

Improving Efficiency and Safety of Highway Inspection

Clark Nexsen, an architecture and engineering firm headquartered in Norfolk, VA, USA, improved the efficiency and safety of a highway maintenance survey by using GPS-Photo Link photo-mapping software from GeoSpatial Experts and a Ricoh 500SE digital camera.

In just 10 days, the five-person Clark Nexsen field crew, divided into two teams and one driver, collected more than 3000 geotagged photographs documenting the condition of the roadway and related infrastructure on 20 linear miles of the Chesapeake Expressway in southern Virginia. Back at the office, the [GPS-Photo Link](#) software correlated each photo with its GPS coordinates and placed the photo locations on a GIS map layer for digital delivery to the City of Chesapeake.

Before the project began, Jim Owecke of Earth Vector Systems met with Russell Vrhovac at Clark Nexsen to understand their technical and field requirements. Owecke recognized that the GPS-Photo Link System with the Ricoh 500SE would meet Clark Nexsen's photo record, GPS location, and photo mapping requirements. A quick demonstration of camera and software also convinced Vrhovac.

"Taking photos with the GPS-enabled camera is a really efficient way of collecting information," said Russell Vrhovac, Clark Nexsen GIS Analyst. "Data collection was safer because the GPS Camera technology was quick, efficient and enabled a crew member to quickly lock a GPS position while taking the digital photo from a safe vantage point if needed."

The City of Chesapeake, Va., contracted Clark Nexsen to survey the expressway and document damage and wear of pavement, light poles, guard rails, fences, overpasses and utility covers. The two crews each consisted of an engineer and photo technician. The GPS-enabled camera with built-in compass recorded precise location coordinates and heading direction for each photograph.

Operating as a plug-in to the ArcGIS software, GPS-Photo Link automatically correlated the photos by GPS location. The photo-mapping software watermarked each photo with its coordinates, and acquisition time. The shapefile output was populated using the hard copy reports and was then available for analysis in the GIS. The technicians ran mile-by-mile analyses of the condition assessments to provide a written report documenting damage patterns and trends along the Expressway.

The shapefile was delivered along with the written report to the City of Chesapeake for direct integration into its public works GIS. Each photo is capable of being displayed as an icon in the GIS map layer and can be viewed with attribute details simply by clicking on the icon. The digital photo pops up onscreen for close examination by the city officials, who are using the survey information to prioritize roadway repair activities.

While GPS-Photo Link is used in conjunction with the Ricoh 500SE camera in the Chesapeake Expressway project, the photo-mapping software is compatible with any handheld GPS receiver and digital camera as well as some cell phones cameras with geotagging capabilities. The software can display the digital photos in most GIS and KML-based digital maps.