

# the American Surveyor

NOVEMBER 2018

## IT'S ALL ABOUT THE DATA

### Trimble Clarity

Confident collaborating

### Future of Surveying

Is a degree required?

### Decided Guidance

Decoupling the PLSS

# contents

## ON THE COVER



**10**

Progress aerial topo surface for a large highway project.  
COURTESY TAKE-OFF PROFESSIONALS.



**16**



**30**

## features

### **10** It's All About the Data

Arizona's Take-Off Professionals exhibit the value of data in the coming construction environment.

JASON E. FOOSE, PS

### **16** Collaborating with Confidence

Trimble Clarity makes it possible to easily visualize and share 3D point cloud data with clients.

JOHN FOMBY

### **30** Survey: Sometimes it's the Pits

Quarry surveys are just one of this Maine surveyor's jobs.

LARRY TROJAK

## departments

### **6** Decided Guidance:

Broadus, Butternut, and Bowling for Brass Caps

"It is ironic that laws seemingly put in place to stabilize the PLSS under state authority are actually decoupling the cadastre from land titles."

JASON E. FOOSE, PS

### **38** Test Yourself 57:

At the Corner of the Box  
Exercising geometry and trigonometry skills.

DAVE LINDELL, PS

### **40** Vantage Point:

Flashy (but not in a good way)  
Our FEMA expert examines flooding from a practical standpoint.

WENDY LATHROP, PS, CFM

## in this issue

### **2** Guest Editorial: Should a College Degree be a Required Element of Professionalism?

Continuing with our series about the future of land surveying.

DONALD JOHNSON, PS

### **34** MarketPlace

# SURVEY: SOME- TIMES IT'S THE PITS

» LARRY TROJAK



Quarry surveys  
are just one of this  
Maine surveyor's jobs



**W**hile not one to dote on the challenges facing women in the workforce today,

Tara Hartson will concede that there's still "room for improvement" in the attitudes of some toward a female surveyor, and can cite some interesting anecdotes to back that up. In a career field in which women make up only 10% of the workforce and serve largely male-dominated industries such as construction, mining, etc., perhaps that's really not surprising. Attitudes notwithstanding, the Ellsworth, Maine surveyor loves the work she does, gets a great deal of personal and professional satisfaction in the service she provides on behalf of her employer, Herrick & Salsbury Land Surveyors (H&S), and, 11 years into a tenure at that firm, has no plans to go elsewhere in the foreseeable future—except perhaps up.



## Finding Her Way

Tara Hartson's path to surveying was anything but direct. Initially focused on a career in music education, she first attended a college in Maine, but quit upon finding the school was more party than practice.

"Not long afterward, my sister was accepted to St. Olaf College in Northfield, Minn., and I thought I could apply there as well," said

**“**... a woman came out and was so excited to see a female surveyor that she totally ignored my colleague who was standing right next to me. **”**



Using a Topcon GR-5 base/receiver and a Tesla controller running Topcon Magnet 5 software, Tara Hartson collects coordinates and elevations to prepare an existing conditions topo site plan.

Hartson. "I was accepted into the school's biology program and was fairly happy doing that and music. However, with no money available to come home during school breaks, I started taking some summer geology courses at nearby Carleton College and thought that perhaps landscape architecture might be a good area to pursue. So, with a long-term goal of getting my master's degree, I interned for a bit with an architectural firm."

During that internship, which included a good deal of data entry from surveyors working for the firm, Hartson realized how much she enjoyed the survey side of the business and knew immediately that was the path she needed to pursue.

"It was like a light bulb went on and suddenly it all made sense," she said. "I knew I wanted to work in the outdoors, but I also knew the job had to have a brain component to it—survey provided both of those. So instead of working on my master's, I transferred credits and, in two years, got my BS in surveying engineering technology from the University of Maine, Orono. After completion of school, I interned at H&S and in 2007 Stephen Salsbury, the owner, offered me a position with them."

### Idle Robot

Immediately upon starting at H&S, because she was new and young, Hartson became

the *de facto* technology expert for the company. Her first assignment involved using the firm's GPS in a mining application.

"One of our clients was capping an old mine site to stop it from leaching—it was an environmental hazard," she said. "So we were working with a geotechnical firm, and, using GPS, I would come out every day and shoot elevations to make sure the cap was to the design standards. Steve told me I was going to be at their beck and call—and I was. It was my introduction to the world of survey and it kind of reaffirmed my career choice."

Around that same time, H&S had just purchased a new robotic total station which,

*continued on page 36*

# Building toward a stronger infrastructure.



We have the technology to simplify your layout process.

Whether you start your workflow from printed plans, PDF's, or fully coordinated Building Information Models. Moving the construction data from the office to the field and back has never been easier.

The Intersection of **Infrastructure** and **Technology**™

 **TOPCON**

Learn more at [topconpositioning.com/vertical](http://topconpositioning.com/vertical)

while advanced for the time, left Hartson less than impressed.

"I refused to use it because, even though it had a lot of potential, the technology wasn't quite there yet," she said. "I would run a traverse and come back and it wouldn't close properly—it just made me nervous. Steve tried to get things right, sending it back repeatedly to the dealer to have them look at it, but I still wasn't comfortable with it. So, essentially, it sat there for ten years and we just used other total stations to get the job done."

Last year, in a continuing effort to upgrade its equipment, H&S purchased a Topcon GT-505 robotic total station, a lighter, yet undeniably more powerful version of earlier models. This time, it passed the Hartson test. "Not surprisingly,

it's like night and day compared to that older gun," she said. The technology is much more accurate, it's much faster, it allows for hybrid positioning, and, when we need to, we can have a one-person operation. Most importantly, I have a nice level of confidence in it."

### With Her, Permitting

Much of H&S's business includes boundary and topo surveys, land-use permitting, easements and rights of way, wetland mapping, elevation certificates, and more. The

land-use  
permitting  
mentioned  
in that list  
of offerings  
includes

work with area gravel pits, a business segment which H&S has captured well.

"Handling permits for almost all of the gravel pits in this area is definitely one of our strengths, said Hartson. "There is a decent amount of development in this area and, as a result, aggregate is in demand. However, operators of the pits generally don't like to deal with the permitting issues, so they leave that to us. We come in, and, using either a Topcon GR-5 GPS with a Tesla controller or a Sokkia GCX3 GPS with an SHC5000 controller, do all the topo work

they need to ensure they are in compliance with local, state and federal regulations and get them permitted."

Due largely to their location—in an area dotted with lakes and rivers and roughly ten miles from the Atlantic ocean—elevation certificates or Letter of Map Amendments (LOMA) represent another decent piece of H&S's business. A LOMA is usually issued because a property which is actually on natural high ground above the base flood elevation, has been inadvertently mapped as being in a floodplain.

As Hartson puts it: "If someone is buying a house, and there's even a remote risk the tide could one day take that house away, the bank will require flood insurance. Yet, many of the maps aren't terribly accurate and may put the house in the flood zone. So we get hired by the bank of the purchaser to do a LOMA to determine how much that flood insurance really should cost. Using GPS, we will do a topo of the house in question to get a more accurate read: what elevation is this house really at? What is the risk factor? It's not just a big part of our services, it's an important one."

### Anecdotally Speaking

Of course, the anecdotes mentioned earlier warrant clarification. In the course of all the permitting visits Hartson has made in her 11 years with H&S, she said workers in the pits have been overwhelmingly welcoming.

Handling permitting for almost all the Ellsworth-area area gravel pits is one of Herrick & Salsbury's strengths. The firm has been a proponent of GNSS technology for over a decade.



"At the beginning, I'm sure it was different for them to see a woman doing what had always been done by a man," she said. "But out of all the people in all the pits I covered doing permitting, I can only recall one guy whom I could tell genuinely didn't like dealing with me. On the other side of the coin, we were recently doing a residential job and a woman came out and was so excited to see a female surveyor that she totally ignored my colleague who was standing right next to me."

Unfortunately for all surveyors, some people, feeling confident about where their property boundaries are, allow their contentious side to come out when they hear otherwise. Other times it's just overreacting to the unknown. Case in point: Hartson recalled one time a resident came out to greet them in a way none of them expected.

"This past spring, I knocked on a door to introduce ourselves and the owner came to the door with a gun," she said. "One of our guys settled him down, I explained what we were there for, and things were fine from then on. In fact, on our last day, we stopped by to tell him we were all done, and he said: 'I put some lunch money on your dash.' You just never really know what to expect and I think that's part of what I like about this job."

### Small Wonder

Given their inventory of some of the latest Topcon and Sokkia survey gear, it's obvious that H & S has a handle on technology and staying abreast of its changes. Membership in the Maine Society of Land Surveyors means a yearly gathering, which allows for an exchange of such ideas. And workshops, needed to maintain current licensing, are generally attended by vendors who bring their latest offerings.

"Steve also has a knack for sniffing out the latest and the greatest stuff online," said Hartson. "And it doesn't hurt that we just added two people right out of college—guys who recently had access to all the newest technology. Picking out equipment with them was great because they came with a knowledge set that really helped us make decisions. The GT-505 is proof of that."

Three of the surveyors on staff at H & S: owner Stephen Salsbury, Hartson and Benjamin Bartlett, hold Professional Land



Using a Sokkia GCX3 paired with a Sokkia SHC5000 mobile tablet—also running Magnet 5 software—Hartson locates a granite post marking a property boundary corner. The receiver utilizes a cellular data connection to provide a virtual reference station, giving real time positioning without having to return to the office to process collected data.

Surveyors licenses (Salsbury is also qualified as a code enforcement officer). Rounding out the H & S team are Daniel Sawyer, survey technician and Stacey Clement and Lisa Salsbury who share the office manager function. That staff of five full-time employees has remained fairly constant over the years, according to Hartson.

"Generally speaking, there's almost no turnover here; when people come on board, they stay here until they retire," she said. "We have a fairly new crew right now

because of two recent retirements and one gentleman's passing. In the history of the company, most people get hired and stay on for 40 years. I'm more than a quarter of the way there already and I feel like I'm just getting started." ■

---

**Larry Trojak** of Minnesota-based Trojak Communications is a freelance marketing content specialist. He writes extensively for the geopositioning, utility, aggregate processing, recycling, construction, and demolition markets.