Esri News
for State & Local Government
Spring 2016

Integrating Severe Weather Data Helps Manage Snow Removal

By Matthew Balling, AICP, New York State Department of Transportation

Buffalo, New York, gets snow—and lots of it. Last winter, a number of surrounding areas—including parts of Erie, Niagara, Chautauqua, and Cattaraugus counties—were pummeled by lake-effect snowfalls.

During a snowstorm, Region 5 of the New York State Department of Transportation (NYSDOT) is responsible for maintaining 3,675 lane miles (length plus number of lanes) of highway used by commuters, freight haulers, and emergency responders in western New York. To do this, NYSDOT snowplow operators clear the roads on their assigned snow and ice beats while emergency managers use geographic information systems (GIS) in the background to help predict where the storm is going to make the biggest impact.

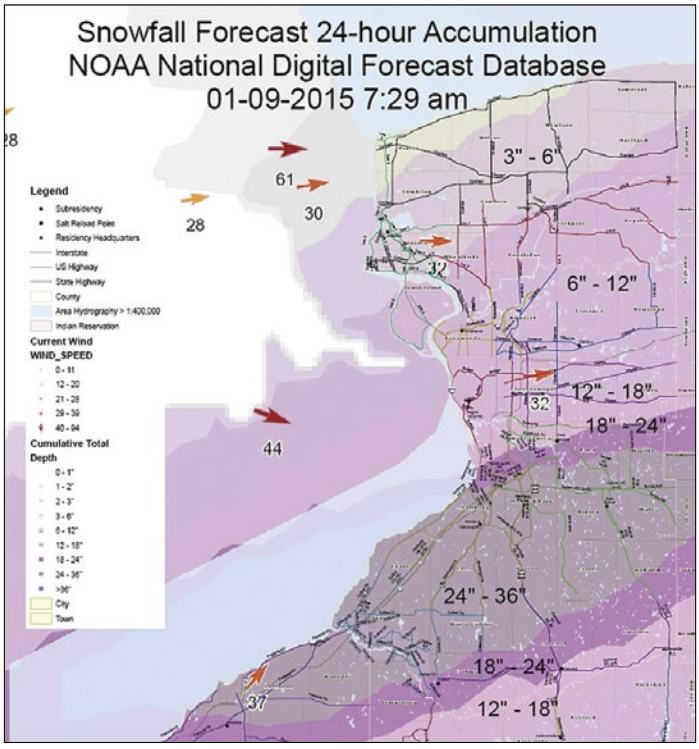
With assistance from the National Weather Service, the NYSDOT Emergency Operations Center developed two ArcGIS software-based map applications in January 2015 to help emergency managers better respond to severe snowfall events. To achieve more encompassing situational awareness, practitioners wanted to create reliable snowfall forecast maps that could be analyzed using GIS to predict a storm's impact on the transportation network.

Getting Accurate Snowfall Forecasts

Finding reliable sources of snowfall forecast data was challenging. NYSDOT does not maintain or generate weather forecasting data or mapping, so researchers at the department explored the data and tools available in ArcGIS Online to see what they could find.

The group quickly discovered that users affiliated with Esri generate a number of mapping products available to the ArcGIS Online user community. One of the maps NYSDOT discovered was the Severe Weather Web Map, which contains information from the National Weather Service.

According to federal policy, the National Weather Service is required to provide a diverse suite of products and services derived from its digital forecast databases. To get the most accurate and



↑ This map shows projected cumulative snowfall, wind direction and speed, maintenance areas, and plow routes.

up-to-date snowfall forecasts, the National Weather Service uses its National Digital Forecast Database (NDFD), which collects weather data 24 hours a day from field stations across North America. The NDFD makes its weather observations, forecasts, and warnings available to the public via databases that can be converted into maps, graphics, and GPS points.

NYSDOT ended up consulting with the National Weather Service's Buffalo field office, which recommended using the Severe Weather Web Map for its mapping applications. The map uses NDFD gridded raster data in KML format to show predicted snowfall, so NYSDOT implemented it as its basemap

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Engaging with Executives Is Critical to Your Success

By Keith Cooke, Esri State Government Account Executive

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

First, GIS really started to gain traction in government agencies and the private sector in the 1990s and early 2000s. Organizations wanted it but didn't always put a lot of thought into where it best fit within the organization as a whole. Often, it would fall under whatever department seemed the most able or willing to house it.

Over time, IT professionals saw the value of GIS in terms of how it could benefit the organization, whether it meant geoenabling an existing business system, providing spatial insight to other departments, or using it as a way to share data with the public. That's when the game changed. GIS evolved from essentially a niche technology to a mission-critical business system. As a result, we've seen IT departments increasingly embrace what was previously seen as an outlier technology.

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

As a result of these two big shifts, the role of the GIS professional has forever changed—and for the better! The traditional days of sitting in a corner cubicle and printing out paper maps in a reactive mode are long gone.

Colleagues expect more.

The public expects more.

And executives demand more.

Therefore, being able to engage with executives is a crucial factor in the future of a GIS professional's success.

So how can GIS managers do this? Engaging with executives takes some prep work. Three changes in your approach pave the way for better interactions with executives.

Understand Their Pain and Vision

Before you schedule a meeting, you need to understand two key things about the executives: you need to know their pain and their vision. They have something that's frustrating them—something that's keeping them up at night and that's putting pressure on them. They probably also have a vision—a specific goal—that they want to achieve.

So what exactly are their pain points and vision? Don't be afraid to ask. I ask executives this question all the time, and you'd be surprised how willingly they'll share this information.

Change Your Terminology

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

Your conversation with executives should focus on three things: organizational workflows, mapping, and analysis. Typically, I try to avoid all mention of GIS jargon and vendor-specific terminology when meeting with executives. I've even had very productive conversations where we never even mentioned the term *GIS*. Focus on how mapping and analysis can be integrated into workflows—not just to make a map but to optimize workflows; make better decisions; and enable collaboration, communication, and transparency.

For example, focus on how GIS can be integrated into your organization's business systems. Are you using location analytics to get the most out of your permitting or asset management system? Are there other business intelligence systems that have a location component that could be mapped and analyzed?

Create Solutions

The most effective way you can become a trusted adviser for an executive is to take the information given to you and map out a solution. I would even submit that this could be the most important role a GIS professional plays in an organization.

To do this, first identify the problem, its cause, and the negative impact it creates. The next step is to produce the solution by stating how you plan to solve the problem and what the positive outcome can be. Keep this solution map short and sweet and at a high level. And again, avoid technical terms and jargon. Executives don't

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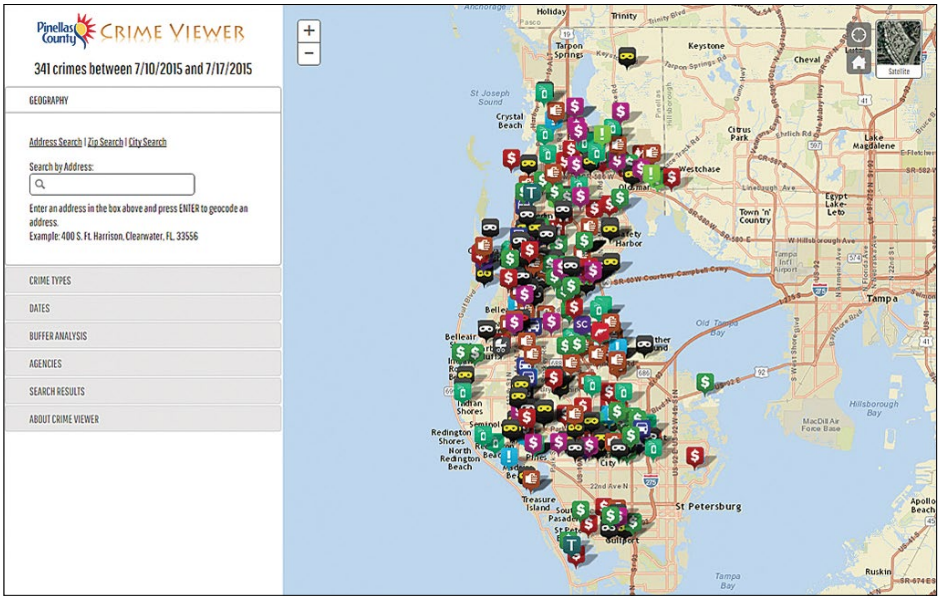
Slashing Development Time and Cost with COTS

To keep pace with its enterprise vision, Pinellas County, Florida, created a GIS governance committee to guide county GIS projects—in particular, web map and app creation with Esri commercial off-the-shelf (COTS) software. With help from Esri professional support staff, the county upgraded its public GIS website and created an ArcGIS Open Data site to serve the needs of county residents as well as its municipalities.



↑ The Enterprise GIS team created a Crime Viewer, which displays all crime statistics for the current week to the media and citizens.

Power Steering

Since 2006, Pinellas County's eight-person GIS staff has tirelessly provided application development, data analysis, and cartography services to all county departments. As a result, practically every department manager understands the benefits of GIS and has vouched for it as a tool that promotes efficiency.

Impressed by that consensus, the county chose executives from various constitutional offices around the county to form the Pinellas County Enterprise GIS Steering Committee to prioritize and potentially fund projects. Concurrently, the county assembled the Enterprise GIS Working Group, a team of GIS practitioners that would actualize the projects and applications ordered by the committee. At the recommendation of Esri Professional Services, the county used ArcGIS Online so that specialized web maps and apps could be built quickly.

"The working group's departments rely heavily on ArcGIS Online to meet the county's GIS demands across a broad spectrum of business applications," said Bryan Zumwalt, GIS manager, business technology services. "Many of the COTS solutions in ArcGIS Online enable us to create applications fast without any need to code and with great business impact to our GIS user community."

"In less than one day, we solved the problem of delivering timely FEMA [Federal Emergency Management Agency]. and county data to the public," said Michael Dawson, senior GIS developer at Pinellas County. "Using ArcGIS Online and COTS technologies helped us cut our development time and costs to a fraction of what a custom application would've been."

Within months, the county built a professional collection of GIS viewers using ArcGIS Online preconfigured resources—specifically, templates that easily display county data. For example, tapping the county's aerial i magery database, the team made a web map for land managers who needed to assess land change and compare older imagery with newer datasets. When county and city police departments requested a web map that displayed crime statistics for media and citizens to access, the enterprise GIS team created a crime viewer.

Within weeks, the group created and published on the Pinellas County website an impressive collection of viewers that provide access to information on topics ranging from manatee sightings to construction projects.

Moving from Legacy Systems

All this work didn't happen overnight. Pinellas County needed a plan to replace its legacy Autodesk MapGuide viewers so it could maintain a sustainable web presence. Pinellas County used its credits for the Esri Enterprise Advantage Program (EEAP) to implement recommended best practices. The group also asked EEAP staff to conduct security vulnerability, scalability, and testing workshops for departments migrating to ArcGIS Online.

"Using EEAP takes all the guesswork out of how we should configure our infrastructure," said Zumwalt. This allowed the county's staff to focus its efforts on delivering business applications and serving the end users. "It's nice to have high-caliber personnel from Esri make sure that we're following the best practices that will continue to make our program successful," Zumwalt observed.

Sharing Open Data

Other cities and towns in Pinellas County have become users of the county's

ArcGIS Online subscription. This allows them to create their own maps. To help those municipalities more rapidly create web maps and apps, the county worked with data stewards from internal departments to create an open data portal and publish the county's internally managed datasets for use by other municipalities. In just weeks, Pinellas made 117 of its layers publicly available in a portal created in ArcGIS for Server.

"Our municipal partners can create and publish applications straight from the ArcGIS Online platform, rather than us having to export shapefiles from geodatabases and email them," said Zumwalt. "It's been much easier for them to come in and participate in our ArcGIS Online organizational account and retrieve the data they need and publish the data they collect."

For example, the city of Oldsmar has fewer than 14,000 people and just 66 parcels. It has used ArcGIS Online to create damage assessment maps after storm strikes. For Oldsmar and other cities that need to perform damage assessment, the Enterprise GIS Working Group configured Collector for ArcGIS with specific fields for gathering data on various kinds of storm damage. This data collection app for iOS and Android platforms is available on the Esri solutions website.

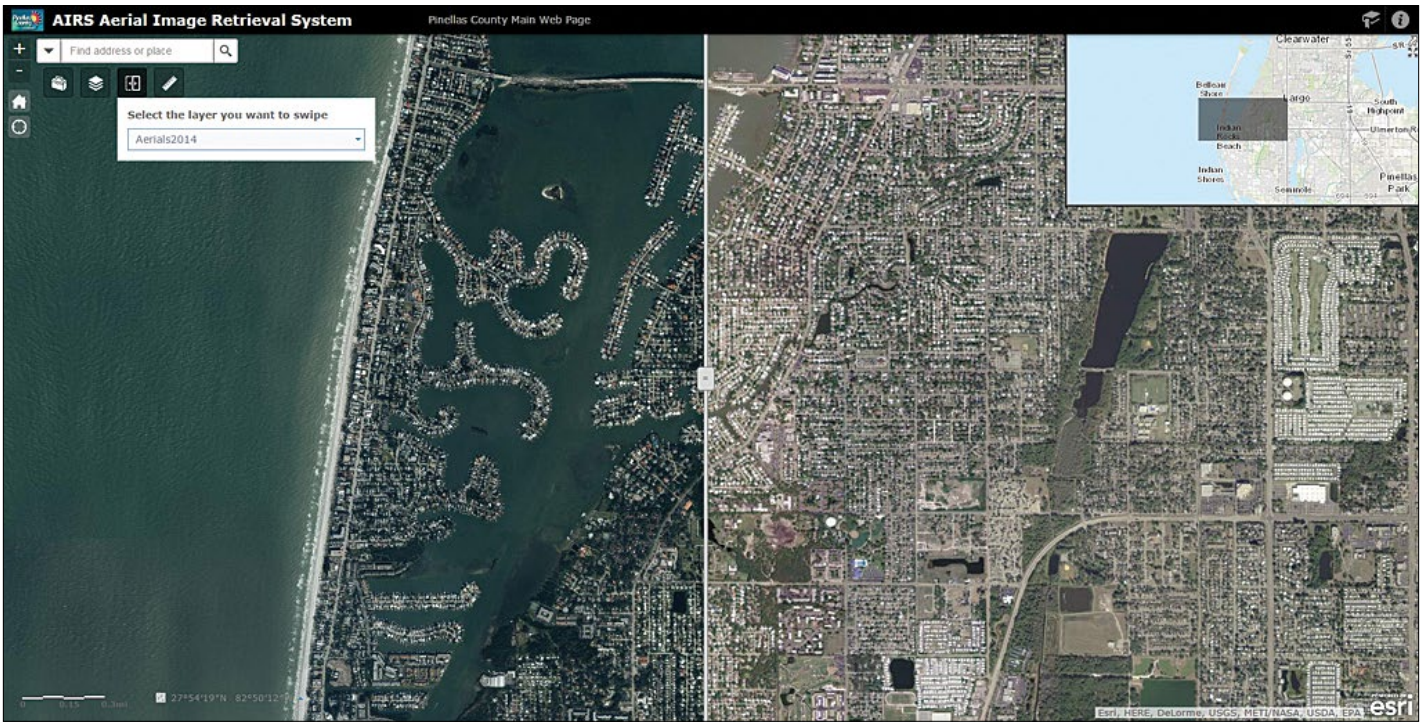
"For residential, commercial, industrial, or public properties, each has a different set of information for insurance and FEMA reimbursement purposes," said Zumwalt. "The Collector app is the perfect platform to collect data that will eventually aid the county in potential reconstruction efforts, as well as share data among internal departments and other agencies."

Now many municipalities within Pinellas County continually populate the portal with data, thus making it a robust mapping resource.

Asset Inventory Mapping

Pinellas County used several ArcGIS for Local Government solutions to inventory department-specific assets and organize this information for future maintenance management needs. For instance, the county's transportation group now uses the Sign Inventory solution to inventory all county street signage. The urban forestry group has similarly begun using the Street Tree Inventory solution to collect data on all of Pinellas County's managed trees.

"The county's asset management program will involve an implementation of a new GIS-based system for work management and capital improvement planning," said Zumwalt. "Using Collector and several ArcGIS for Local Government solutions to inventory county assets will help us get the full value and maximum return on investment from our enterprise asset management implementation."



↑ The swipe feature in Pinellas County's Aerial Image Retrieval System juxtaposes any two imagery datasets, such as the imagery from 2014 and 2004 shown here.

Navigator for ArcGIS Helps Fieldworkers Be More Efficient

Many consumer navigation solutions can take people from point A to point B, but businesses and organizations need more than that. They require support for commercial workflows such as inspections, service and repair, and local parcel pickup and delivery.

That is why Esri developed Navigator for ArcGIS, a new app launched at the 2015 Esri User Conference that empowers entire organizations to become more efficient in the field.

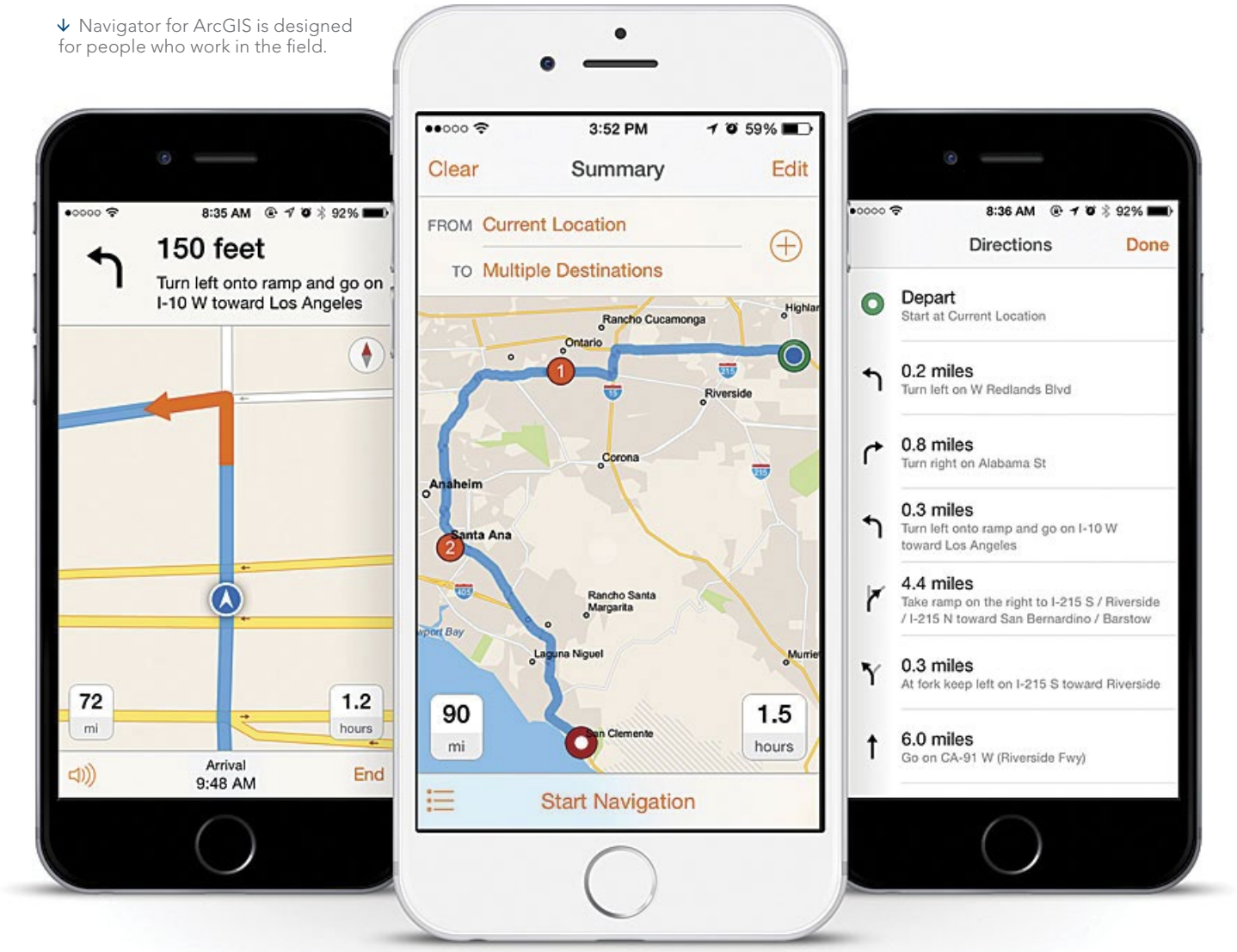
Tailored to the Field

Navigator is designed for people who work in the field: service technicians, rig operators, utility inspectors, and others. The app allows users to work even while disconnected, use their own data, and integrate with other apps. It also, of course, finds the best possible route for getting from one location to another, based on many factors not considered by standard routing apps.

Workers in the field can access directions on Navigator anytime, even when disconnected from wireless Internet or cellular service. What's more, staff can do this from devices they probably already have in their purses or pockets—their smartphones—instead of carrying a second device for GPS.

Navigator goes well beyond basic routing. The app includes commercial street data for the whole world, which users can

↓ Navigator for ArcGIS is designed for people who work in the field.



enhance or replace with custom street network data. Thus, workers can navigate street networks that are not available from any commercial data vendor—something that is especially useful when managing assets such as oil wells, forest stands, and utility poles.

Users can search and visualize their organization's own asset and location data as well. For example, instead of going to a street address and looking around for the right fire hydrant, field staff can simply search for "Fire Hydrant 126" and be directed to its precise location.

Another routing feature is vehicle mode. Users can specify what they are driving—a truck, a car, or even an emergency vehicle—and Navigator will calculate the most efficient route depending on the vehicle's road capability, height, weight, and curb-approach guidelines.

Navigator works seamlessly with other ArcGIS apps as well. Field staff can start Navigator from Collector for ArcGIS or Explorer for ArcGIS. It also works with other business apps via a simple URL scheme, which allows users to launch Navigator automatically by clicking an external link.

Once Navigator is open, field staff can access tasks created for them in other apps and see a list of all the stops they have to make. They can also plan ahead by creating a work list of all their stops for a given day. Navigator runs on all types of devices, too, from smartphones to rugged tablets.

Major Benefits

Navigator helps commercial organizations save money while improving performance and reliability. When field crews have more efficient navigation, they reduce mileage and travel time. This gives them more time to perform their duties in the field. Drivers can also focus on driving rather than navigation, which decreases the risk of traffic accidents.

Organizations can also use Navigator to get more from the data they already have, which improves performance. Most companies make investments to ensure that data is accessible, accurate, and up to date. Navigator taps into the ArcGIS platform to access this authoritative data—whether provided by Esri or the organization itself—and makes it accessible to everyone. This equips field crews with the newest and best information so they can make smarter, faster decisions.

Navigator is designed to help field crews operate more quickly, be more punctual, and miss fewer appointments. These advances in operations lead to greater reliability and consistency, which, in turn, build trust and boost customer confidence.

Navigation as a Platform Capability

Navigator delivers navigation as a platform capability and a mobile solution. When an organization adds navigation to its mobile workforce applications, it extends the power of the ArcGIS platform from planning to execution and unlocks efficiency in the field.

Engaging with Executives Is Critical to Your Success

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care about geodatabase designs, models, or widgets, nor should they. That's what they pay you to do.

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

Embrace Your New Role

Gone are the days when the GIS professional could fly under the radar and work independently of the organization's essential workflows and goals. But have no fear. There is a very important role for you to play in this new work environment. And to be honest, this evolution of your role is actually a process toward making you indispensable. This is your chance to make executives see both your role and GIS for what they really are: mission-critical elements to the success of the organization.

About the Author

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

Maps Locate Brighter Future for Homeless

DeKalb County Community Development Department provides affordable housing resources to the more than 700,000 residents who call the region home. Funded primarily by the US Department of Housing and Urban Development (HUD), the department acts as the collaborative applicant for the DeKalb County Continuum of Care program and funds several others to prevent homelessness and help those who are homeless find shelter and stability.

> "For the first time, we can drill down to the exact location of unsheltered individuals. By knowing where they are located, who they are, and how to find them, we can better serve our homeless populations and get them the help they need."
>
> **Melvia Richards**, Housing Manager
> DeKalb County Community Development Department

The Challenge

Every other January, teams of hundreds of volunteers embark on an overnight mission to locate and count unsheltered homeless people living in DeKalb County, Georgia. Their goal: identify people in need and provide them with available resources to get back on their feet. The homeless Point-in-Time (PIT) count is mandated every two years by HUD and is fulfilled locally throughout the country.

In preparation for DeKalb County's 2015 PIT count, the Community Development Department, in collaboration with Pathways Community Network Institute, planned to execute the census in the traditional fashion: equip boots-on-the-ground teams with paper surveys, pencils, and clipboards. Volunteers would collect hundreds of data points about homeless persons, and then workers would manually enter the information from the paper surveys into spreadsheets. The data would take three or more full days to enter, and once complete, the team would cross-check the spreadsheets with volunteers' handwritten notes for errors.

The Solution

DeKalb County's 2015 PIT count would signify two things: the county's inaugural census independent from a multicity collaborative on homelessness, and the first time any agency in the country would implement geographic information system (GIS) technology into its workflow. Initially in search of volunteers, the team consulted with the county's GIS department. What transpired was an idea to modernize the outdated paper survey by using the Esri ArcGIS platform and apply geography to discover new insights about homeless populations.

The GIS team created a custom mobile application using GeoForm, an ArcGIS web application template. The mobile app digitized the original survey and included new information layers. Instead of handwriting demographic data and block-level location points of unsheltered people, volunteers entered the information via cell phone. They used the app to quickly enter demographic data in a custom form, upload photos and notes, and pinpoint the exact location of each surveyed person. Teams analyzed the information in real time with live web maps and determined where to dispatch additional volunteers to high-need areas.

The Results

The ArcGIS platform helped volunteers collect reliable information faster and geolocate approximately 200 unsheltered people down to the street level. The data was instantly available in spreadsheets and web maps, saving the county time and money by eliminating hours of manual data entry. The Community Development Department confirmed existing data on where unsheltered people live and located other people in need of housing assistance.

DeKalb County can now employ the ArcGIS platform to track population patterns and trends over time to plan where and when to allocate services. With plans to expand the department's use of GIS, outreach workers are already utilizing the data to get people in need a home of their own.

Learn more about ArcGIS web app templates at esriurl.com/WebAppTemplates.

Civic Innovation

Promoting Civic Innovation and Participation

Esri Donates Credits to Code for America Brigades

Esri is excited to announce a new program that benefits and enhances civic innovation. Esri now offers vouchers for ArcGIS Online credits to Code for America Brigades for use when creating applications that support civic innovation. As a longtime supporter of government's mission to innovate, Esri is happy to provide this kind of support to people who are interested and committed to helping governments innovate the way they work. This program gives developers quick and easy access to either a developer account or an ArcGIS Online org.

"Through this program we are exposing new generation of civic minded people to geospatial technology," says Christopher Thomas, Esri Director of Government Markets. "By giving developers access to these powerful tools they are better equipped to help create solutions governments want and need."

Code for America Brigades are comprised of volunteers in cities throughout the U.S. who work with local jurisdiction to develop applications that meet community needs. These volunteers give their programing and web development skills, time, and passion back to their community.

Licensing Announcement

Esri Announces Big Changes to Small Government Enterprise License Agreement Program

Esri has announced a significant change to its Small Municipal and County Government Enterprise License Agreement (ELA) program. Municipal and county governments serving populations between 100,000 and 250,000 that have been looking for ways to build smart communities using Esri's GIS technology now have the opportunity to place data creation and analysis tools and apps into more hands. The expanded ELA program provides a new vehicle for these jurisdictions to join the hundreds of governments that have already leveraged the program to expand the ArcGIS platform throughout their entire organizations.

The ELA provides the software, training, and data that all government disciplines—such as planning, health, economic development, public safety, and public works—can use to improve employee effectiveness and communication with citizens. These governments can take advantage of the more than 150 ArcGIS for Local Government applications and open data offerings that act as the foundation for delivering smart approaches to government.

This ELA is for municipalities and counties in the United States only, and pricing is based on population tiers, which previously were limited to governments with populations up to 100,000. The eligible population tiers for the whole program now include the following:

Tier 1: Population 25,000 or fewer
Tier 2: Population 25,001–50,000
Tier 3: Population 50,001–100,000
Tier 4: Population 100,001–125,000
Tier 5: Population 125,001–150,000
Tier 6: Population 150,001–250,000

"A smart community is defined by the technology it uses," said Christopher Thomas, director of government markets, Esri. "The changes to the ELA program were made to help more governments become hubs of innovation."

Be Ready to Support the Next Election with New ArcGIS Election Solutions

by Howard Crothers, Esri Product Manager

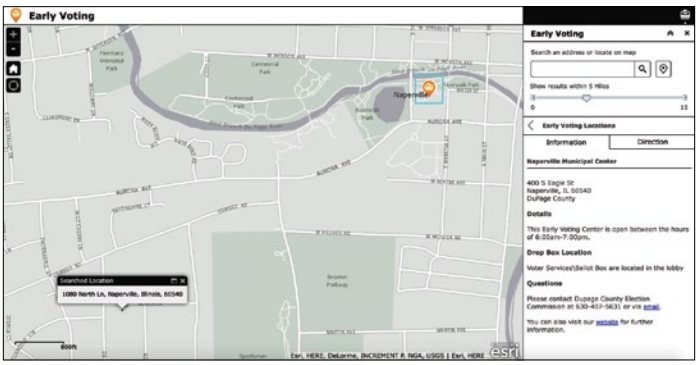
Before an election, citizens want to know where to vote. On Election Day, voters want to know how long the wait will be to cast a ballot so they can choose the best time to vote. As the polls close, people want to know who won and see detailed election results.

Making this information easily accessible can increase participation and engagement in the democratic process.

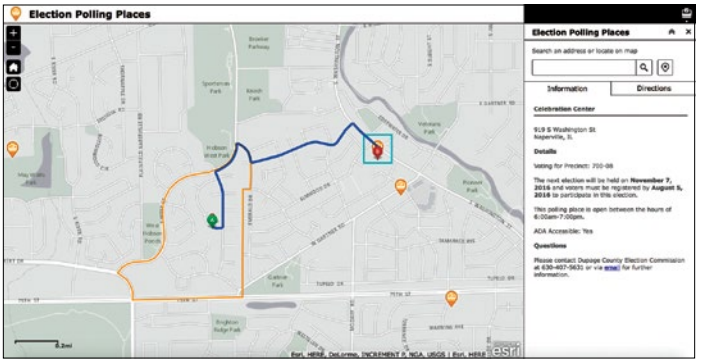
ArcGIS now includes a series of recently released solutions that enable governments to quickly deploy apps that inform citizens about where to vote, how long the wait to vote is, what the results of an election were and who is currently in an elected office. Organizations that license ArcGIS can download these election solutions at no additional cost.

Where do I vote?

The Early Voting app enables citizens to see early voting locations and hours, find the locations closest to them, and generate driving directions.



The Election Polling Places app helps citizens find where they can vote on Election Day. The app shows the location of polling places, allows citizens to input their address or click a location on a map to see the assigned polling place, and can provide driving directions. The app can also be configured to show detailed information about polling places such as precincts served, voting hours, and Americans with Disabilities Act (ADA) accessibility.



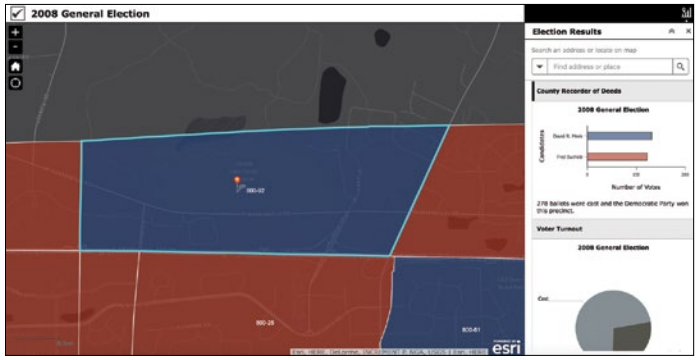
Both the Early Voting and Election Polling Places apps can be accessed by citizens through a web browser on a tablet, smartphone or computer.

How long will I wait to vote?

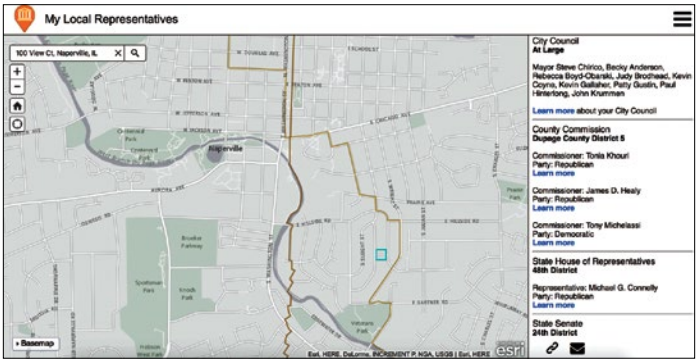
Polling Place Wait Times is a mobile application that runs on smartphones and tablets. Poll workers use the app on smart devices to log wait times at their assigned polling location. Wait times can be shared with citizens through the Election Polling Places app or in a map embedded in an official election website. Informing citizens about polling place wait times can help reduce peak surges in voter turnout by smoothing voter flow throughout the day.

Who won the election?

The Election Results app can be used to share election night results and historical results from previous elections. The app Results enables people to visualize and understand election results better than tabular information can.



My Elected Representative tells citizens who currently represents them in local, state and federal elected offices. The app also provides information about how to contact elected officials. Through the configuration process organizations can choose to put all levels of elected representation in a single app or create multiple apps for each level of representation.



Both Election Results and My Elected Representative apps are web apps that can be accessed on mobile devices and computers.

Be Ready

If your organization supports elections extend your ArcGIS implementation now to better inform citizens and foster a more inclusive democratic process during the next election.

Integrating Severe Weather Data Helps Manage Snow Removal

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in ArcMap. A critical step was being able to convert the data from KML into layers using the KML To Layer tool in ArcGIS for Desktop, which allowed NYSDOT to adjust the symbology and further refine the weather data.

Engaging Framework Data

NYSDOT also has GIS framework data that consists of various feature classes for highways, capital assets, community facilities, and natural landforms. The highway network data, symbolized as lines, documents all the highways NYSDOT is responsible for maintaining. DOT storage facilities that house plowing equipment, salt, liquid de-icing agents, and fuel are represented as point feature classes. The framework data displays the maintenance boundaries for each NYSDOT office as well, and Region 5 has GIS data that shows the highway routes traversed by specific plow drivers.

The initial purpose of developing this framework data was to create operational maps for snow and ice removal. However, the NYSDOT researchers repurposed it to figure out which DOT facilities and plow routes could be most impacted by a severe snowfall event. Combined with the GIS data for predicted snowfall, NYSDOT could understand the magnitude of expected conditions, as well as the spatial context needed to begin planning snow removal.

Two Advantageous Maps

After the NDFD and NYSDOT GIS framework data was incorporated into ArcGIS Online, the department created two map layouts that the Emergency Operations Center can activate for severe snowfall response. The 72-Hour Cumulative Snowfall Map, which is updated every 12 hours during events to help plan for upcoming operational periods, displays the predicted snow accumulation in the area plus the parts of the transportation network and locations of NYSDOT facilities expected to be most affected. The 6-Hour Snowfall Forecast Map goes a step further, displaying the forecasted snowfall amounts in 6-hour increments. This allows NYSDOT to estimate the predicted rate of snowfall per hour.

Using these maps—which are printed and posted on the walls of the Emergency Operations Center and emailed in PDF form to affected DOT offices—emergency managers can keep emergency responders well informed about potential conditions. Managers can also identify areas where a storm may have the greatest impact on transportation so they can allocate NYSDOT resources there for a specified amount of time.

For more information, contact Matthew Balling, NYSDOT Region 5 transportation analyst at matthew.balling@dot.ny.gov.

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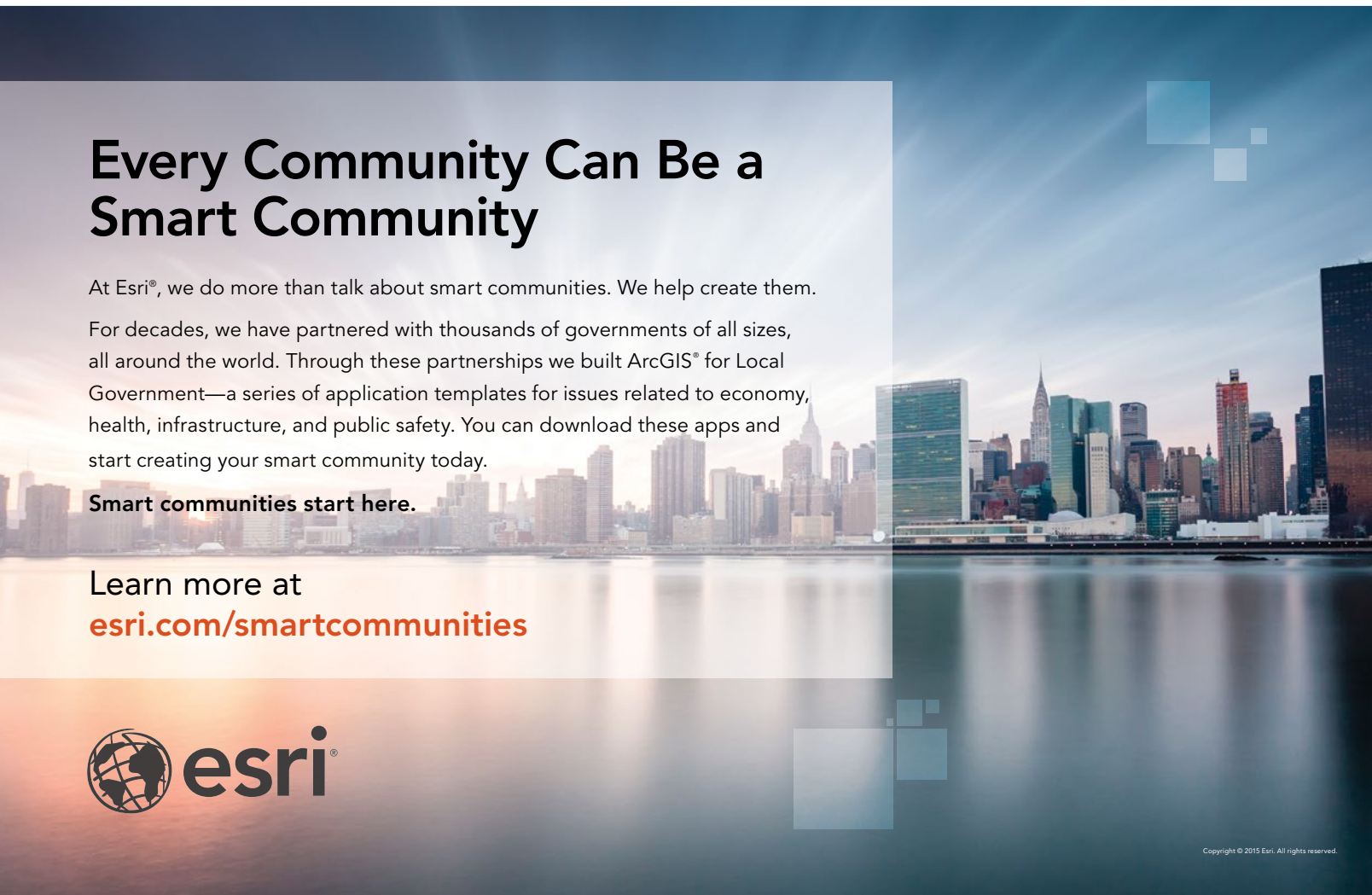

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