

## Latest Trends

# Part 2: User, Industry, and Vendor Trends

**Geoff Jacobs**

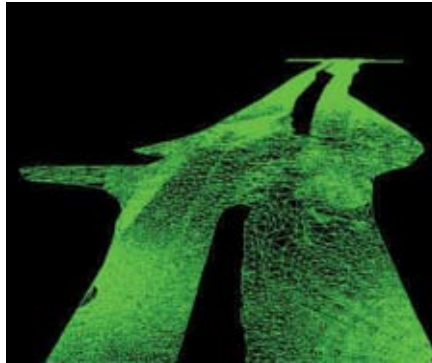
**T**his is Part 2 of a two-part series examining the latest trends in high-definition surveying. The goal of this series is to provide current information to professionals who are closely watching this technology as they do their “Should we invest in this technology or continue to wait?” homework. Part 1 looked at User & Market Trends. This article continues to look at key User/Market trends and also discusses important trends in the general laser scanning industry and vendor community.

### Increasing Client Demand and Acceptance

A number of clients today are increasingly requiring the use high-definition surveying on certain types of projects and this trend is expected to continue. This basic trend is visible across all market segments including civil, plant, and architectural clients. Several major clients, including some of the world’s largest oil & gas companies and associated engineering companies, have created very large demand for scanning on retrofit projects. On the civil side, transportation agencies have likewise started to stipulate, for example, high-definition surveying as the method-of-choice for providing survey-grade maps of urban interstates or for surveying roadways where vehicular hydroplaning has occurred.

### New Service Category for Transportation Agency Contractors

Within the spectrum of growing client demand for high-definition surveying services is the emergence of

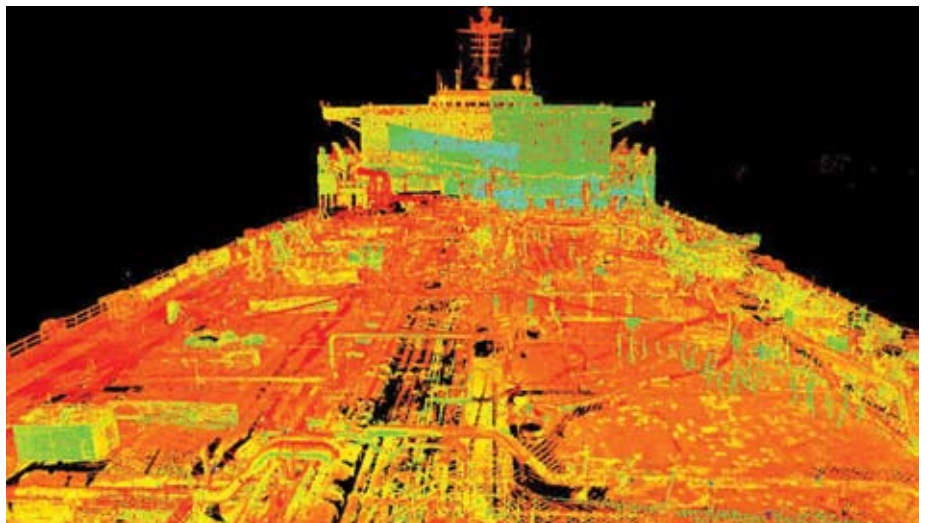


*NCDOT has created a new service category for “high-definition scanning” for surveying roadways where hydroplaning has occurred and for other transportation applications.” Image courtesy: Mulkey Engineers and Consultants*

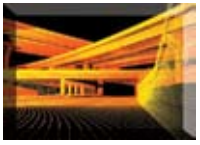
a new “category” for services and for contractors with laser scanning capability. Consider, for example, the case of North Carolina DOT. In 2004, two different contractors provided scanning-based services on projects at the specific request of NCDOT. The

projects went well and in 2005 NCDOT added “high-definition scanning” as a fifth services category to the existing four service categories (sub-surface utility services; GPS; conventional services; and, hydrographic services). Today, NCDOT can still specify to contractors that they use scanning on specific projects or NCDOT can award contracts to contractors with several service capabilities, including high-definition scanning, and let the contractor decide how they want to do the job.

To date, NCDOT has required the use of scanning on several types of projects, including pavement surveys to address accident locations involving hydroplaning; pavement surveys as an alternative to low-altitude helicopter surveys; monitoring of bridge and building settling over time; and monitoring of pavement cracking over time. As of April 2006, the list of scanning-qualified contractors for NCDOT had grown to four.



*This ship conversion project is one of several scanning mega-projects done by S&C Technologies. Image courtesy: S&C Technologies*



# 3D SCANNING

Tennessee DOT has likewise developed a new laser scanning category of services for open-ended contracts. In recognition of the significant added value that high-definition surveys offer, Tennessee DOT has been progressive by categorizing laser scanners as "Special Devices." This designation allows contractors to add a daily fee to their contracts for the scanner(s) on projects. This aids contractors in recovering their investment in the technology while Tennessee DOT reaps the value-added benefits of scanning, such as eliminating road closures on urban interstates.

## More Mega-projects

As the technology has increasingly proven its worth over the last few years, more clients have become willing to use high-definition surveying on so-called mega-projects. I am increasingly hearing of organizations using several scanners simultaneously on a single project. I am also increasingly hearing of projects with laser scanning service revenues in the hundreds of thousands of dollars, some around a million dollars. Many of these projects are large plant retrofit projects and others are large civil projects or regional programs.

## Increasing Assortment of Clients

Many clients for high-definition surveying services are traditional types of clients such as transportation and other government agencies, engineering firms, and architectural firms. However, another trend today is the increasing breadth of client opportunities. This includes more and more construction contractors and owner/operators directly requesting scanning services. Contractors are using increasingly requesting scanning for construction QA/QC, construction planning, progress payments, before-and-after construction archive records, and final as-builts.

Owner/operators and even developers are also increasingly requesting high-definition surveying services. For many projects, these organizations



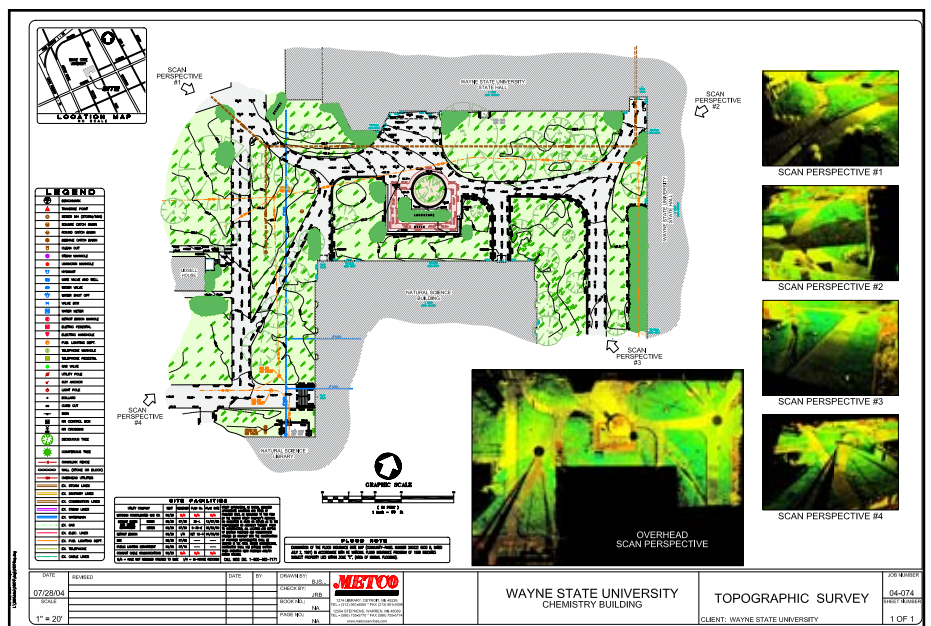
The theme park owner and project contractor specifically requested laser scanning for this project. Image courtesy: JMR Surveying Group, LLC

actually reap the biggest financial benefits of applying high-definition surveying. For example, the use of laser scanning can reduce the number of days a plant, building, or other major asset is "down" for maintenance, repair, and upgrades. This often represents a value in the millions of dollars to owners. As owners and contractors catch on to the value of these benefits in contrast to the relatively low cost of using scanning,

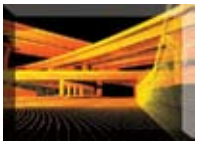
they are increasingly requiring its use. As a corollary to this, many who service these clients tell me that their role is changing from that of a contracted surveying service to one of a true project consultant to the owner or contractor.

## Marketing Costs are Falling

In the earliest days of the technology—back in the 1990s—many organizations that invested in high-



Adding scan images to drawings is a low-cost way of marketing high-definition survey service capabilities to clients. Image courtesy: METCO Services



# 3DSCANNING

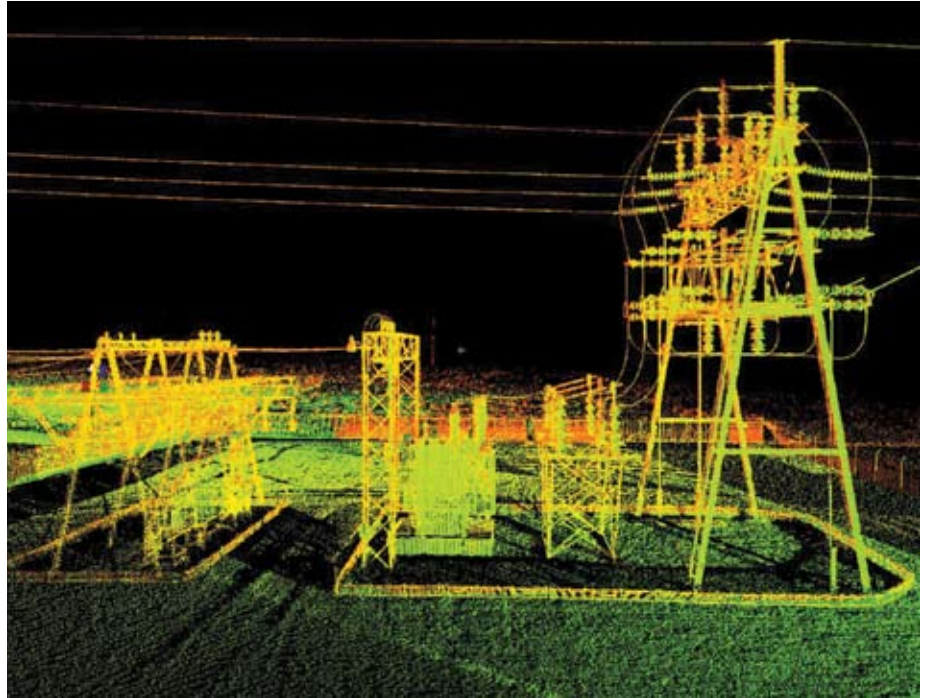
definition surveying technology reported that they had significantly underestimated the costs associated with marketing the technology to prospective clients. Today, many of these same users report that the market is generally much better informed about the technology and its potential benefits, which has, in turn, reduced their marketing costs. This is especially true where the “sweet spots” of the technology have really delivered significant benefits. Examples include the plant industry, especially offshore oil and gas, and the nuclear power industry; civil projects involving bridges, overpasses, and urban interstates; heritage/architectural projects; and volumes/quantity surveys.

Another trend here is that users have developed very clever ways of effectively promoting their high-definition surveying services at low cost. For example, the practice of including thumbnail scan images on 2D maps is one that is spreading. Clients inquire about these interesting images and then the service provider can use this opportunity to educate the client about the value-added benefits they are receiving. This helps generate repeat business.

## Point Clouds as Deliverables

As end clients have become more knowledgeable about the technology, there is an increasing trend for laser scanning service providers to provide “registered point cloud data sets” to their clients. This may be in addition to traditional deliverables or as the one and only deliverable. Clients who receive point clouds can save them as record archives of projects and/or use them directly to meet various aspects of a project’s needs.

Numerous free “viewing” software packages are available on the market to view point clouds in 3D. These can be useful for “internal marketing” and client communications. Many clients also acquire low-cost point cloud software for simple measurement checks or drawing creation. However, clients increasingly own heavy-duty point cloud processing software applications and simply process the registered scan data sets into final deliverables themselves. This practice began in the plant



*The practice of providing point clouds directly to clients has spread from process plant applications to civil and other applications. Image courtesy: Digital Mapping Services, L.P.*

industry but is now spreading to civil and architectural clients as well.

## More Training & Support Resources Available

On the training side, the number of professionals who are expert in the technology is steadily increasing. These include not just vendor and dealer personnel, but also independent consultants who can train your new staff and also assist on projects. These two activities—training staff and helping on projects—can be conducted simultaneously and have proven to be a good way to reduce risk for scanning newcomers on their initial projects.

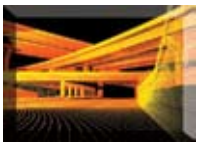
Going forward I think the market can safely expect to see more CEU courses available, more types of training services offered by vendors, and a wider choice of training courses tailored to specific user needs. The latter has already started to happen. There is also a clear trend to expanded hours of phone support and more local hardware repair and calibration facilities, which shorten repair service turnaround times.

## User Networks Emerge

Another support structure has emerged in the last couple of years that has been a real boon to the market. These are networks among users. Today it’s not uncommon for users to train or consult to other users formally and/or informally. They also share staff or equipment among each other for projects that are too large for one user to handle on their own. Some users team with other users on project proposals and on overflow work. Users often compare notes with other



*Strong laser scanning user networks have started to emerge along with User Conferences.*

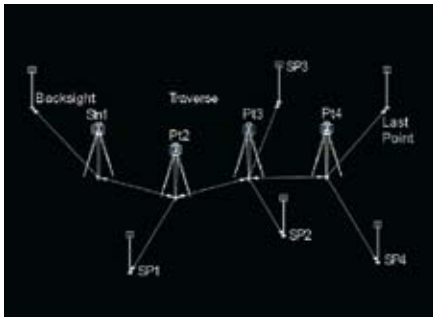


# 3DSCANNING

users in their networks on how to execute certain types of applications, on pricing ideas, marketing, etc. A couple of vendors have also organized formal User Conferences where both new and long-time users gather to exchange ideas and do further networking. The emergence of this strong user community over the last couple of years has helped all users within the user networks.

## Shorter Learning Curves

Another trend on the training side is steady improvement in hardware, software and recommended workflows in terms of their ease-of-learning. In hardware, for example, the introduction of dual-axis (tilt) compensation has provided surveyors with a familiar workflow option for setting up over known points,



*New scanner capabilities enable resection, traverse, and backsight workflows that make scanning easier to learn.*



*Scanning software emulates a data collector interface to make office processing of scan data easier to learn.*

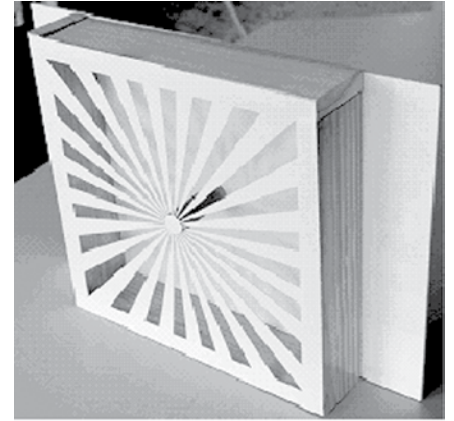
resectioning, backsighting, and traversing. Many surveyors felt uncomfortable with scanning workflows that were heavily dependent on the use of scan targets, which is more of a photogrammetric type of workflow than a traditional survey workflow.

In software, tools and workflows that enable “virtual surveying” which emulates traditional data collector workflows have caught on very quickly and shortened learning curves. Similarly, software that lets users create deliverables directly within their preferred CADD applications has become increasingly popular as it also shortens the learning curve.

## Vendor Trends

In addition to the hardware, software, and support service trends already described, a couple of other vendor-related trends are worth noting.

One trend of note within the vendor community is a trend toward developing standards. NIST, for example, is developing a test facility in Maryland to enable standardized testing of laser scanners. The NIST activities involve vendor, user, and agency representatives. FH Mainz University in Germany had developed a facility for this task a few years ago, but there has been no such facility in the U.S. Organizations such as ISPRS

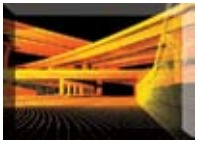


*Industry standards are being developed for testing laser scanners. This fixture was developed for standardized scanner testing by FH Mainz University. Image courtesy: FH Mainz*

are also looking into data standards. Vendors have also started to come more in line with each other with respect to their product specification practices, although this still has a ways to go. On the user side, many have already developed their own internal process and workflow standards for deploying high-definition surveying in the field and in the office.

One vendor trend of interest to many is on the hardware and software pricing side. Pricing for both laser scanners and fully-featured software (that does heavy duty point cloud processing) has been considered relatively high, especially compared to prices of traditional total stations and survey office software. The laser scanning industry trend here has been to make the hardware and software tools much more efficient, while pricing has continued at the relatively higher levels. This is not unlike what has been the case with laptops over the years. Laptops have long held a significant price premium (over desktop PCs) while laptop capabilities have been continuously improving over time.

Lower cost scanner models have started to appear on the market as have low-cost versions of point cloud software. In the case of lower cost scanners, shortcomings in key capabilities have limited the overall versatility and popularity of these instruments. The same is true on the software side—low



# 3DSCANNING

cost software solutions have tended to be quite limited in their capabilities.

## Current Challenges

This snapshot of today's trends has painted a solidly brightening picture for the technology. However, some challenges remain as well.

One current challenge is that demand for the technology is growing so rapidly that it's even outpacing the steady growth in the number of experts in it. As a result, there is currently a shortage of staff with experience in high-definition surveying. I increasingly receive inquiries asking if I know any individuals with high-definition surveying experience who might be available and open to working for the organization that is inquiring. Few colleges in the U.S. presently offer undergraduate courses in laser scanning, also contributing to the demand/supply imbalance. The demand/supply mismatch of people with expertise in laser scanning has also driven the recent emergence of strong user networks, as these networks can address part of this knowledge gap.

As much as solutions and workflows have improved over time, there is still room for improvement. Some professionals sitting on the sidelines

still do not consider the available solutions friendly enough, in the field or office. This challenge is linked to the need for more types of training tools and the current shortage of experienced personnel. If solutions were friendlier or more training services were available, then the shortage of experienced staff would not be as much of an issue.

A third challenge is the slowness of the standards development activity. Standards initiatives, in general, tend to be very slow moving and I think this will likely be the case for standards development for high-definition surveying. Standards are often compromises among many different types of constituents and the negotiations on standards setting are often very long, drawn out processes. So, don't expect anything soon in this arena.

One final challenge—and it's somewhat related to standards development—is that there are relatively few vendors who are currently “one-stop shopping” sources. If a user finds a particular feature of a scanner or piece of software attractive, it may not have enough companion software or hardware developed by the same vendor. So, users can find themselves in “mix-and-match”

situations. Many users steer away from these situations; hence, the preference to acquire solutions from one-stop vendors will likely continue to be a near-term trend.

## Summary

As high-definition surveying matures as a technology, several trends are visible. These trends include rapid technology adoption, decreasing deployment costs, increasing user success, and a growing infrastructure of support services, including the emergence of strong user networks. This rapid technology adoption has also created a new challenge for the industry and those planning to enter it: a current shortage of experienced personnel. In view of this shortage, organizations are looking more closely at solutions that require less training as well as available training and support services. ↓

**GEOFF JACOBS** has been employed by Leica Geosystems, HDS, Inc. since 1998. He currently acts as Senior Vice President, Strategic Marketing. He is also a contributing writer for the magazine.

