

City of Virginia Beach Unifies Spatial Data With Autodesk MapGuide



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GIS coordinator
City of Virginia Beach*

Before January 1, 1963, Virginia Beach was mostly a resort town on the oceanfront, where people came to enjoy the surf and sand, stroll along the boardwalk, play miniature golf and other beach-town pastimes. But on that day, the oceanfront city annexed all of Princess Anne County, which extended well inland, to create what the city fathers called "the largest resort city in the world." Today, with a population of 425,000, Virginia Beach remains the largest city in Virginia and the 38th largest city in the United States. Its metropolitan area encompasses a sprawling 258 square miles; by comparison, Washington, D.C. is 61 square miles.

With so much ground to cover, and with developers, planners and utilities busily building out infrastructure throughout the metro area, the city's map rooms were some of the most well-trafficked areas in city government. At the map rooms, staff spent hours each day retrieving and copying paper maps—tax parcels, plats, zoning maps showing commercial and residential areas, sewer and stormwater plans with the latest improvements. In addition to paper maps, city agencies maintained computer-aided design (CAD) drawings for many of these features, but in varying formats such as Microstation .dgn or ArcView .shp files.

In 2000, the city resolved to create an online geographic information system (GIS) that would unify all of its paper and CAD maps. The city's eMapping application gathers spatial data from various sources across the government into one easily accessed site on the city's Web-based intranet. Built on Autodesk Map™ and Autodesk MapGuide®, the GIS has generated positive reviews and has seen steadily increasing numbers of users from all over the city government since launching in March 2001. The city rolled out a public version of the eMapping site (www.vbgov.com/e-gov/emapping/) in April 2003, available to anyone over the Internet.

'They Don't Have to Be Experts'

Rob Jessen, Virginia Beach's GIS coordinator, said that before moving to eMapping, the city's main map room was often a crowded place. "There was constant walk-in traffic," he said. "There's a very high demand for maps here, and there were paper copies of everything. If people in a different building were preparing a report that required a map, they would have to walk across the government campus just to look at it. So from a productivity point of view, it made a lot of sense for us to move to a Web-based GIS."

Centralizing the city's map data on a Web-based system didn't mean that users had to become GIS specialists, though. "People don't have to search for a lot of this information because it's right at their fingertips, and it's presented in a very simple, visual way," Jessen said. "They don't have to be experts. There's one plug-in for their browser, we give them one class, and they're off and running."

As an example, Jessen said that before the GIS went online, a developer planning a new subdivision had to visit several different agencies to get maps. "First they would have to go to Zoning and Planning to find out where the commercial zone boundaries were," he said. "Then they would go to Public Works or the real estate assessor's office to see the parcel layouts for their plots. Then they would go to the utilities to see if there were any water or sewer easements already running through the property."

"Now all of those maps are available from the same place, over the intranet, and it takes about a minute," he said. "With [Autodesk] MapGuide, we were able to take all these disparate sources of data that resided in different agencies—paper maps, different kinds of CAD formats—and put them together as one application."

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Flood Zones and Jet Noise

The newly available public Internet site is expected to complement the city's already rich "e-Gov" efforts for citizens and businesses, which include the ability to pay parking tickets online; regular HTML bulletins of city news; Web pages that show current bids for city contracts, online reporting of problems like potholes and graffiti; and live, streaming video of City Council hearings. "Access to the GIS will help citizens because when they're looking for homes, for example, they can research where the house is located and which schools are nearby," Jessen said. "They can see who their City Council member would be, where the police and fire stations are, or hazards like flood zones or aircraft noise zones."

Noise is an issue in Virginia Beach because the city's area includes Oceana Naval Air Station, the largest Navy air base in the United States, where F-14 Tomcats and F/A-18 Hornets roar on and off the runways once every two minutes, on average. Given the huge air base and its flight paths, the city requires that for any new home sold, agents must disclose where it falls in the Air Compatibility and Usage Zone, or AICUZ, which shows both accident potential and comparative decibel levels of noise. Citizens, developers and civic groups refer to the AICUZ frequently, and the AICUZ "layer" on the city's eMapping GIS is expected to be popular.

On the intranet side, other layers on the GIS include: interstate highways; capital improvement projects; water features such as lakes and streams; demographic features such as election districts, ZIP codes, census blocks and voting precincts; and utility service areas with water, sewer and stormwater lines. The city's agricultural agency, farmers and developers use a soil layer that shows how much sand or clay is in a given lot and whether they would have to build a septic tank.

Other GIS Users

Property Records. Tax parcels are searchable by street address or parcel number; type in an address, click on a table and the user is switched to another database with plats, deeds and the property's latest appraisal figures. If planners need to contact the homeowners adjacent to a given parcel, they can click on surrounding properties and the GIS will pop out a list of mailing addresses. "That's a big time saver," Jessen said. "That used to be a much more painful process of typing everything in manually,"

Planimetrics. A "planimetrics" layer on the GIS shows the footprints of most buildings, parking lots, driveways, docks and sidewalks, which helps stormwater planners calculate runoff levels. The fire department consults a layer showing the locations of all hydrants. Traffic engineers use a layer where they can search for a specific traffic signal, and once they find it, they can pull up a design plan showing the signal's timing.

Streetlight Inventory. The city has also recently developed a streetlight inventory feature that is expected to save money on maintenance costs. "If you're in the Public Works Department, the GIS has a map of all the streetlights in the city," Jessen said. "When a streetlight goes out for whatever reason, we have a team that goes out to check it and reports back. The GIS delivers a map showing the lamps that need attention, we send it to the power company and they give us a discount on the city power bill. It's great for tracking."

Pipe repair requests. Other special applications that the city devised for the GIS were focused on utility infrastructure. The utilities contribute a map showing water pipes that have experienced leaks; if a city resident calls to complain about a leak, city engineers can quickly click to an eMapping map of the area the resident is calling from. If the leak is

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from a water main, the city will send out a repair team; if the leak is shown to be on private property, the caller is advised that repair is their responsibility. Similar functions exist for mapping sewer backups online and coordinating repairs.

Water quality. The city also has been using the MapGuide GIS to help monitor the quality of its drinking water. Using monitoring sites throughout Virginia Beach, the city tracks the levels of chlorine and ammonia in the water-levels that tend to decrease slightly the further away water moves from the treatment plant. "By mapping the chlorine levels visually, we can see patterns developing before they get too far and be more proactive," Jessen said. "We can add more chlorine to the filter in Site X, say."

Neighborhood Traffic Program. City traffic engineers have found the GIS useful in their work with the city's Traffic Calming Program, in which the city fields calls from residents requesting signals, signs, increased traffic enforcement or lower speed limits. "People will call in to say there are too many people speeding, or too much cut-through traffic," Jessen said. "When they get a call, they can go into the GIS, go to the neighborhood they're in, check the accident history and look at the connecting roads. They can see if that neighborhood has already qualified, or if it won't because it's in an industrial zone. They can usually respond to callers right away." Traffic engineers can also use the GIS to measure from the edges of pavements to calculate walking times for pedestrians, a task that used to require a field visit.

Future Plans

The city is considering adding an eMapping site for contractors, who would use Autodesk MapGuide as a document management system when they review water and sewer plans. Engineering and surveying companies would log in with a secure password to

download plan data that is more detailed than the maps currently available on the GIS. In the post-9/11 world, that proposal still must go through security review by a city GIS panel, as well as the Army and Navy, which are concerned about allowing too much infrastructure data to be available online. The city also plans to add more "cultural" features to the GIS, as well as recycling and trash routes, polling places, a new function showing work orders for pavement and sewer work, and aerial photography. These databases can all be linked to through Autodesk MapGuide because of MapGuide's ability to reach into any ODBC (open database connectivity) source for data.

As Jessen spoke, the city was in the first week of a small marketing campaign to promote the GIS to public users. He expected it wouldn't be long before the Web site gathered its own momentum among Virginia Beach citizens. "We're just going to send the news to the local newspaper and the TV stations," he said. "If our experience is anything like it was with government users, we'll have plenty of Internet users before long. The best argument for the GIS is the GIS itself."

This case study was prepared by DLT Solutions of Herndon, Va., Autodesk's master government sales and marketing partner. DLT and Authorized Autodesk Resellers deliver the complete family of Autodesk and companion products to federal, state and local government agencies nationwide. For a free demo CD, call 888.447.ACAD (2223) or visit www.autodeskgovernment.com GSA schedule # GS-35F-4543G.