Figure 1: Tectonics Mountainville NY office with the new survey van

American Trail Blazers

in New Mobile Mapping Technology

With all the new emerging technologies, established companies using traditional methods must explore ways to remain competitive. Most of us are familiar with Albert Einstein's famous quotes "Insanity: doing the same thing over and over again and expecting different results" and "Life is like riding a bicycle. To keep your balance you must keep moving." Both of these quotes (we could even call them axioms at this point) lend themselves extremely well to the geospatial and business worlds. With advances in technology, it is necessary to keep one's business balance by carefully observing market dynamics related to competitiveness, service or product pricing and overall profitability. Just doing the same old thing over and over ultimately results in declining profitability. The balance is found by investing wisely, to stay at the more profitable areas of one's offerings.

Study of an Actual Business Case

A prime case study is with the recent decision of Tectonic Engineering & Surveying Consultants (NY, USA)[1] to expand their business into the offering of very high performance mobile mapping. Early in 2017, they placed an order for a SITECO Informatica (Bologna, Italy) Road-scanner Compact[2], equipped it with a pair of FARO (Lake Mary, FL, USA) Focus[3] laser scanners and deployed it onto a newly purchased

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and custom outfitted van. Tectonic is the first company in USA to adopt this SITECO technology (**Figure 1**).

Tectonic offers a full spectrum of professional engineering and design services. Established in 1986, it has grown to become a multi-disciplined engineering firm and is repeatedly recognized by Engineering News-Record[4] as one of the top 500 engineering design firms. Committed to providing well-organized, thorough work, their team of over 500 is focused on delivering a timely, economical, and quality product. Tectonic had been providing terrestrial scanning for several years and with hundreds of projects under their belt and were looking for the next step up in technology. With several major agency clients in New York City embracing this technology it was a no-brainer decision that Tectonic needed to be in the mobile scanning market.

Evaluating the Options

The question that arose was how to best employ the required investment to get the greatest overall effectiveness and efficiency out of the funds being spent. With the many available mobile solutions on the market today, a long line of decisions were made, such as;

- Determining accuracy requirements, which hardware could deliver the desired engineering and survey grade performance.

Figure 2: close up view of the SITECO Roadscanner Compact with Faro scanners

- Evaluation of workflow software delivered with a system. It was quickly discovered that many available system offerings were highly dependent on additional third-party software products, not included with the hardware.
- Ensuring that the workflow also fit seamlessly into the Tectonic existing environments, consisting primarily of AutoCAD based tools and the Cloudworx suite from Leica Geosystems.
- Many questions arose to getting the required support for the application suites, not having to rely on multiple vendors.
- Finding a supplier having an actual track record with real-world experience in carrying out roadway, infrastructure and asset management survey work.
- Being able to maximize the use of systems components for other work (i.e. using the scanners in static mode also), when mobile scanning is not required.
- Robustness in the design and build quality of the overall system implementation.

Finally, the SITECO-FARO Roadscanner Compact was determined to be the best, and only, combination that really fits these criteria (**Figure 2**). While there were other highly robust competitors offering very good packages, there was nothing else as high performance yet cost effective that included a true end-to-end software workflow. So the purchase decision was made, the system configuration determined and the order placed. (**Figure 3**).

Post Deployment Discoveries

The first result of going mobile that was discovered was that the in-house drafting needs have multiplied. With field team deployment time cut down by more than 50% Tectonic had to increase its drafting capacity. Most output is still traditional flat 2D maps so to keep up with the speed of field production, Tectonic had to increase the office staff side of the equation. They also had to re-think the entire approach to work flow. Field crews required additional training to avoid picking up all the traditional information typically needed, since the mobile mapping system scanners do that very effectively. They only need to survey the few pieces the scanner does not pick up, such as inverts and monumentation. Attention was now being focused on shadow areas, fill-in, and most importantly, better attention to accuracy in ground control survey.

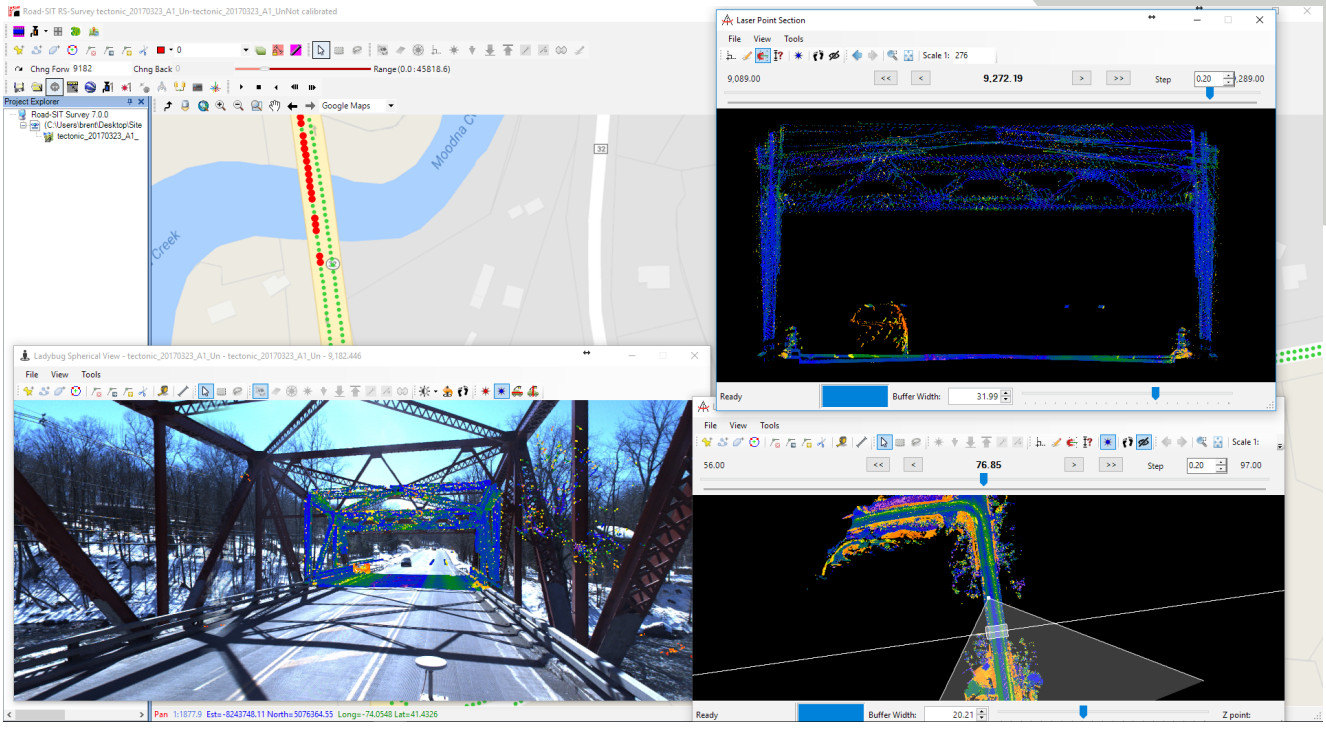

Figure 3: SITECO RS Survey analysis software sample. Clockwise from top left; Google maps view of data collection area, vertical cross section, top view horizontal section showing cross section and camera pointing position, camera view with lidar point overlay of the selected cross section)

While this may initially appear as a major disruption to the organization, the overall process has brought Tectonic into a higher sphere of efficient operations. The retraining and redeployment of staff has strengthened Tectonic's competitive edge, allowing the firm to be in a better position to win higher value projects, rather than only traditional survey where there is much more competition, eventually of course leading to price and profitability erosion.

Trailblazers

The entire process that Tectonic experienced has now effectively differentiated them as a leading edge provider of top level services. By having carefully examined all the available offerings on the market, and the surrounding support infrastructure, they have placed themselves into a very cost-effective position. Their technical decisions to select flexible hardware with multiple deployment capability (both mobile and as static scanners) maximizes the investment efficiency. The system performance, being on highest levels of data capture accuracy, can also be easily upgraded as newer scanners and other components become available on the market.

So going back to the original quotes from Albert Einstein, here is a company which has very carefully and thoughtfully embarked on a new path to differentiate itself in the geospatial services marketplace, delivering higher value products. Using the flexible instrumentation deployment concept (i.e. 3D scanners for both static and mobile mapping solutions) allows for Tectonic to have a better overall cost effectiveness of their capital investments. They are definitely not doing the same thing over and over again and are continuously keeping a strong balance by moving forward with the latest technology.

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[1] Tectonic Engineering www.tectonicengineering.com

[2] Siteco Informatica www.sitecoinf.it

[3] FARO Technologies www.faro.com

[4] Engineering News-Record www.enr.com