GEOGRAPHIC INFORMATION SYSTEMS

Oblique Aerial and Street Level Photography Project

Data scheduled for delivery to local assessment offices in 2011

Following a formal 2009 Request for Proposals (RFP) process, the Westchester County Department of Information Technology (DoIT) selected Pictometry International Corporation (www.pictometry.com) to supply countywide oblique aerial imagery and street level photography.

This county-sponsored procurement follows the recommendation of the March 2009 Collaborative Assessment Study, which found that using these images can improve both efficiency and fairness of property valuation, and concluded that economies of scale of a countywide effort made the project practical. High-accuracy imagery is also officially accepted by the International Association of Assessment Officers (IAAO). The Standard on Mass Appraisal of Real Property *Alternative to Periodic On-Site Inspections* says, "Jurisdictions may employ a set of digital image technology tools to replace a routine cyclical field inspection with a computer assisted office review."

Oblique images are different from traditional orthophotography (the straight-down view already used in county and local government mapping programs), providing unique three-dimensional views of structures from all sides. Pictometry's Electronic Field Study (EFS) viewing software also provides tools to measure the height and width of buildings and other features from the four-inch resolution oblique images (one pixel represents approximately four inches of visible surface).

Sub-inch resolution street-level photography can also be used to assess the quality, grade and physical condition of structures. New 360-degree images will be captured on every roadway in the county by Pictometry's subcontractor Facet Technology Corp. (*http://www.facet-tech.com*), whose viewing software links the photos to local assessment property information and provides additional measuring tools.

In addition to making the imagery accessible to local assessors, the contract calls for integration of the imagery into the county's E911 system for emergency dispatchers.

The project kick-off was held on July 20, and a communications meeting for local governments is scheduled in August. The **Town of Ossining** and **Village of Scarsdale** will be working with the county as "pilot" municipalities prior to full implementation. Data capture is scheduled for Fall 2010, with data delivery and integration with local government systems slated in 2011.

For more information, contact Sam Wear, *stw1@westchestergov.com*.
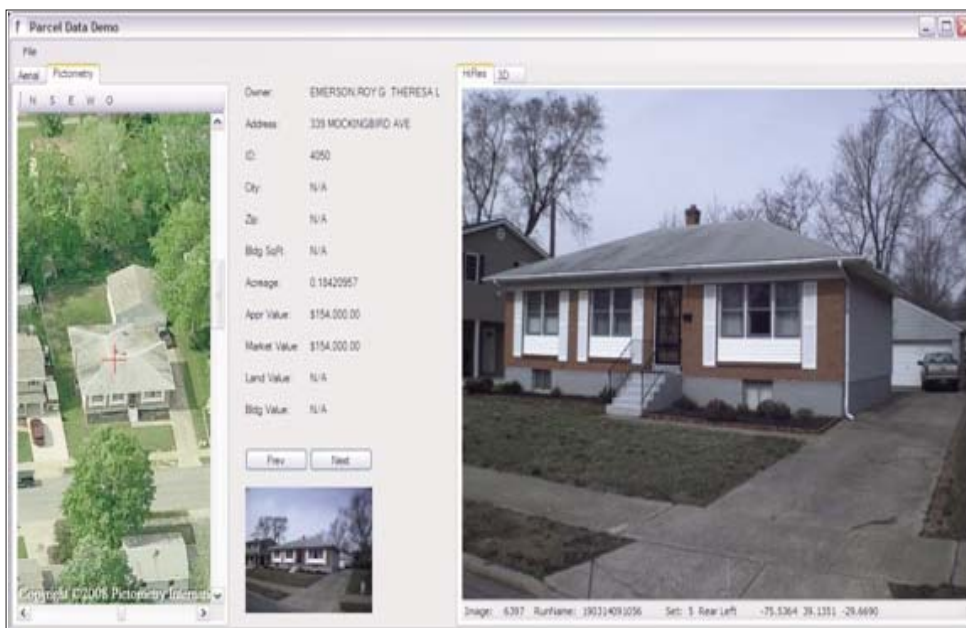
Facet's Parcel Viewer interfaces with Pictometry's oblique imagery and assessment system information. Users can pan and zoom in the oblique image window, and by clicking on any visible structure can access corresponding street level photography for the property.

Upcoming GIS Events

NYS GIS Conference

The 26th Annual New York State GIS Conference will be held at the Saratoga Hilton in Saratoga Springs, N.Y., October 24-26, 2010. Events include a wide range of user and vendor presentations, poster sessions, pre-conference workshops and training classes. For more information and registration, visit the conference website at *www.esf.edu/nysgisconf*.

NEARC

The 25th Annual Northeast Arc Users Group conference will be held at the Newport Marriott in Newport, R.I. November 7-10, 2010. Scheduled sessions will include topics such as facilities and management, natural resources, web mapping, public safety and health, climate change, and mobile GIS. For more information visit *www.northeastarc.org*.

2010 NACo Award

The Optimal Routing Application (ORA), which was developed by GIS staff member Zhenglu Zhang, was selected for a 2010 National Association of Counties (NACo) Achievement Award. This nationwide award is designed to "recognize unique, innovative county programs." ORA was developed entirely in-house using Google Maps API and other open source software. These software products generate the optimal routes which is provided by OptiMap (*http://www.gebweb.net*). The script is available under Common Public License domain. ORA provides county employees with optimal driving routes for multiple destination addresses during inspections and other operational activities. The application can minimize the number of miles driven in county cars, reducing gas consumption and pollution, and indirectly reducing vehicle maintenance expenses.

Coyote Sighting Mapping

In conjunction with Rye Brook village officials, Westchester County GIS is geocoding the addresses of coyote sightings as reported to the Rye Brook Police Department. The coordinate values are then returned to the village which are then incorporated into ArcMap for the publication and generation of PDF maps. The maps are being updated on a regular basis and show the spatial distribution of sightings throughout the village. The PDF maps are available for viewing on the village website at *www.ryebrook.org*. For more information, contact Ilir Tota at *iat2@westchestergov.com*.

LiDAR Data Acquired

In collaboration with the New York City Department of Environmental Protection (DEP), Westchester County has obtained countywide LiDAR (**L**ight **D**etection **a**nd **R**anging) data and an ESRI terrain-format elevation model. LiDAR data was captured in Spring 2009 as part of a larger DEP photogrammetric project which produced one-foot resolution color orthophotography and included a color infrared band. Westchester County leveraged federal funding from the U.S. Geological Survey (USGS) to help support acquisition and development of the LiDAR data.

In addition to very dense and accurate LiDAR X-Y-Z coordinates, the raw LAS files (an industry-standard binary format) are loaded with rich information which can be analyzed to produce a wide range of high quality geospatial models including 3-D visualizations, hydrology, vegetation density, and both bare-ground and surface (canopy) models. Pending the availability of funding, Westchester County GIS anticipates acquiring some of these products over the next several months. For more information, contact Deborah Parker at *dape@westchestergov.com*.

Building a Picture of the Past
Geo-referencing historic aerial photography

Stretching back to early aviation, historical aerial photography documents nearly 70 years of Westchester County history and development in a series of 12 separate photogrammetric campaigns ranging in 5- to 14- year intervals between 1925 and 1995. Since spring 2000, all countywide aerial photography has been captured digitally.

Westchester County GIS has successfully initiated the geo-referencing of scanned images of historic pre-2000 countywide panchromatic (black & white) aerial photography. Initiating the process was the conversion (scanning) of 6,290 original single frame photographs by the Westchester County Archives and Records Center supported by a grant from the New York State Archives. While an initial county application built several years ago enables users to search and access the scanned photography, images were not individually geo-referenced and could therefore not be used in reference with current GIS datasets and corresponding imagery. Notably, the quality and resolution between individual flight years varies due to the year of the photography (the earliest being the 1925-1926 series), cameras types, flight altitude, and other issues.

Leveraging the county's existing repository of scanned historic aerial photography, GIS staff selected the 1976 photogrammetric campaign, due to the overall high quality of photography and corresponding scanned resolution, as the pilot project. Flown on three dates in March 1976 (8th, 14th, and 23rd), the photography is captured mostly between the hours of 10:00AM and 2:00PM with the sun being at its highest angle in the daytime sky so as to minimize shadows. Even today, similar photogrammetric projects also require minimum cloud cover and are flown in the late March – early April timeframe (after winter snow and before the appearance of leaves).

The first step was to visually align (or "rubbersheet") each 1976 image to a corresponding 2004 aerial image covering the same geographic area (or "footprint"). This was accomplished using ESRI's ArcGIS 9.3 georeferencing toolbar. Next, a countywide grid was created with the ArcMap "Fishnet" extension so each 1976 image could be assigned to an individual cell. This uniform layout enabled the cropping and edge-matching of adjacent images was accomplished using LizardTech GeoExpress Version 7 software. The 1976 mosaic included pieces of 485 individual photo frames from a total of 1,002 images in the 1976 catalog.

Finally, the 1976 image will be incorporated into *Mapping Westchester County (*giswww.westchestergov.com). The 1960 collection is now being reviewed and edited, and 1947 is scheduled to be completed next.

For more information, contact Deborah Parker at *dape@westchestergov.com*.
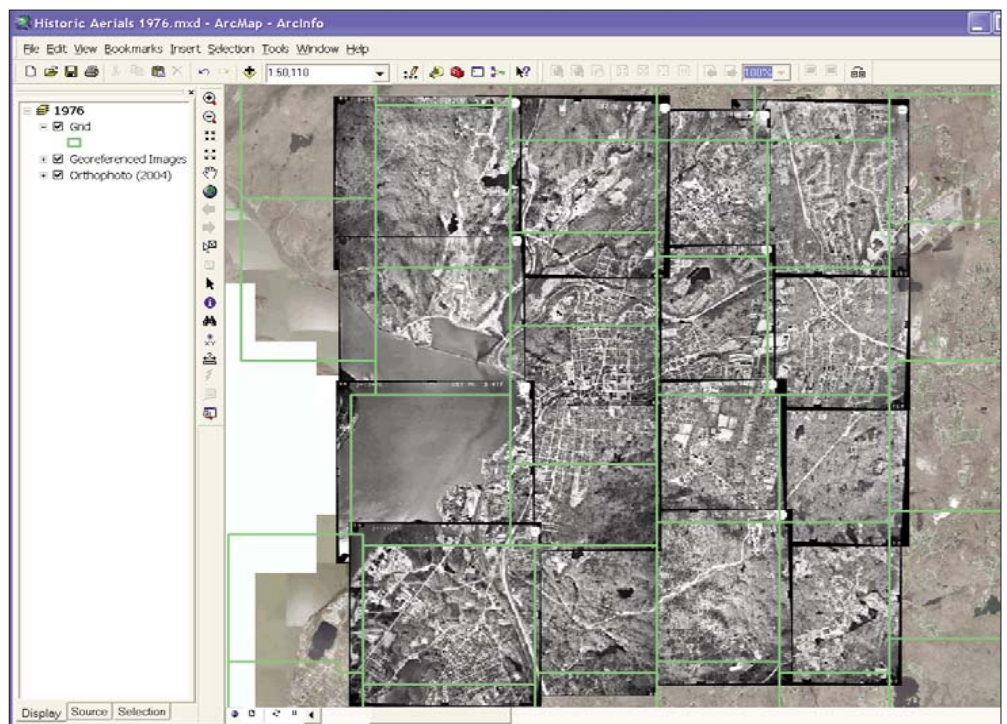
This ArcMap editing session shows the grid (green) which was used to edge-match and crop adjacent images once geo-referenced. Individual images can also be color balanced using LizardTech software.

Featured Project
Points of Distribution System (PODS)
A database-driven GIS application for Health and Emergency Services

Westchester County GIS has completed work with other DoIT staff to develop a mapping component for an application jointly used by the departments of Health and Emergency Services. Based on a model developed in New York City, the application links groups of emergency response agencies and responders to a single facility which functions as their Point-of-Distribution ('POD'). A POD is the location (fire or police station, or EMS facility) where responders must report first to obtain prophylactic treatment such as a dose of medicine or special protective clothing before exposing themselves to an outbreak of disease or other widespread health threat (the bacterium legionella, for example) in their community.

An earlier version of the PODS application contained static PDF maps showing 21 POD groupings. Any changes or additions to the groups would not be visible to the coordinating users unless the map could be linked to the database of responding agencies (fire, police and EMS) where the groups were created. Taking advantage of Google Maps API and the Microsoft Visual Studio .NET environment, the (intranet) GIS map portal does just that - it connects directly to department databases maintained and edited by authorized users in DES and Health (Emergency division) on an as-needed basis.

Changes to the data are immediately reflected on the map: if a new POD is created, it's listed and its member agencies appropriately symbolized. If an agency joins a POD group, or becomes a POD agency, its new status is reflected by its symbol, and by its appearance on a different dropdown list – all accomplished on the fly by reading the databases when the application is launched. Any other components of the application can be upgraded without affecting the GIS map portion of the PODS application, and GIS staff can implement enhancements or version upgrades on the GIS map component without affecting the user department's application.

This model offers huge advantages for future system maintenance, and showcases how GIS can be used across different departments to visualize live, internally maintained agency data on a map. County GIS will build on this model, so that other departments and agencies can benefit from the power of GIS, providing valuable location and spatial information to mission-critical programs.

For more information, contact Deborah Parker at *dape@westchestergov.com* or Zhenglu Zhang at *zqz1@westchestergov.com*.
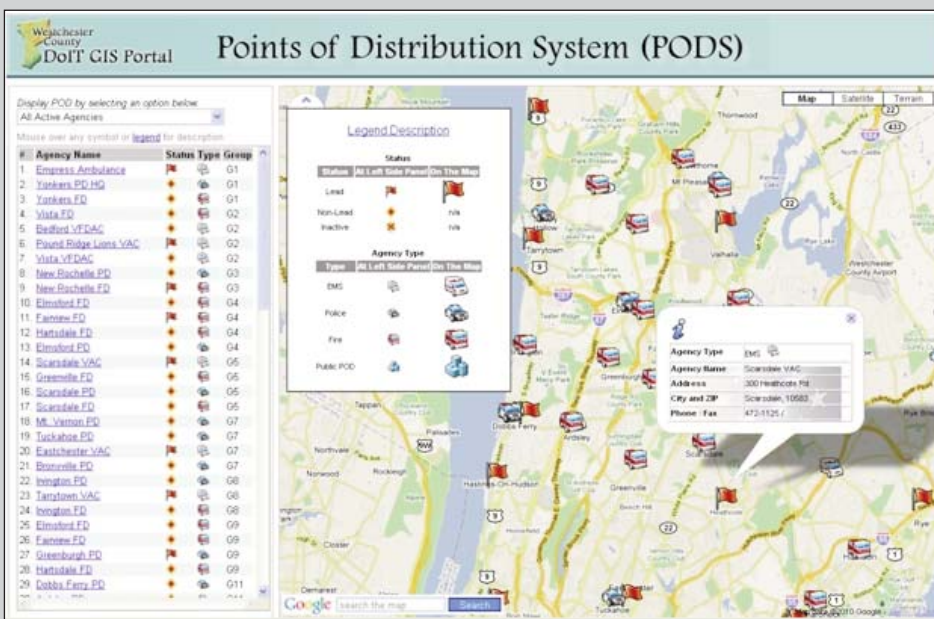

Image shows 'All Active Agencies' selected from the display options. The program connected to the user department database performed the quey , and then rendered the result on the map. The query result, including agency name, status (lead, active or inactive), type (Fire, EMS and Police) and POD group, is populated on the left panel. Users can also display agencies by type or status or show a single POD Group.

Asset Maps Locator

The County's Department of Senior Programs and Services (DSPS) has received an Aging Achievement Award in Technology for its Livable Communities Web Portal. The Livable Communities Web Portal is a community resource website for seniors in Westchester County (*http://www.livablecommunitieswestchester.org*).

One of the key elements of the Web Portal is the Asset Maps Locator. The Asset Maps Locator provides a link to the Livable Communities viewer integrated with the County's primary web mapping application *Mapping Westchester County*. Starting from a user-defined address, the application identifies community resources such as adult homes, fitness centers, restaurants, senior centers, and related service providers.

The Web Portal also won an Achievement Award in June from the National Association of Counties (NACo). For more information, contact Ana Hiraldo at *aeh2@westchestergov.com*

ELA Agreement

Westchester County recently entered into a three-year enterprise license agreement (ELA) with ESRI (*www.esri.com*). The county is one of ESRI's longest-standing and most progressive customers with GIS applications serving many county departments, local municipal governments and the public. The agreement greatly expands the county's access to ESRI's suite of geographic information system tools and services. The ELA provides the county unlimited access to a wide range of enterprise desktop and server software components which will support the county's migration to the new ArcGIS 10 platform over the next 12-15 months. The agreement also includes a technical services support component as well. For more information, contact Paul Rooney, ESRI Account Manager at *prooney@esri.com* or Xiaobo Cui at *xxc1@westchestergov.com*.

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Robert P. Astorino, Westchester County Executive
County Board of Legislators

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Local Government GIS

GIS capacity continues to expand in municipalities as local governments increasingly leverage the county's established web mapping infrastructure and extensive geospatial catalog of data. Because the county is publishing *Mapping Westchester County* as a map service (both as an ArcIMS image service and as a WMS), local governments can add mapping capabilities to many of their local business applications at no cost. These map services can also be "mashed-up" and accessed in other easy-to-use viewers such as ArcGIS Explorer or Google Earth.

County GIS staff also provides unique URLs to local governments which can be used on their websites to provide immediate, no-cost web mapping capabilities. This specific URL provides access to the *Mapping Westchester County* application which immediately "zooms" to the municipal boundaries and provides users with a range of online mapping functions including address matching, the addition or deletion planimetric or environmental layers, aerial imagery, and printing of 8" X 11" maps amongst other capabilities. By example, see the ***Village of Croton-on-Hudson*** website at *http://village.croton-on-hudson.ny.us/public_documents/index* by clicking on "GIS Maps."

With the increased demand for public infrastructure data, many of the mylar maps associated with the mid-1990's county sanitary sewer system evaluation surveys have been scanned and geo-referenced and can now be viewed in combination with local engineering datasets (either with GIS or AutoCAD software). For more information on collaborative local government/county GIS projects, contact Sam Wear at (914) 995-3047.
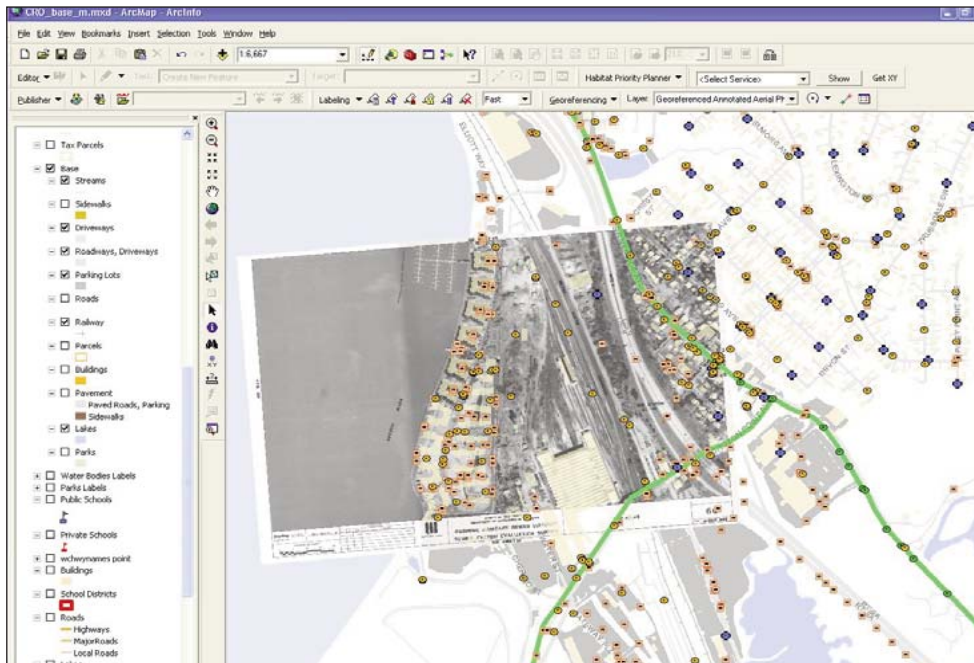
The repository of mid-1990's county sanitary sewer district maps included annotated information with regard to manhole locations, connections, flow direction, and pipe size. The image above shows a geo-referenced Peekskill Sanitary Sewer District map (1993) in Croton.