Services and Technical Support

Course Developers for Utilities and Public Safety—Work with the latest Esri software and apply your GIS knowledge, communication skills, and management experience to develop content for Esri solution training.

Technical Account Manager—Use your superior account management skills and experience to provide expert-level technical support and coordinate overall escalation management and technical solutions.

Sales

Account Executives and Account Managers—We're seeking seasoned sales professionals to prospect business development activities and focus on selling Esri solutions in a number of domains in locations across the United States.

Account Executive—Commercial Real Estate

Account Executive—Telecommunications and Cable

Account Manager—Health and Human Services

Account Manager—Transportation

Presales and Solution Engineering

Technical Marketing Specialist for Telecommunications—Build and deliver software demonstrations that communicate how GIS solves business problems to be used in pre- and post-sales support.

Solution Engineers—Help shape and deliver a strategy that demonstrates how Esri's ArcGIS platform can enable organizations to discover, use, make, and share maps for any device, anywhere they are. Opportunities are available in a number of domains and locations.

Marketing

Manager, Corporate Storytelling and Strategy—Develop marketing messages and stories for acquiring, nurturing, and developing new customers and transform Esri's brand in the new hyperlocal and location analytics markets.

Marketing Manager for Technology—Bring strategic marketing leadership to a team focused on building and managing activities that generate awareness for an engagement with Esri among developers and technology decision makers.

Marketing Specialist for Developers—Create and implement effective marketing activities that increase the adoption of Esri technology globally.

esri.com/careers Follow @EsriCareers on Twitter

EXELIS

Visual Information Solutions

What if your entire organization could share geospatial knowledge?

Sharing information can be a challenge – especially when your workforce is scattered across geographic locations and they all have different methods for accessing the geospatial information they need. ENVI for ArcGIS® allows everyone from your organization to use geospatial imagery and data, such as SAR and LiDAR, to enhance their GIS applications. ENVI products are fully integrated with ArcGIS so whether your team is analyzing imagery from a desktop computer, or they need to share the latest advanced image analysis tool with their colleagues via ArcGIS for Server, we have the imagery software to suit your needs. Now with ENVI, sharing information just got a little easier.

ENVI® for ArcGIS®

Information from Imagery Means a Better GIS.

For more information about ENVI® for ArcGIS®, visit **www.exelisvis.com/ArcNews**

esri Partner Network Platinum

Subscription Additions and Address Changes or Deletions

E-mail: requests@esri.com

Fax: 909-798-0560

Subscribe on the web: **esri.com/subscribe**

Subscribe outside the US: Contact your local distributor.

Unsubscribe on the web: **esri.com/unsubscribe**

Update information on the web: **esri.com/coa**

To request other publication services: See page 2.

143191

esri
380 New York Street
Redlands, CA 92373-8100

Presorted
Standard
US Postage
Paid
Esri