Image based GIS Asset Inventory at Frederick, Maryland

Frederick County is Maryland's largest county in size - 664.1 square miles. The City of Frederick, the County seat, is situated at the intersection of five Interstates and National highways that provide easy access to Baltimore, Washington, D.C., Virginia, Pennsylvania, and West Virginia. The attractive location plus the continuous growth of the DC and Baltimore metropolitan area has attracted businesses and increased the population in the County. The County's current population is approximately 200K and is estimated to approach 250K by 2010.

Frederick County GIS has been in development since 1994. To date, over 50 GIS data layers have been created in the County's enterprise GIS database. The county's Division of Public Works (DPW) maintains GIS data layers related to roadway and engineering features. The DPW's GIS is used to support the needs of various roadway operations within the County such as providing the Office of Highway Operations with annual snow route mapping, maintenance for the County roadways, updates of road asset inventories (such as signs), and location and tracking of the repair and inspection of roadway sink holes.

DPW's long term GIS goals, according to Mr. Douglas Reedy-GIS Manager for DPW, include the development of an automated pavement and roadway data management system using ESRI's geodatabase and linear referencing technologies. To accomplish this goal, DPW contracted Enterprise Information Solutions (EnterInfo) to develop a countywide asset inventory database using images captured along County roads.

Image based asset inventory system – EnterRoadInfo was used to complete the project. EnterRoadInfo has several key components including global positioning systems (GPS), digital cameras, a distance-measuring instrument (DMI), and an inertial navigation device. These components are installed in a vehicle to capture images along roads at normal traffic speed.

ArcGIS Extension is the centerpiece of this image asset management system. Using the EnterRoadInfo ArcGIS Extension and the images, geo-referenced asset records for signs, guardrails, and pavement markings were created and delivered to the County. From the ArcGIS environment, the county GIS users can:

- Click on the objects in the image to create geo-referenced asset records
- Click on a road to view images as driving video along the road
- Click on an asset to view the image used to collected the asset
- Select a database record to request the corresponding image

"The EnterRoadInfo system provides Frederick County DPW with the means to not only "spatially" collect roadway asset information but view field conditions of county roads (pavement, guard rails, signs, etc.) without the need for field visits saving staff time and providing a safer means for roadway inspections. I believe the success of this project with the EnterRoadInfo system indicates this data collection method will be highly effective for roadway asset management in the future." said Mr. Reedy.

According to the County GIS Manager Mr. Marshall L. Stevenson III, "The EnterRoadInfo system provides a valuable resource for many agencies in Frederick County. The County Enterprise GIS uses this resource routinely for the validation of street names and addresses. The County Sheriff's Office has used the captures images for traffic accident documentation to be used in future court appearances."

Data quality and cost were two of the major concerns for this project. EnterRoadInfo's cost effectiveness and the ability to verify each collected record using the corresponding images were the reasons why EnterRoadInfo was selected to complete the project. Asset collected include signs, guardrails, and pavement markings. The attributes collected included the location of the asset, condition rating, and MUTCD code for signs. The EnterRoadInfo project approach satisfied both the quality and cost requirements of the DPW when the project was completed within budget and all of the collected asset objects correctly overlaid with the County aerial photography. Using the images, signs, signposts, guardrails and Passing Zones were precisely collected. The signs were created as point features. Guardrails and passing zones were created as linear features showing their actual shapes and curvatures. The data collection cost alone if using a traditional approach, is estimated to be higher than the total project budget. However, the County would not have had the ability to verify the accuracy and completeness of the results from the office. As an added benefit, using the images, Frederick County can now capture additional asset objects for a fraction of the cost versus paying proportional cost using the traditional methods.

Beyond the creation of asset inventories the EnterRoadInfo ArcGIS Extension viewing application is also the ideal tool for verifying the accuracy and status of existing data layers. The ability to perform object location and measurement on photos while synchronizing the cursor position on the map and photos will make GIS even more powerful in the coming years.

For question regarding the image based asset inventory project, please contact:

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