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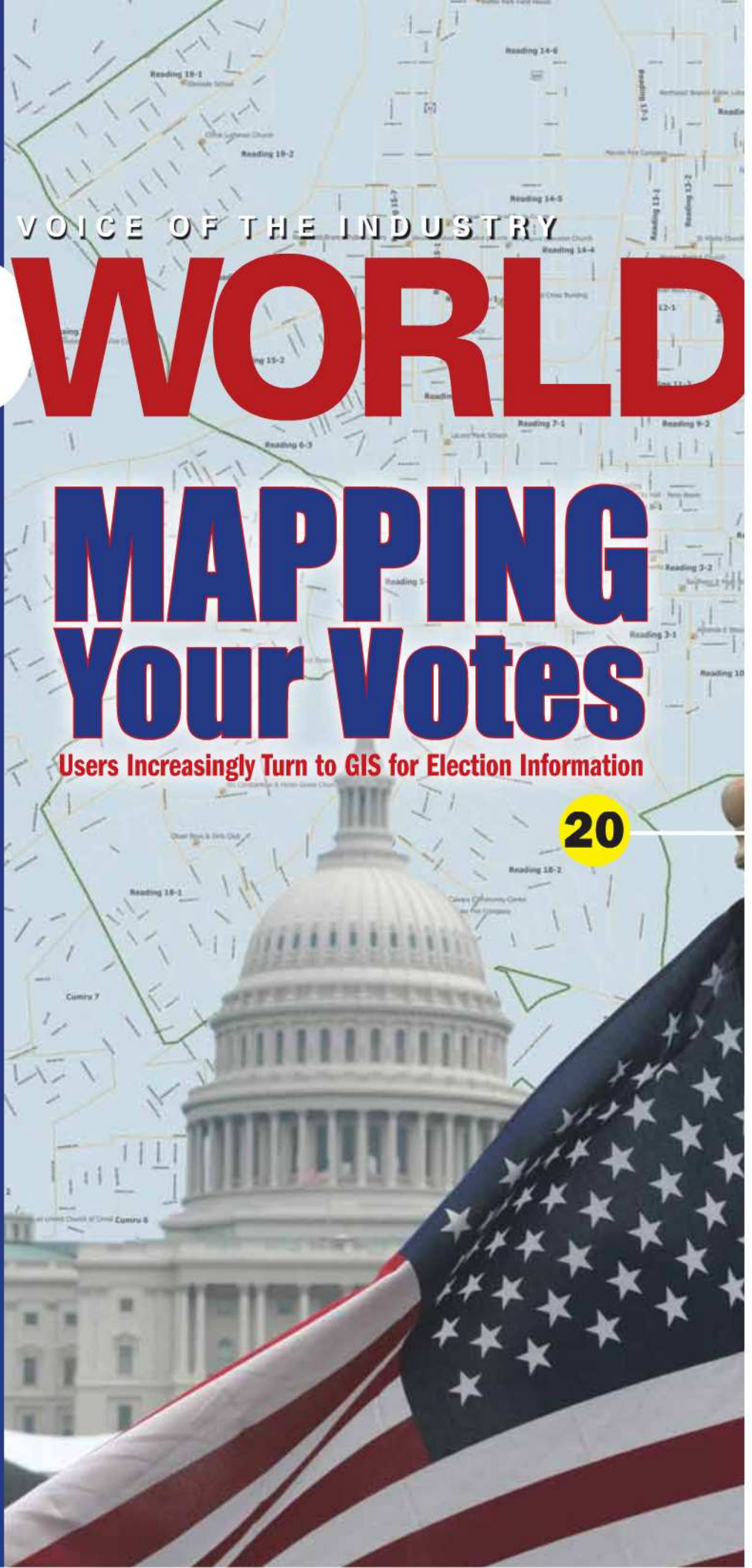
NOVEMBER 2008

MAPPING Your Votes

Users Increasingly Turn to GIS for Election Information

20

FEDERAL SPECIAL ISSUE





20 Mapping Your Votes

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BY L. SCOTT TILLET

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NOVEMBER 2008

NewsLink 8

NetLink 10

Government Connection 12

Product News 28

Business News 29

Advertiser Index 29

FEATURES



Keeping Democracy Honest – Philadelphia GIS Boosts Election Oversight 24

BY MEGAN HECKERT

COLUMNS

POSITION 6

Sometimes the Government Just Can't Win BY KATHLEEN HASTINGS

BEYOND MAPPING 16

Discover the "Miracles" in Mapping Data Clusters BY JOSEPH BERRY

INTERSECT 18

How Can Your IT Group Make Your GIS Project Successful?

BY MARK DOLEZEL AND JANET JACKSON

TECH TIME 30

But Where Will You Be in the Future? BY PETER BATTY

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Keeping Democracy Honest

Philadelphia GIS Boosts Election Oversight

On April 22, 2008, Philadelphians left their homes and workplaces to head to the polls and cast their votes in the primary elections. For the vast majority, it was a straightforward process: they went to their local polling location, gave their name and (if they hadn't voted there previously) ID, and cast votes for the candidates of their choice.

But for others, the day wasn't so simple: some people found they weren't on the voter rolls, others that their party affiliation had mysteriously changed, and still others were turned away because someone else had already voted in their names or left because they felt intimidated by campaign volunteers or polling officials.

The truth is that these events aren't as uncommon as one might think. Even in this oldest of democracies, relatively few (if any) elections are carried off without a hitch. And no one knows this better than Philadelphia's Committee of Seventy.

Election Oversight

The Committee of Seventy (Seventy) runs the oldest non-partisan, local election oversight program, and it

was established to fight for free and fair elections in Philadelphia. For more than a century, Seventy's activities have included monitoring Election Day irregularities to ensure that all citizens can exercise their right to vote.

Seventy works with the Lawyers' Committee for Civil Rights Under Law, a national election-protection organization, and several local partners to coordinate the Election Oversight Program. On Election Day, Seventy deploys hundreds of volunteers to Philadelphia polling places to monitor, document and resolve election irregularities through the combined efforts of field volunteers at polling places, office volunteers answering phones at a hotline call center, team leaders and a senior-management team at the command center, and attorneys trained in election law in election court.

In the call center, office volunteers field calls from voters, polling officials and field volunteers reporting election irregularities, and they enter the incidents into an online database. Team leaders review the database, determine if the problems require a response at the polling place and immediately coordinate with the team closest to the incident to respond accordingly.

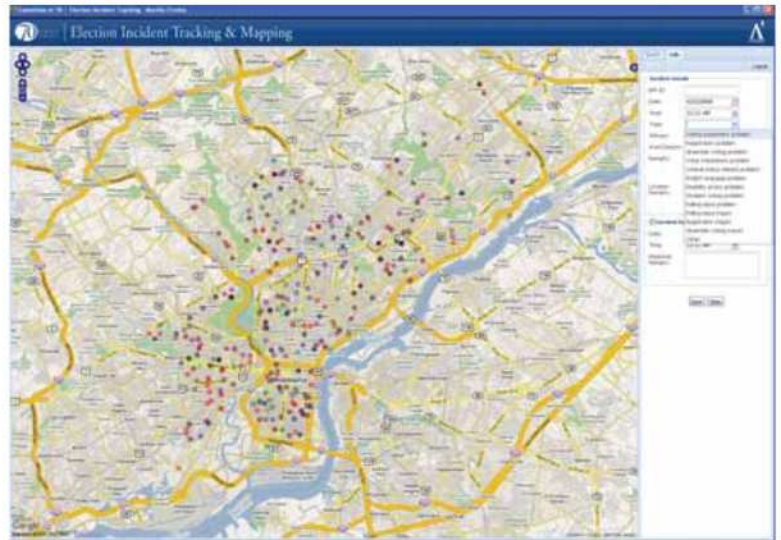
Incidents range from polling locations being moved without notification and problems with voting machines to electioneering (campaign workers and materials within 10 feet of the polling-place entrance) and voters experiencing intimidation to vote for a specific candidate or not at all. When serious violations occur, the events are documented, and Seventy coordinates with law-enforcement agencies for follow-up.

As calls come in, incident details are tracked in an online database. Seventy typically has used a paper push-pin map in the command center to track incidents and determine the most important areas for targeting field teams. Although this was helpful, the map wasn't something that could be circulated among staff, with the management team or to volunteers in the field. Also, it wasn't necessarily a real-time representation of reports.

In mid-2007, Seventy started looking into how GIS might be employed to help record, map and analyze these incidents, improving communication and facilitating quick response to problematic trends as they unfold, while also providing data that might guide future analysis and action.

2007 General Election: Paper Maps to Desktop GIS

Unsure of how this might work and with a relatively short time before the general election, Seventy decided to start with a simple desktop system. The primary challenge was to create a GIS that would enable quick recording of incidents and rapid map generation throughout the day.



● A Web-based system enables easy entry of all incident details on a single screen.

The catch was that a variety of maps were needed, including maps showing individual incident locations as well as aggregations by larger political boundaries indicating relative numbers and proportions of different types of incidents. Moreover, these tasks needed to be performable by volunteers with limited GIS experience.

Seventy turned to Avencia Inc., a local GIS software-development firm, to help. Using ArcView 9.2 and taking advantage of ModelBuilder technology, Avencia created a series of models that would automatically perform the aggregations. These models were designed to take the incident point data and create choropleth maps aggregated to wards and council districts to show the number of incidents in each area as well as chart maps displaying the types of incidents occurring in each region.

Users placed each incident based on a pre-geocoded layer of polling locations. In addition to location, other incident details were entered, including time, ward and division, type of caller, type of incident, and a description.

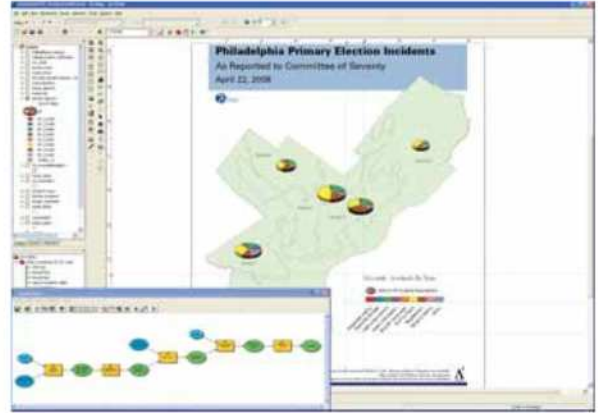
The aggregated maps were revised by running the models and generating PDF files that then were used by the central management team to see incidents as they developed in their region to enable efficient dispatch of legal teams. New maps were generated roughly every two hours. Viewed as a time series, the maps illustrate how the types and locations of incidents shifted throughout the day.

With few hotly contested races in the election, Seventy wasn't expecting a large number of incidents,

but, with the relatively low turnout of an off-year election, 139 incidents were reported. The reports ranged from the expected and relatively innocuous, such as voters unsure of their polling place's location; to troubling and bizarre, such as electioneering, questionable behavior by polling officials, rumors of thugs hired to intimidate voters and, perhaps the strangest of all, a local committeeman sitting in a van passing out alcohol and suspected by some to have a gun.

Although the mere report of an incident is no guarantee that it actually happened, or that it happened in the way described by the caller, these reports and their accompanying maps helped paint a near-real-time picture of what goes on at the polls as well as what issues and geographic locations need the most attention from voting officials.

The maps were particularly important to "management staff and senior-level volunteers who needed to understand problematic trends—as they developed—so teams could respond quickly," notes Jonathan David, Committee of Seventy's election program coordinator. "Another benefit of the maps was that, for the first time, we were able to easily see how frequently problems were occurring in council districts, which are too gerrymandered to easily discern on the old push-pin map."



● A desktop system uses a series of models to automate creation of aggregated maps depicting the number and types of incidents at various geographic levels, including state senate districts.

The 2008 Primary: Incidents on the Web

As helpful as they were, the desktop-based maps were of limited utility in the field, where real-time access to the data is important. The project's long-term vision was to create a software system in which the incident maps could provide information about the distribution of events at the end of the day in static form as well as be viewable in real time by team leaders, field volunteers, the media and the general public. Seventy envisioned a Web-based system that would be easily accessible regardless of location and enable more automated entry of incident details.

With expectations of a higher-than-usual voter turnout and a large number of newly registered voters, Seventy and the Lawyers' Committee for Civil Rights Under Law mobilized 800 volunteers in anticipation of a busy day in the field and in their hotline command center for the April 2008 Primary.

With funding from the William Penn Foundation, Committee of Seventy and Avencia were able to design and build a proof-of-concept application to address some of the basic needs of the Election Oversight Program. Using a mix of open-source and consumer mapping software tools that included Google Maps, OpenLayers, GeoServer and PostGIS, Avencia built an application that would enable fast Web-based data entry as incident information was received and easy search by incident types.

Calls to the command center were entered into a database by volunteers and then manually entered into the mapping system. But the new application enabled all information to be input on a single screen, automatically placing incidents on the map based on



● An interactive map enables users to click on any incident marker for details.

precinct numbers and color-coding them based on incident types.

Authorized users could log into the system to update incident information or add details of responses. Although only registered users could enter or edit incident information, the interactive map was accessible by the public.

Avencia contributed legislative district boundaries from its Cicero Web service to add district boundaries for state senate and assembly, city council, and congressional districts. These additional map layers could be turned on and off to provide important contextual information as events unfolded.

It proved to be a busy day for volunteers at the command center, with more than 400 incidents reported. With the Web site projected on the command-center wall, each new incident added a little color and another interesting story illustrating Philadelphia's primary election.

Future Developments

The system continues to be a work in progress. Additional funding is being sought to add features to the system that may include the following: automated e-mail alerts to users registered for a particular geographic area, GeoRSS feeds, automated transfer of data from the call-center database, real-time aggregated maps, trend charts, time-based filters, hot-spot maps, summary reports, display of clustered incidents and other features.

So far, the maps have shown that most incident types are fairly evenly distributed across the city. Democracy is messy, and election-law violations occur, but there was no strong evidence in the most recent elections to suggest coordinated efforts to affect election results within particular legislative districts. Although perhaps a slightly less interesting story from a journalistic perspective, this is good news for Seventy and the voters of Philadelphia.

The new digital version of the election-incident maps has already enabled improved operational response, and better communication with journalists and the public as well as higher-quality analysis in the weeks following each election. Philadelphia's Committee of Seventy has long been a national leader in regional election-monitoring efforts, and these software tools have enabled the organization to set a new standard for how such operations are managed.

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