

the *American* Surveyor

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MEASURING MINNESOTA

ALTA Standards

Say what?

World War II

Marine surveyors

New Technology

Striking a balance

Baseline used the Leica Nova MS50 MultiStation (a fast, high-precision total station with scanning capabilities) to scan nine bridges on Interstate 10 in Houston. The crews mounted the MS50 to the barrier walls of the bridges using a bracket that was invented, designed, and constructed in-house. This allowed the field crews to remain behind the barrier walls away from traffic while obtaining all the required survey data.



The Bench Marks of Success

These can be bewilderingly difficult times for surveying firms. National and regional economies have been dynamic in ways that discourage investment, but the seemingly endless parade of new, business-transforming technologies—like GPS, robotic total stations, laser scanning, and now UAVs—seem to *require* big investments in new equipment, staff, and training to take advantage of the profitable new deliverables and irresistible productivity gains that are on offer.


Baseline Corporation is a Houston-based surveying firm, one of the largest in Texas. The company strives to balance traditional business values, like quality work and customer care, with a commitment to progressive technology. It's working for them. President Steven E. Williams, RPLS says, "We're a wholly owned subsidiary of multidiscipline consulting engineers Binkley & Barfield, Inc., and we've been in the survey business for 40 years. We have a tremendous history of serving clients in Texas, and have the capacity and experience to take on any surveying project, and deliver an excellent product"

Williams himself has been in the business for a long time, with a career that is a model for ambitious surveyors. The discipline caught his interest in high school, where he won state-wide competitions for architectural drafting (that's drafting on a table, by the way, with actual pens and pencils) which led to 14 years with a "mom and pop" survey firm, mastering the field and office aspects of his profession, while pursuing undergraduate studies in land surveying and geomatics and obtaining licensure in 1989.

In 1995, he made a move that many young surveyors both anticipate and dread: He joined a much larger firm, and put himself on a track that would lead to management positions. "I spent a rewarding 17 years there, working on big projects like the Texas Motor Speedway, the FedEx Hub at Fort Worth Alliance Airport, and on emergency repairs to the Gulf Coast Jetties to name a few, while developing a good clientele, and eventually becoming vice-president"

Williams was recruited by Baseline in 2012. "Basically, they offered me an opportunity I couldn't refuse, including being president of the firm. I'm glad I took them up on it," he says. "I brought my brother

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A surveyor wearing a white hard hat, sunglasses, and a yellow safety vest is standing in a desert landscape. He is holding a Leica GNSS RTK receiver mounted on a black tripod. The tripod is positioned on a concrete base. The background features a large, rocky mountain under a clear blue sky. The foreground is filled with green desert vegetation, including cacti and shrubs.

Baseline insists on using high-quality surveying technology. All eight crews are equipped with Leica Viva GS14 or GS15 GNSS RTK receivers. The company was also one of the first firms in Texas to invest in a Leica Nova MS50, and it was the first in Houston to buy the new CS20 controllers with Captivate software for use with its GS14s and TS15 Imaging Total Stations.



A Baseline crew runs levels with a Leica DNA10 Digital Level.

Darren along as Director of Transportation Projects, and since then we've grown tremendously, kept existing clients, and added new clients, and we've been key players in large meaningful projects here in Texas."

Williams attributes his success at Baseline to a focus on three things: quality work, talented staff, and taking very good care of clients. For him, part of the focus on quality work has been a commitment to quality surveying equipment.

The Right Solutions for Baseline

Baseline is a Leica Geosystems firm, which was a switch for Williams, who had relied on surveying equipment from another manufacturer in previous years. "I was used to working with another vendor, and it took some effort to really get to know and trust the different interfaces and ways of doing things," Williams explains. "But after working with the Leica Geosystems total stations, and especially the RTK receivers with the SmartNet network here in Texas, I was convinced—RTK results are faster and better, and vertical results are more accurate."

Baseline deals directly with Leica Geosystems for equipment purchases, via Technical Sales-Support and Geomatics Specialist Jeff Ryall. "Steve brings so much to the table when it comes to survey

equipment," Ryall says. "He's worked with everything, and he's eager when it comes to adopting new solutions for increased production—Baseline was one of the very first Texas firms to use the Nova MS50 MultiStation, and the GS15 and GS14

used the MS50's scanning capacity right out of the gate to scan nine bridges on Houston's Interstate 10," he says. "It was very new equipment at the time, but with Jeff's help we became comfortable with it and actually finished ahead of other consultants on the

“Leica Geosystems’ solutions help us to work with everything and give the client what they want. They also work well with the mapping standards we’ve developed for our deliverables.”

RTK units, and they were the first firm in Houston to buy the CS20 controllers with Captivate software for use with their GS14s and their TS15 Imaging Total Stations. He's very detail-oriented and thoughtful about surveying equipment. His contributions to SmartNet seminars at TSPS (Texas Society of Professional Surveyors) conventions are also helpful and insightful."

Williams' early use of the Nova MS50 is a good example of Baseline's commitment to quality, and the reasoning behind it. "We

project. That one project nearly repaid our investment. I don't actually like to be on the bleeding edge of technology, but when it works out that well, it's awesome."

Crew safety, of course, is also an extreme necessity. On the bridge scanning project, the MS50 was mounted to the barrier walls of the bridges using a bracket that was invented, designed, and constructed in house. This allowed the field crews to remain behind the barrier walls away from the constant high-speed traffic while obtaining

Adopting New Technology Profitably

Given the pace at which new survey technologies are being introduced, consulting firms have to think carefully about how—and when—to invest in new solutions. The stakes are high; companies that made good equipment choices and had good timing when investing in computer drafting, electronic data collectors, GPS, robotic total stations, and laser scanning have reaped massive productivity gains and tended to thrive in recent decades, even in tough economies. On the other hand, firms that made ill-timed investments in new solutions that were hard to implement profitably have saddled themselves with the kind of overhead that puts firms out of business in lean times.

The right approach to investment in new technology is a mean between two extremes:

1. Committing too early to expensive technology that doesn't end up contributing to a firm's bottom line, and
2. Getting into profitable sectors like laser scanning too late, after competitors have already established themselves.

The “sweet spot” between these two extremes is when a firm makes a purchase that adds productivity immediately, and does so soon enough to benefit commercially from the new work capacities. Existing work is done more efficiently, and the firm has access to new projects and clients who have a need for the different deliverables made possible by the new technology.

Baseline has walked this line very effectively, and a few helpful principles can be derived from their experience:

Have a particular project or use case defined that will go a long way toward justifying the investment. Baseline was one of the first firms in Texas to purchase Leica's Nova MS50, and their early adoption was prompted by a large TxDOT contract that required as-built surveys of ten highway bridges. The MS50's scanning capacity was used immediately to make this work safer and more efficient, and the increased profit on this one project substantially justified their investment.

all the required survey data. And, “quite aside from the scanning, the MS50 is a great reflectorless robotic station,” Williams says. “It's a one-second gun, and even compared to our (Leica) TS15s, the reflectorless technology is faster, has a range of up to 2,000 meters, and seems to shoot just about anything. That also keeps our crews away from traffic, and we use it to take tricky shots in difficult-to-access areas as well as for measuring the sag points in telephone and power lines. The MS50 is in use every day.”

At Baseline, all eight crews are equipped with Leica Viva GS14 or GS15 GNSS RTK receivers, and five robotic total stations are also in constant use. Data is processed with

Have a good relationship with your equipment vendor and technology representative. Baseline's long relationship with a particular supplier, Leica Geosystems, and their technical sales-support representative, Jeff Ryall, greatly increased their confidence in early purchases of Leica Geosystems' newest RTK receivers, the Nova MS50, the Viva GS15 integrated GNSS system, and now the new Leica CS20 controllers with Captivate software. “They're the first firm in Houston to try the CS20 controllers,” Ryall says. “And of course they have my full attention as they integrate them into their workflow—I'm as invested as they are.” An excellent vendor relationship makes a tangible difference when implementing new technology; when putting the Nova MS50 into use on the bridge project, for example, Baseline dealt with classic early adopter challenges. But they were able to work closely with Ryall to resolve challenges quickly and still improve profitability on that project.

Know your current technology and staff very well, and take care of both. When purchasing the Nova MS50, Williams had a crew in mind; he knew from their work with robotic total stations that they were likely to have the attitudes and skill sets needed to effectively use this particular new equipment.

Be proactive, and cautious, when investigating new technology. Right now, Baseline's President, Steve Williams, has begun to look at unmanned aircraft systems (UAS, also called UAVs) as platforms for photogrammetric surveying. “We're looking into drones and are interested in what they can do; we've even performed a pilot project. So that may be the next place we go.” Or, it may not. By being informed now, and seriously investigating this new technology, Baseline is ready to invest quickly... *if* the right project comes along.



Baseline has the staff and capacity to do top-quality work.



Client satisfaction is paramount for Baseline. About 80% of the firm's business is for repeat clients.

Leica Infinity office software for scan data, and Geo Office for GPS control data as well as some total station data. "Our policy is to process data and produce deliverables suited to whatever design software the client is using," Williams explains. "Leica Geosystems' solutions help us to work with everything and give the client what they want. They also work well with the mapping standards we've developed for our deliverables."

Taking Care of Clients... and Staff

"I'm happy to say that about 80% of our work comes from repeat clients," Williams says. "That comes from taking good care of clients." As an example of the practical value of being devoted to his customers, Williams cites Baseline's work for O'Reilly Automotive, a nationwide retail parts supplier with 4,100 stores in 42 states. "We do a large portion of their ALTA/ACSM

surveys and platting work in Texas, even though that can require a lot of travel," he says. "They're willing to pay more than they would for local surveyors because they know their needs will be exceeded by what Baseline provides; therefore, there's a great deal of trust on both sides."

Building trust with clients has led to large projects in a variety of work sectors. For example, Baseline has several on call contracts with TxDOT, and is working on the massive Grand Parkway around Houston. They're principle surveyors for Generation Park, a 4,000-acre development that began in 2012 and is Houston's largest new commercial development. "About 40% of our work is for TxDOT, and the rest is for clients doing land development and planning, public sector work like flood control districts, utility districts, and work for cities, counties, and private clients such as O'Reilly Automotive and the LDS Church

in Texas," Williams says. "All of our clients are very important to us."

Of course, good client service is just one side of the coin; the other side is taking care of Baseline, so that the company has the staff and capacity to do top quality work, and a lot of it. In addition to investing in progressive measurement solutions (Williams says they're now looking into UAVs), Baseline invests in personnel. "Longevity is so important—when you're sending people out to work with expensive equipment, you have to have qualified people you can trust. One of the best things I can say about our approach to employees is that two of our party chiefs have been with us for over 25 years and several of our office staff have been with Baseline for over 30 years."

It hasn't always been easy; at times, booming oil field work led to skilled labor shortages so severe that Williams has hired good prospects from unrelated fields. "We'd find, and train, just about anyone who appeared trustworthy and had the aptitude to learn and grow." This focus on "sharpening the saw"—continual investment in staff and technology that builds Baseline's capacity to serve clients—has paid off. "The majority of our clients, some of whom have been with me for a big part of my career appreciate quality work, great service and trust; they care about price, of course, and we're competitive; however, the confidence and trusted relationships developed over time are the most important factor in our growth and success."

The end results speak for themselves. With the right technology, dedicated talent, trustworthy employees and an experienced president who is dedicated to the art and discipline of land surveying and satisfying clients, Baseline is the very model of a successful consulting firm. Williams says, "I couldn't be happier with what we've accomplished here at Baseline. Since 2012, we've opened two additional offices, tripled sales, and doubled in size. And, we've continued to take care of all our clients and staff while doing that. To me, that's the definition of success in the surveying business." ■

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