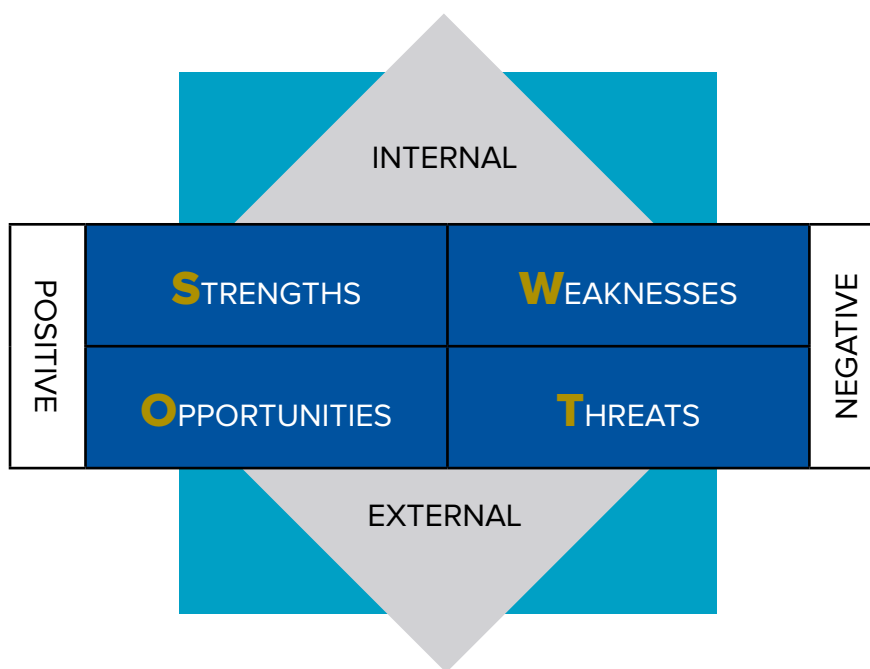


Thinking of Buying a Scan System?

Use SWOT

There is a tool your company can use to evaluate whether to outsource to a service provider or invest in a LiDAR scan system. SWOT Analysis has been used in business to identify sources of competitive advantage as well as potential liabilities, but it can be more than just an exercise of putting together a two by two matrix. SWOT is an acronym for Strengths, Opportunities, Weaknesses and Threats. It can be used to complete an objective analysis of a company and aid in decision making.

There are two key categories of the analysis. Internal components (strengths and weaknesses) are things that the company has direct control over. They are obtained through customer feedback, employee information, capabilities, resources and processes. External components (opportunities and threats) are things the company cannot control but which have an effect on what goes on within the internal environment. External components



are also obtained through customer feedback, industry data, competition, and environmental aspects (i.e., loan rates, available workforce, status of the economy and legislative requirements).

STRENGTHS are something a company has that provides them with a competitive advantage. Identifying strengths will allow a company to capitalize on them by making informed decisions.

BY CYN RENÉ WHITFIELD

WEAKNESSES are the things a company does that aren't necessarily positive, but can bolster positioning when identified. They are often considered liabilities. The purpose of identifying weaknesses is to be able to commit resources toward them, turning them into strengths.

OPPORTUNITIES are more complex when applying it to LiDAR technology. LiDAR technology affects many established professions through change (surveying, engineering, architecture, and forensics). It is up to the profession to identify opportunities in technology that LiDAR scanning can present as an avenue for growth.

Here are some questions to ask about your company:

What does the company do that no other company can? The expertise of a company means providing a service that is focused on a specific area that allows for a better product at a lower cost. Unique services can be a strength for a company provided they are not over extended. Extreme diversity in a company can be a weakness because it creates providers of everything and experts of nothing. Maintaining low costs within the company through efficient operations means the potential for providing low costs to the client. Justifying purchasing a LiDAR system can mean evaluating its utilization rate. Because these systems collect tremendous amounts of data over a large area in a short period of time it is important to evaluate the cost effectiveness to owning or hiring a service provider. Keeping the company on track allows a company to focus on what they do best.

What is the company known for?

The positive branding of a company evokes confidence in a quality product and sets the stage for how the client and competition perceive you. In the case of LiDAR, it can be data extraction, collection, software creation or support. If a company is known for LiDAR data collection then keeping a competitive edge would lean towards owning a system provided the chosen technology was designed to capture the data with the level of accuracy and speed in which the discipline requires. The purchase of a GIS grade mobile scanner would not

with the data. Would you know what to do if your scanner stops working in the field; or if you get a bad scan or some of your targets don't register? What if your registration error is at unacceptable levels or your scan data is giving odd unexpected returns? If you are under tight time constraints you'll need someone who knows how to address these issues and who can do things right the first time. Hiring a service provider can also help limit your liability by shifting the duty to provide accurate data to them. The evolution of LiDAR technology is dynamic. Positioning

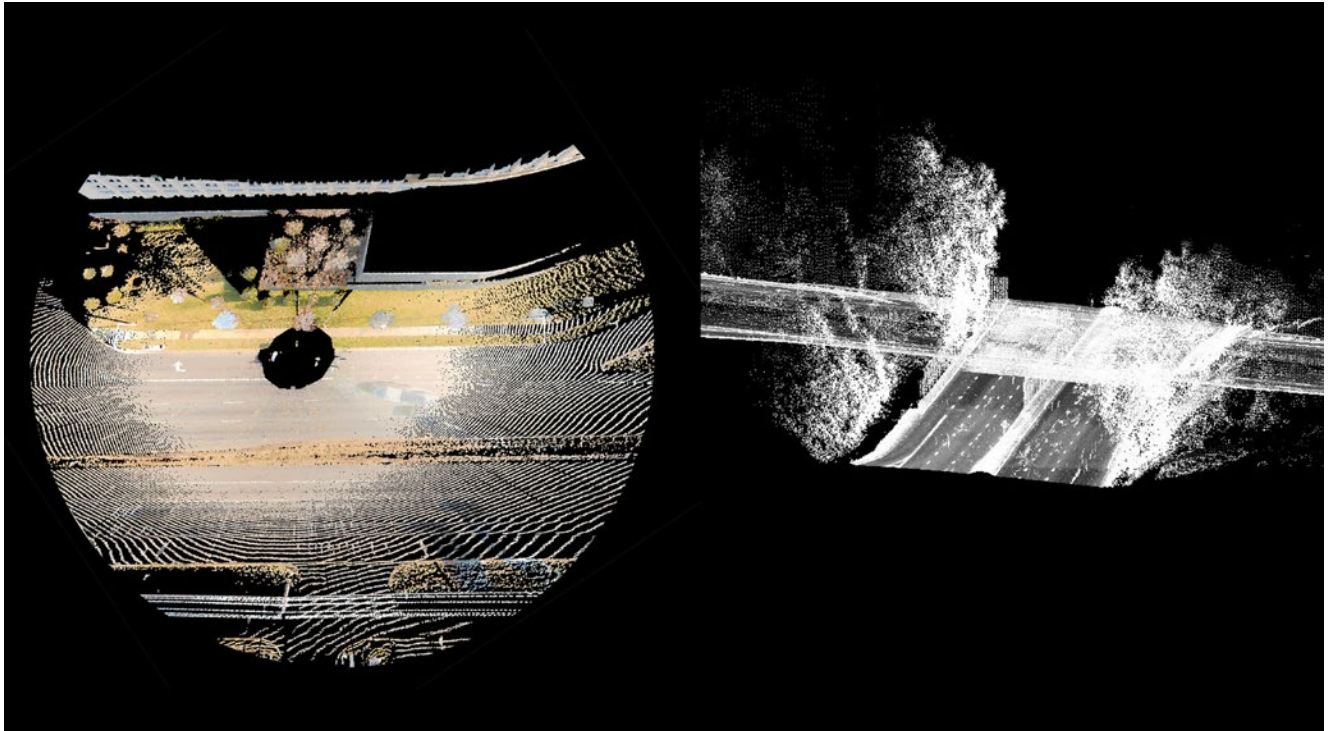
“It is up to the profession to identify opportunities in technology that LiDAR scanning can present as an avenue for growth.”

be a cost effective choice if a company is known for engineering grade data just as purchasing an engineering grade scanner would not be cost effective to use only for GIS work.

What are the financials available to the company?

If the company is in the position to purchase a scan system to keep the work in house rather than outsourcing potential profits supported by other strengths then owning a system is probably a good consideration especially if the company can maintain a high utilization rate. Otherwise the better choice may be to hire a service provider. Added advantages are the service provider is generally an expert in operating a scanner and working

a company to keep up with the latest versions of software and hardware in order to be competitively positioned to pursue additional options can be a costly venture. A company needs a positive return on investment in three years or less in order to keep up with the changing technology. However, if the company is financially healthy then the ability to react with the advancing technology can be a strategic advantage to remain competitive. There is a costly learning curve to any repositioning, especially if the service is already mastered and provided by other means. Having a good working relationship with service providers can be a company's greatest asset. It is important to identify what areas kept in house add little or no



Static LiDAR (left) acquires in a singular spherical set-up diverging lines out from the center. Mobile LiDAR (right) acquisition is 360 linear return in a drive by acquisition resulting in a more evenly spaced data set.

value. And often overlooked is the cost for maintaining the scanner. These instruments require annual calibration and maintenance.

What is the condition of the company's human resources? The intellectual property of the workforce is a guiding factor in a successful project and the most valuable asset a company can have. When considering buying a scanner a company needs to recognize whether or not there is an adequate skilled workforce within the organization in which to maximize the investment and what their longevity will be. Employers that continually train their employees can serve as a competitive advantage especially in the fast moving technology of 3D data. But, it can also misdirect

focus, cause burn-out or misuse skills. Nonetheless, training costs need to be factored into a purchase decision. Evaluating the tenure rate within a company is a good indicator of its internal health and the external draw by the competition. Negative entropy of information and team building within an organization often occurs when skills are misused or misdirected. Exhausting resources not only affects moving the company forward but also in maintaining the status quo.

What are the external environmental conditions? Seen as both favorable and a deterrent, understanding the conditions that may influence a decision can be political (regulations and requirements), social (attitudes,

trust in change and misinformation), economic (research and development, maintenance, training) and technological influences (longevity or potential applications). Finding an unfulfilled demand or providing a better quality deliverable at a favorable cost is the result of understanding the external environment. There is potential overlap between a threat and an opportunity.

Does having the ability to collect your own data advance the current business plan of the company?

Often times what seems like a good idea may actually add restraints to the overall goals of the company or even the profession. Often expanding opportunities does not add value to the client. Instead it can create competition

with existing clients which can lead to protective communications. In addition to potentially isolating a client, taxing resources and additional expenses may not be in line with the original plan. But, expanding opportunities within a company could be a good fit providing growth. Altering the business plan from a stagnant company to a forward thinking dynamic one is guided by SWOT Analysis. This is one area where the specific, verifiable research that is obtained is used to identify the goals. Once this list of “pros and cons” of internal and external factors are assembled they can be prioritized so that time is spent on the most important factors.

SWOT analysis can also be used as an evaluation tool for the technology as it identifies the capabilities of LiDAR systems, software and value.

Questions to ask about the technology:

What are the strengths and weaknesses of a particular LiDAR system?

What can it do or not do? Often times a GIS grade system is being positioned as providing engineering grade acquisition when the component’s error budget does not allow for such high accuracy. When someone is looking to make a purchase there are a number of factors that should be considered. First and foremost, what type of data collection will the instrument primarily be used for? If you are scanning bridges, land, or tall buildings you are going to benefit more from a long range, time-of-flight scanner. Where speed and higher point density is needed such as in building interiors, historical preservation work, and plenum scanning a short range,

high speed phase-based laser scanner is probably the better choice.

In the civil survey discipline, a mobile scan system is safer and more cost productive than a static scanner. Then the features and accuracies of the scanners become important. Some scanners also have integrated cameras for capturing colorized photo imagery that can be mapped to the point cloud. The registration software that comes with the scanner can be an important factor. We are starting to see some manufacturers offer automated registration and target-less registration. Size and weight are also an important consideration. Newer models are starting to appear that are light weight and will fit in an airplane overhead compartment. One of the most important considerations is the quality of the data itself. The data is what you are really after so get sample data of projects. Check how much noise is generated. Often the samples provided by manufacturers have been cleaned up.

What new opportunities are being presented with advancing technology?

What is perceived as a threat may actually be an opportunity. For example, the survey profession often perceives LiDAR acquisition as a threat when in reality it is a safer more efficient means of expanding a company. The key is in knowing where your resources are best used.

What are the threats with investing in LiDAR technology?

Advancing technology means a short hardware and software shelf life. The proprietary software that runs these systems are even more dynamic with new versions and better more efficient new developers advancing capabilities every year. As users demand faster, more efficient

and automated ways of data extraction the software alone can be a costly component, but a necessary component to support the hardware.

Making a large investment in a LiDAR system can be a daunting task. SWOT Analysis aids in decision making by systematically evaluating the company in a number of key areas. Used along with a mixture of option generating tools like market research, trend analysis, risk assessment, and impact assessment SWOT Analysis provides an overall company-wide evaluation of both large and small organizations at an actionable level. If a large project can justify the purchase of a laser scanning system, if the human capital and intellectual property within a company can effectively support the training and learning curve required by adding new or unfamiliar technology then perhaps it is an opportunity to add a new service.

If your company’s strength and experience is in dealing with point cloud and 3D data, becoming a service provider maybe an opportunity to expand your business. If a company has never dealt with point clouds and 3D data then using a service provider is a good way to get involved thus lessening the threat of what appears to be intimidating technology while avoiding the capital investment. ■

Cyn René Whitfield is a nationally published journalist who has been involved in marketing for land surveying and 3D/4D laser scanning documentation for the past 28 years. She has a Bachelor of Science degree in Broadcast/Journalism, an Associate’s Degree in Electronic Imaging and a Master’s Degree in Managerial Business Communications. She is currently the Business Development Coordinator for Terramatrix LLC (www.terramatrix3d.com), Omaha, Neb. She can be reached at cwhitfield@terramatrix3d.com.