Additionally Selected Technologies | 2008

Priority, Market-Ready Technologies and Innovations

Putting It In Perspective

State DOTs need faster and safer methods of gathering survey information for design and other applications. High-definition 3D surveying provides a cost-effective solution to gathering survey data.

The use of HD 3D surveying technology in the planning stages of a project facilitates communication among surveyors, designers, project managers and senior management. Through the production of 3D visual, dimensionally accurate models, stakeholders gain an understanding of the site. Either point cloud or intelligent pixel methods will give team members an enhanced picture of a project's complexity.

HD 3D surveying is much faster and safer than traditional surveying methods. It has uses for planning, modeling, design, construction, and post-construction application.

High-Definition 3D Surveying

The Challenge:

An on-site survey involves a significant amount of time for data collection. It can be a hazardous task for the crew to set up targets, and traffic is often disrupted in the process.

The safety of both motorists and surveyors is compromised, particularly if slopes, tunnels, or bridges must be included. Traditional surveys or photogrammetric methods often require return visits to a site, causing additional safety issues and disruption to roadways.

To complete the process, data must be relayed to CAD programs or desktop surveying tools. 3D models can then be generated, involving significant staff time.

The Solution:

A site doesn't need to be extremely complex or detailed in order to justify the use of high-definition 3D survey tools. Advances in scanning hardware, software, and office workflow have reduced the overall labor content of using scanning for many common site survey projects to as little as 20-30% of the labor cost associated with traditional methods.

Greater safety for crews and motorists is achieved by working away from traffic. Return visits are eliminated as all points are included in a typical scan. The operator can even set the scan to operate robotically, and deal with other issues on site simultaneously.

With the latest scanning solutions and office workflows, HD 3D can now deliver significant labor savings for many ordinary topographic, site, and as-built surveys. There are a number of HD 3D products and suppliers to chose from. Savings can be used to pay back the initial investment in scanning technology over customary payback periods.

Successful Application:
Utah DOT uses HD 3D to great advantage

The Utah Department of Transportation has used InteliSum's high-definition system LD3 on five projects over the course of five years. For example, the agency deployed a comprehensive strategy to replace bridges across I-80.

UDOT used InteliSum LD3 technology to gather detailed terrain information. The accuracy of the HD 3D survey was so precise, UDOT was able to assemble a bridge several miles away from the intended location. Once the bridge had been built, UDOT transported it to its new location, removed and destroyed the old bridge, and installed the new bridge in one weekend, disrupting less traffic, and increasing worker safety in the process.

The Result

According to Shana Lindsey, PE, Director of Research and Bridge Operations at UDOT, "HD 3D surveying can be implemented as easily as a typical survey job. The tool is very intuitive and after a two day training class, our CAD team was able to combine their skills to be very productive immediately."

Lindsey continues, "The InteliSum LD3-type of survey's initial cost is within 10-25% of tradtional surveys. However, the added value, such as safety - no surveyors need to be in the middle of traffic - and speed, reducing days to hours, can easily offset the added costs. There is no need to return to the field as HD 3D collects the entire image. There are no missing points."

Additional Resources

- Cheves. "Laser Scanning: Surveying Revolutionized with True Color 3D Scanning," The American Surveyor, October 27, 2007.
- Henry, McDowell. "Using InteliSum 3D Scanning Technology in Transportation Projects," Idaho Transportation Department Conference, April 4-5, 2007.
- "Projects in Partnership with the Utah Department of Transportation," Research Division Newsletter, UDOT, March 2006.
- InteliSum Website http://www.intelisum.com/scanningservices.htm
- Lochner PowerPoint Presentation at ITD Conference, 2007
- WSDOT Website http://www.wsdot.wa.gov/mapsdata Photogrammetry/3DTL.htm
- InnovMETRIC Website http://www.innovmetric.com/surveying/english/home.html
- WESTLAT Website http://westlat.com
- Kuker-Ranken, Inc. (Leica) Website http://www.krinc.net

Benefits

High-definition 3D surveying is cost effective, rapid and accurate. Motorists are less disrupted, and crew safety is enhanced. Workflow is streamlined through comprehensive data capture on site.

- *HD 3D technology allows users to capture topographic survey and as-built data in a fraction of the time of traditional methods.*
- *All metrics of the site are captured so that re-visits are not necessary.*
- *An HD 3D survey minimizes the need for permitting.*
- *Design files are compatible with most CAD software already in place.*
- *Data is collected in 3D, eliminating the need for CAD staff to generate a 3D model.*
- *Safety is increased as field personnel can capture data remotely.*

Contacts

Daniel Hsiao, PE, SE
Utah Department of Transportation
(801) 965-4638
dhsiao@utah.gov

L. Bradley Foltz
PennDOT – Bureau of Design, Design Services
Photogrammetry Section
(717) 346-4278
lbfoltz@state.pa.us

Frank Algarin
InteliSum
(801) 558-7522
falgarin@intelisum.com