

46-2 Fall 2019

# HOOSIER SURVEY



Quarterly publication of the Indiana Society of Professional Land Surveyors, Inc.

## IN THIS ISSUE

President's Message

Survey Foot Change

First CST Experience

The Land Office Business





# 2019 Officers and Directors

**Term Expires Jan. 2020**

**Director**

**David Myers**  
Terre Haute, IN  
Phone: 812-238-9731  
Email: jdm@myersengineering.com

**Director**

**Ed Sweetland**  
Indianapolis, IN  
Phone: 317-849-5832  
Email: esweetland@b-l-n.com

**Past President**

**Ryan Swingley**  
Indianapolis, IN  
Phone: 317-370-0400  
Email: rswingley@espassociates.com

**Director**

**Kurt Vonderheide**  
Indianapolis, IN  
Phone: 317-636-4682  
Email: kvonderheide@hntb.com

**Term Expires Jan. 2021**

**President**

**Todd Bauer**  
Fort Wayne, IN  
Phone: 260-484-9900  
Email: todd@4site.biz

**Secretary**

**Rich Hudson**  
Valparaiso, IN  
Phone: 219-462-2946  
Email: rickandcal@comcast.net

**Vice President**

**Eric Meeks**  
Scipio, IN  
Phone: 812-592-4145  
Email: eric.meeks@meekscompany.com

**Director**

**Don Williams**  
Crown Point, IN  
Phone: 219-734-7215  
Email: drwilliams@dlz.com

**Term Expires Jan. 2022**

**Director**

**Eric Banschbach**  
Indianapolis, IN  
Phone: 317-522-9736  
Email: ebanschbach@indot.in.gov

**Director**

**Vincent Barr**  
Indianapolis, IN  
Phone: 317-293-3542  
Email: vbarr@vsengineering.com

**Treasurer**

**Norman Hiselman**  
Avon, IN  
Phone: 317-846-6611  
Email: hiselman@weihe.net

**Director**

**Frank Walsko**  
Whiting, IN  
Phone: 219-201-3084  
Email: traverselandsurveying@hotmail.com



L to R: Eric Meeks, Scipio; Norman Hiselman, Avon; Kurt Vonderheide, Indianapolis; Don Williams, Crown Point; Ryan Swingley, Indianapolis; Todd Bauer, Fort Wayne; Rich Hudson, Valparaiso; Frank Walsko, Whiting; Vincent Barr, Franklin; Eric Banschbach, Indianapolis; Ed Sweetland, Indianapolis; Dave Myers, Terre Haute

## 2019 COMMITTEES AND CHAIRS

### COMMITTEE CHAIRS

**Education**

Chair: Carol Mormon

**Ethics**

Chair: Rich Hudson

**Finance**

Chair: Norm Hiselman

**Government Affairs**

Chair: Gary Kent

**Membership**

Chair: Ed Sweetland

**Nominations**

Chair: Ryan Swingley

**Past President's Council**

Chair: Bryan Catlin

**Publications**

Chair: Mike Davis

**Scholarship**

Co-Chair: Jacob Hoffman  
Co-Chair: Michael Judt

**Trig Star**

State Coordinator:  
Tony Gregory

**Young Professionals**

Chair: Frank Walsko

### ISPLS LIAISONS

**Board of Registration**

Liaison: Jacob Hoffman  
Alternate: Jason Coyle

**County Surveyors**

Liaison: David Gaston

**Geodetic Control Workgroup**

Co-Liaisons:  
Eric Banschbach  
Matt Healy

**IGIC**

ISPLS Director: Bryan Catlin

**Indiana's NSPS Director**

Director: Tony Gregory

Masthead.....3  
 Message from the President.....4-5  
 Legal Surveys.....6-7  
 In Case You Missed It: Top Articles Featured in the ISPLS Newsletter .....7  
 Comments, Please, on the Fate of the Survey Foot.....8  
 I Survived Career Day and the CST Exam All in 1 Year (Part 2).....10-12  
 BLN Team Wins Central Indiana Chapter Golf Outing .....14  
 Southwest Chapter Hosts Merit Badge Workshop .....15  
 The Land Office Business: Finding the Homestead .....17-18  
 The Tree Gall and the Land Surveyor .....19-20  
 Surveying Section Corners in Devils Kitchen Canyon: Indiana's Ancient Footpaths.....21-22  
 Completed Career: Byron M. Brady .....24  
 Why You Should Use Terrain Awareness .....26-27  
 Firm Members .....28-29

## COVER PHOTO

Southwest Chapter member Dugan Kippenbrock shows a Scout how to level a Trimble DiNi Digital Level during a Surveying Merit Badge workshop on Sept. 7 at Eykamp Scout Center in Evansville. Five chapter members and five Scouts took part in the workshop. More photos are on Page 15.

## FROM THE EDITOR

Deadlines for copy for various planned issues of the Hoosier Surveyor are as follows:

- Winter - February 1
- Spring - May 1
- Summer - September 1
- Fall - November 1

The Hoosier Surveyor is published quarterly by the Indiana Society of Professional Land Surveyors to inform land surveyors and related professions, government officials, educational institutions, libraries, contractors, suppliers and associated businesses and industries about land surveying affairs.

Articles and columns appearing in this publication do not necessarily reflect the viewpoints of ISPLS or the Hoosier Surveyor staff, but are published as a service to its members, the general public and for the betterment of the surveying profession. No responsibility is assumed for errors, misquotes or deletions as to its contents.



**Mike Davis, Editor**  
 4310 Broadway Street  
 Indianapolis, IN 46205  
 Phone: (317) 283-4630  
 Email: [mijdavis@iupui.edu](mailto:mijdavis@iupui.edu)

## CONTACT

<p>3502 Woodview Trace        Suite 300        Indianapolis, IN 46268</p>	<p>Phone: (317) 454-8309</p>	<p>Email: <a href="mailto:editor@ispls.org">editor@ispls.org</a></p>
---	------------------------------	--

## PRESIDENT'S MESSAGE – WHAT IS OUR FUTURE?

By Todd R. Bauer, PS, ISPLS President

**F**ollowing my last President's Message I received a number of messages echoing my sentiments and sharing their own thoughts, experiences and concerns about the direction of our profession. I appreciate the time and effort of those who contacted me, and it certainly confirmed that I am not alone in my concern about the path we are on and whether we are heading in the right direction. As a result, over the past few months I have been questioning the future of our profession moving forward.



Given that land surveyors have been instrumental in the formation and development of our country — after all, three out of four on Mount Rushmore were surveyors — where do we go from here? What is our role in society? What value do we bring to society? Where do we find the next generation of surveyors? These are all big questions with lots of moving parts. I do not have the answers to these questions. I do know, however, that without the passionate participation of our current practitioners and professional societies we cannot guarantee our place, purpose or profession in the future.

I have had the honor and pleasure this year to serve as ISPLS President. Along the way, I have made it a goal to attend as many of the local chapter meetings as I could work into my schedule. So far I have attended six meetings and met some wonderful people along the way. I have had the opportunity to engage in dynamic conversations about the current status of surveying in Indiana, discussed pricing and theoretical approach, and enjoyed a few adult beverages. Everyone has been passionate about surveying and invested in the future of this profession we all love so much. And yet we have difficulty attracting new people to the field of surveying, and we all struggle to find sufficient number of personnel to sustain our local surveying firms. Why?

I have reviewed the membership-age distribution of the members of the Indiana Society of Professional Land Surveyors, and the numbers are staggering. The average age of an ISPLS surveyor in Indiana is 58. We have more practicing members 65 and older than we do under the age of 40. There are only a handful of licensees under the age of 35. There simply isn't enough of a supply of incoming professional surveyors to fill the ranks and sustain the profession.

Even more troubling, as of the October Board of Directors meeting of ISPLS, there have been only six, yes six, new professional surveyor registrants in the state of Indiana.

And here is the kicker: of those six new registrants, four were from out of state.

During my visit to the Northwest Chapter of ISPLS we had a spirited discussion about several facets of the profession of surveying. As we opined about available personnel, educational opportunities, resources and the backlog of work, we discussed the fact that many lending institutions were beginning to waive the survey requirement for residential transactions and closings. As a surveyor, I cannot understand the concept that someone would purchase real estate and not have the benefit of a properly performed boundary survey. As a business person, I can understand that based on supply and demand, the limited number of professional surveyors coupled with a large backlog could present a potential delay to the real estate closing, and waiving the survey requirement may be an effective method to expedite closings and increase cashflow. It's business, pure and simple. It doesn't hurt that the bank will turn around and sell the mortgages on the open market and they have the benefit of title insurance to protect their interests. Since no one really knows what we do, or the value of our work product, why spend an additional \$300 and slow the closing process down?

Oddly enough, the same dynamic will be created even when the economy slows down as the number of surveyors decrease as our professional membership ages and retires. The supply and demand relationship should lead to the increase in valuation of the service we provide; unfortunately the current trend and response would indicate that the financial institutions will simply eliminate the need for our services. This "solution" is a dangerous outcome, and will eventually lead to greater and greater boundary problems for homeowners in the future. This potential, when coupled with others providing services once solely offered by our profession, has the compounding effect to severely limit the domain of the surveyor.

I do not offer this perspective on the future to dissuade you from participating in the professional practice of surveying, but to motivate you to participate in your profession and professional societies. It is our obligation as professionals to promote the occupation of the surveyor, to educate the public of the value we contribute to society, and to persuade young individuals to follow in our footsteps.

Ed Sweetland and Ryan Swingley from the Board of Directors, and each a past-president of ISPLS, have been [participating in career days](#) at numerous high schools throughout the state in an effort to introduce students to the opportunities in surveying. Ed and Ryan have had assistance from a few other members in the local area and are looking to develop a dedicated group of surveyors who can



represent the profession and ISPLS at future career fairs. ISPLS invested in table coverings and banners for use in these career days, and the IPLS Foundation has provided materials and marketing products for the attending students. The NSPS has prepared speaker kits for a variety of presentations, and these documents offer an outline of topics and speaking points for most any occasion. If you are interested in assisting with career days in your area, you can help in two ways: 1) you can work to establish connections with your local schools and guidance counselors to establish the dates and locations of your local career fairs; and 2) you can contact Ed and Ryan to provide much-needed assistance in representing our profession during these events.

If presenting at a career fair isn't your thing, then find an opportunity to promote the profession in your local community. Participate in a local day of giving project, donate services for Habitat for Humanity or offer your expertise to a needy charity. Promote the profession and the value we provide locally, and work to educate the public on our contribution to the community and the world. Make a difference in your area, and you may influence someone

to become a surveyor, join the profession and impact the future of the profession.

Another option to contribute is to become active in your local chapter or participate on the Board of Directors of ISPLS. I first became active in our local chapter immediately after becoming licensed. After a few years at the local level, I ran for the Board of Directors to represent northeast Indiana at the state level, eventually becoming president. The opportunity to network with fellow surveyors both locally and at the state level has been rewarding and provided multiple opportunities to be involved with various initiatives to promote and represent the surveying profession.

I don't have all of the answers to the future of surveying. The one thing that I do know is that if we fail to participate, we have no one to blame except ourselves for whatever our future may hold. Our future is yet to be written, and we can influence our destiny by the actions we take today.

Now go make a difference for your future!

Todd R. Bauer, PS  
President, ISPLS



# The Women of Surveying

## SHARE YOUR STORY

*Inspire the next generation of women surveyors*

Join us at the ISPLS Annual Convention in Fort Wayne, and share your story in a video interview to be shown to girls and women thinking of choosing surveying as a profession.

Interviews will last no more than 30 minutes.

To schedule a time or ask any questions you have about the event, contact [Cara Morman at cmmorman@cincinnatiatstate.edu](mailto:cmmorman@cincinnatiatstate.edu).

## LEGAL SURVEYS

By Bryan F. Catlin, PS, ISPLS Past President

The goal of this column is to provide brief summaries of recent Indiana Court of Appeals and Supreme Court cases involving topics related to surveying practice, certainly not to provide legal advice. Information is gathered from the courts website at [www.in.gov/judiciary](http://www.in.gov/judiciary). Comments or suggestions for future columns are welcome by email to: [Bryan.Catlin@indy.gov](mailto:Bryan.Catlin@indy.gov).



*ordered to connect to the town's sewer system. The trial court said the town should install the grinder pump first and the Appeals Court reversed that ruling, noting that would typically cost a homeowner more, as well as not being a correct reading of Indiana Code on this matter.*

Now a dispute arises about fees and penalties totaling \$351,857.75 awarded to the town by the trial court. It should be noted that after the earlier appeal the town passed a new ordinance greatly increasing the connection fees. Hoagland appealed, arguing that since it filed applications to connect within 40 days of the certification of the first appeal, which is less than the 90 days in the ordinance, that they should not be charged penalties; that they should have been charged under the prior rate structure; that the trial court should not have awarded attorney fees to the town; and that the trial court erred by refusing to penalize the town for alleged discovery violations. The Appeals Court agreed with the first three points but not the last. The judgment of the trial court was affirmed in part, reversed in part and remanded back to the trial court.

**Indiana Department of Natural Resources v. Kevin Prosser, Indiana Court of Appeals Case No. 18A-MI-2644, August 1, 2019**

This case from the Fulton Circuit Court doesn't really involve surveying, but a DNR surveyor did provide testimony. This case turned on whether a portion of Lake Manitou shoreline was in a "developed area" where a concrete seawall is allowed based on dredging from the 1940s or in an "area of special concern" where a seawall would have to be constructed with bioengineered material and/or glacial stone. The judgment was that this was not a developed area and there is discussion about the role of the DNR administrative law judge, the Natural Resources Commission and the Circuit Court in determining that dredging, even if it shifted a shoreline between two points slightly landward, might not have lengthened the shoreline if it was straightened in the process. Lengthening of the shoreline is a factor in determining if it is a developed area. There is also brief discussion about the use of old aerial photos and GIS and the limits of what that can prove, which most surveyors will already understand. If your practice involves assisting with permitting seawalls, it is interesting reading.

**Hoagland Family Limited Partnership v. Town of Clear Lake, Indiana Court of Appeals Case No. 18A-PL-2088, August 28, 2019.**

As a reminder, my earlier summary of a prior Appeals Court opinion on a part of this case follows in italics.

***Town of Clear Lake v. Hoagland Family Limited Partnership, Indiana Court of Appeals Case No. 76A05-1606-PL-1241, April 6, 2017***

*This is a fairly technical case from the Steuben Circuit Court which revolved around which would come first: the town installing a grinder pump to serve a property, or the property owner applying for a connection to the sewer so the town can decide how to best serve a property that has been*

**Virginia Novak v. Porter County Board of Zoning Appeals, and William Grep, Tammie Champie, Robert Shudick, Sharon Shudick, Jerry Uitermarkt, Keith Ellis, Kristin Ellis, Ed Lauridson, Marcia Lauridson, and Neal Molengraff, Indiana Court of Appeals Case No. 18A-MI-3134, September 9, 2019 MEMORANDUM DECISION**

Here Novak owns a 50-acre homestead that includes a private road used by neighbors to the north to access their homes. After a change from pasture to row crop operations on a neighboring farm that increased runoff across her property, and eventually caused erosion on Novak's property, she had fill brought in and began grading and filling the northern part of her property, including the private road. The Porter County Engineer visited the site and saw between 20,000 and 25,000 square feet of soil stockpiled. A stop work order was issued. The County Engineer visited twice more and on both occasions noted more material had been brought in and stockpiled and a berm was acting as a dam along the private road. The Board of Zoning Appeals, later joined by ten of Novak's northern neighbors, filed suit in Porter Superior Court, alleging Novak was engaged in land-disturbing activities without a permit. Porter County has a Development Ordinance that requires a permit for land-disturbing activities in unincorporated areas unless: the activities involve less than 10,000 square feet; nursery, mineral extraction, or agricultural operations are conducted as a permitted primary or accessory use; or emergency activity is immediately necessary to protect life, property, or natural resources. Novak claimed she was engaged in land-disturbing activities to conduct existing agricultural operations (housing, rearing and maintaining pasture for



her horses), she was addressing an emergency to protect the lives of people and animals endangered by the loss of the private road, and she was preventing fencing from washing away and protecting pasture land used by her horses, so the ordinance does not apply. The County Engineer again visited the site and saw additional grading had been done and that there was up to ten inches of water standing in the private road.

During a two-day hearing, it was determined that the trucking in of soil and embankment fill did not directly relate to the horse pasture area. Novak testified that "it took a long time to really notice" that her property was eroding. Novak invoked the nursery exception as she had planted 7,500 trees as a part of a USDA conservation program, but not in the filled area. Novak's son testified that they keep three horses, several chickens and six or seven goats, but the animals don't go to the filled area, nor does their hay come from that area. The trial court rejected Novak's arguments and found she should have applied for a permit. The court also issued an injunction, enjoining Novak from transporting fill onto her property and ordering the removal of any fill placed along the private road. Novak appealed.

On appeal, the judgment of the trial court was affirmed.

Frustrating to me, this opinion did not answer any questions about why the use of individual areas of the property were more important than the use of the property taken as a

whole. Did zoning matter? The Porter County GIS appears to show the parcel in question as being zoned Rural Residential. Did the intensity of the apparently permitted agricultural uses matter? Was the 50 acres just considered a large unkempt lawn? Obviously, causing water to stand in the road was probably a poorly thought-out way to address erosion and probably what brought this to the county's attention. But if I had planted that many trees, grew hay and kept livestock, I would have felt that I was conducting some sort of agricultural operation and had the right to fill eroded and low areas to correct problems and improve that operation as well as provide better drainage. After all, this whole problem started when a long-time pasture was changed to row crops on the neighboring property with what appears to be the same zoning, so responding by filling an area not in current production to preserve potential future expansion of existing agricultural use of the property seems reasonable, in my opinion. As an exaggerated mental exercise, do you think the need/process for a potential permit to build an accessory building in a typical suburban lot setting would be allowed to differ if the potential building footprint area in question was producing vegetables in a garden bed or merely lawn? But answers to any of these questions are not to be found in this opinion.

*Bryan F. Catlin, PS has been registered as a Land Surveyor in Indiana since 1991. He holds B.S. Land Surveying Engineering and M.S. Engineering (Geodesy) degrees from Purdue University.*

## IN CASE YOU MISSED IT:

Top Articles Featured in the ISPLS Newsletter | [September - November 2019](#)

Podcast: Timothy Hawthorne - Making GIS accessible to the masses  
[September 24 Newsletter](#) | [Directions Magazine](#)

Economic outlook: GNSS on the rise  
[October 2 Newsletter](#) | [GPS World](#)

The March Toward 2022  
[October 9 Newsletter](#) | [xyHt](#)

'Get Kids Into Survey' comic book  
[October 22 Newsletter](#) | [NSPS](#)

How do we capture culture on a map?  
[October 30 Newsletter](#) | [Directions Magazine](#)

First Women Surveyors Summit  
[November 5 Newsletter](#) | [xyHt](#)

Have an article you want to see in the ISPLS Newsletter? Email [Evan Hoffmeyer](#).

## COMMENTS, PLEASE, ON THE FATE OF THE SURVEY FOOT

By Mike Davis

**W**hen the new year begins in 2023, the U.S. survey foot will be superseded by a unit simply called the foot, a length of measure formerly known as the international foot, according to an Oct. 17 notice in the Federal Register.

The official title for the action is “Deprecation of the United States (U.S.) Survey Foot.” In this case, said ISPLS member Bryan Catlin, PS, “deprecation” means after Dec. 31, 2022, the National Geodetic Survey will stop publishing or providing coordinates or distances in U.S. survey feet — and anything identified as being in feet will mean it is in international feet.

It’s the result of collaborative action taken by the NGS, National Ocean Service, National Oceanic and Atmospheric Administration, Department of Commerce, and National Institute of Standards and Technology. It is “designed to establish national uniformity in length measurements based on the foot,” according to the Federal Register notice.

As the NGS points out, there have been two definitions of the foot in the U.S. since 1959. The international foot was adopted here at that time, but use of the U.S. survey foot continued, supposedly for a temporary period. Though the difference is very small, with the survey foot being longer by just one-hundredth of a foot per mile, “The result is decades of confusion and chaos in fields where long distances and coordinates are used, such as surveying and mapping,” says an NGS publication.

Geodesist Michael Dennis of the National Geodetic Survey has another deadline in mind, however — Dec. 2, 2019 — and he wants to call attention to it. That’s when an opportunity ends for the public to contribute comments on ways NGS and the National Institute of Standards and Technology can help bring about “an orderly transition to a single definition for the foot.”

“Your input will help in determining the most effective way to implement the change,” Dennis wrote in an email message. “All comments will be welcome, including whether it should simply be called the ‘foot’ after 2022 ... dropping the word ‘international’ from the name.”

Dennis also encouraged submitting “horror stories” about results of mixing up the two types of feet. “Each can be just a few sentences that gives important details like the type of project and the impact of the error ... including cost, if known,” he said. “All input is valued, regardless of your stance on any part of standardizing the foot definition after 2022.”

### RELATED LINKS

Public notice: [Federal Register’s website](#)

Submit a comment: [Federal Register’s website](#)

Michael Dennis: [“Fate of the U.S. Survey Foot After 2022 - A Conversation with NGS”](#)

Dec. 12 Webinar: [“Putting the Best ‘Foot’ Forward - Ending the Era of the U.S. Survey Foot](#)

xyHt article: [“The March Toward 2022”](#)

ISPLS

## 68th Annual Convention

Fort Wayne

January 22 - 24, 2020



Dozens of CEU-approved seminars



Network with hundreds of other surveyors



Learn about new, innovative products



3 convenient hotel block options

ISPLS members

SAVE \$200

on Full Convention registration  
plus more benefits all year long



CEU opportunities throughout the year



Find or post jobs in our Career Center



10 local chapters for networking



Legislative advocacy on your behalf



Industry news and insights

REGISTER AT [ISPLS.ORG/2020](https://ispls.org/2020)

JOIN OR RENEW AT [ISPLS.ORG](https://ispls.org)





# One System. Dual Use. Yes, You Can Do Both!

Designed to easily move from a UAV to a ground vehicle. Optimize your ROI.  
Spend more time scanning, only 30 seconds to initialize.  
We Make 3D Mapping Easy. Learn more on our website. [www.LIDARUSA.com](http://www.LIDARUSA.com)





## I SURVIVED CAREER DAY AND THE CST EXAM ALL IN 1 YEAR (PART 2)

By Glen E. Boren, PS, CST I

**A**fter successfully surviving my first career day, I turned my attention to the other action item that seemed attainable from the Northwest Chapter's joint meeting about workforce development: the topic of finding qualified individuals or technicians to fill our workforce. Many hours have been spent seeking out experienced individuals to fill in-demand positions where they could be plugged into any company and immediately have results. The reality of it is that those individuals are already working for other companies or there are just not enough new ones coming through what few formal surveying programs we have left.



My company got to the point where we hired a very prominent national head-hunting business to find licensed surveyors, technicians or anyone that we could work with or mold to help fill our employment needs. After writing a very large check with the promise of also providing a percentage of first year's wages, we provided a very basic description of what we were looking for. An envelope arrived about a month later with a check for our money back and an apology letter saying they couldn't find anyone in their entire national network.

We were still left with the same problem as everyone else, but that fateful chapter meeting offered up a different

approach to a solution. The problem wasn't that we can't find employees, but rather we can't find employees with the stuff we want them to already know.

This concept hit me like a ton of bricks because it was absolutely the truth. If you scaled down the description of the employee you were looking for to just "needs to show up and work," then suddenly the prospective employee list just got a lot bigger. Not huge or vast, as you can insert your "millennial" joke here.

This changed my way of thinking in that we could elevate the people we already have through training and fill in the entry level positions much easier. The problem being that nobody has the time to train and often there is no motivation to learn. Enter the National Society of Professional Surveyors' [Certified Surveying Technician program](#).

I had heard about the program years ago and didn't really give it much thought until it was re-introduced to me at that chapter meeting. The program has four levels of nationally recognized certification including specializations in either an office- or field track. The benefits are all listed on their website, but the key element that I was fascinated with was the self-study.

Each level culminates in a very rigorous exam testing the individual in all the fundamental categories of surveying that I was expecting our employees to already know. Knowing that it was going to take years for my career day efforts



*Fifteen employees from DVG Team, Inc. and four from another firm took the Certified Surveying Technician Level 1 exam together at a local library after Glen Boren implemented the program in 2019. (Submitted photo)*



to kick in and produce the surveyors that I needed now, I decided to implement a CST program in our office to tackle the issue at hand.

There were a few fundamental problems that I was going to have to address to get this thing off the ground. This was going to have to be a voluntary thing as I was not going to force my very valuable employees into doing something they didn't want to do. I had to approach this by taking away all the excuses I thought I would hear about why they wouldn't take the exam.

The first and most obvious excuse of the average employee would be cost. Each exam costs \$180 (discounted if multiple people take at the same time) and upon successful completion of the exam, a renewal fee of \$40 per year is required to maintain the certification. This is a valid excuse and the only way around it was to take it away completely. It was decided that the company would pay for the first-time exam fee and the renewal fee every year after that for as long as they were employed by the company. This is a minimal investment for the company, given the cost of what it would take trying to hire prequalified people who don't exist.

The second excuse they would bring up is that they didn't have time to take the four-hour (first level) exam. Most employees were not going to give up their nights or weekends or, worse yet, vacation time to take the exam. Therefore, it was decided that we would schedule the exam during business hours, and they would be paid for their time while taking the exam.

With the first two problems out of the way, the only real big remaining problem was motivation to take the exam. This begs the age-old question, "What motivates people?" For some employees the answer usually comes back as something as simple as "money." I wanted to develop different tiers of monetary reward for successful completion of each level, but I was also reminded that just as important as money is to some people, that paid time off is sometimes equally valuable. This is especially true for field personnel who we struggle to keep busy on bad weather days. We already had Paid Time Off (PTO) days, so for the purposes of installing this new program, we invented Bad Weather Time Off days.

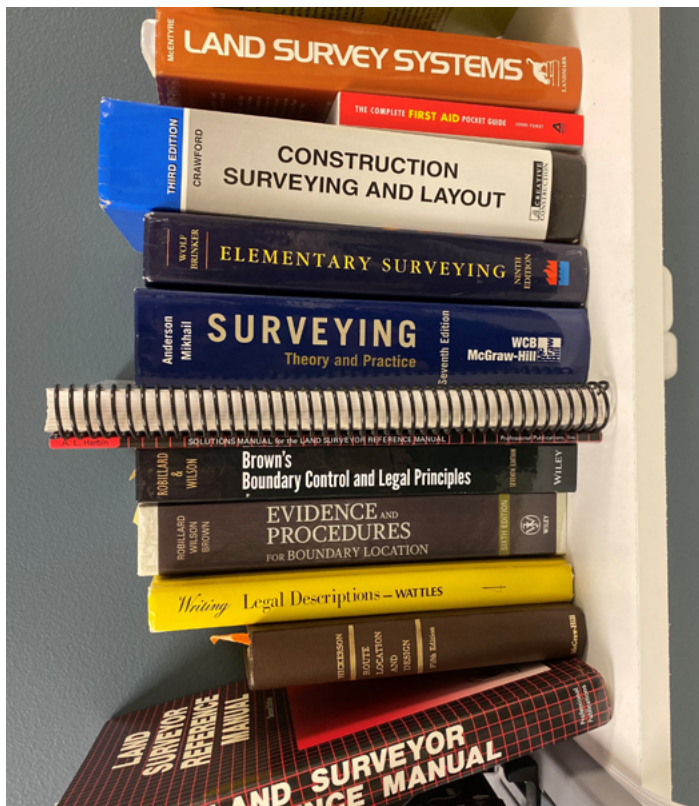
With different tiers of monetary and BWTO days established, my business partner asked me what my goal was for the new company program. More specifically, was it more important to get those who chose to do it to pass and move up or would a high participation number be more important even if the pass/fail results were not great?

I eventually settled in with participation as being the most important goal, and we restructured our company first-level reward tier for taking the CST with a team or group mentality in mind. We added a simple requirement that stated that you would only be eligible to receive the first-tier reward if 80% of the surveying department employees all took the exam at the same time. If we couldn't achieve 80% participation, then the individual would not get a reward until successfully passing level 2. This was an extremely risky gamble on our part, as I felt we were either going to get everybody or nobody.

What happened next was there were a few who wanted to do it and many who were on the fence. Those who wanted to do it started encouraging ("encouraging" being the politically correct term) the others, and the next thing I knew, everyone except for two individuals were on board.

During all of this, in the back of my mind I knew I was on a collision course with the inevitable question of whether I was going to take the exam. At the time, I thought it was kind of beneath me. Here I was, licensed in two states, director of the department and former university guest lecturer with this "technician" test before me. As I debated the question, I came across an internet meme that depicted a man sitting on a rock yelling at the people in front of him to pull a rock labeled "Boss." The picture below it was the same man in front of the rock pulling on the rope with everyone else behind him and was aptly labeled "Leader." I knew at that moment that not only was I going to have to take the exam, but I absolutely had to pass it or lose all credibility with my employees.

I secured a room at our local library and decided on the paper option for the exam. With the date and location locked down, I found a proctor. I announced what our company was doing at our next chapter meeting and offered up to anyone who wanted to send their employees that they would be welcome, as we had a time, a place and a proctor. It was not received like I



*Boren bought books online about surveying fundamentals to help his employees get ready for the exam. Old editions tend to sell for far less money, but are typically still relevant since the fundamentals of surveying stay the same. (photo courtesy Glen Boren)*

expected it, and I heard things like “Why would I want them to get certified? They will just quit and go somewhere else.” While disappointed with some of the comments, another individual approached me later who shared my enthusiasm and brought another four to the exam.

NSPS provides a category list of topics to study and points you to a free online study program specific to each exam level. The exam is open-book, which presented my next problem. Many of the technicians never had a formal surveying class and thus no need to purchase a fundamentals of land surveying book. I brought in every surveying book I owned and put them on a shelf in a common area in our office and created our first company surveying library. I knew that we were still going to be in trouble on the day of the exam with not having enough books to go around, so I went shopping online.

It is amazing how much the value of a book drops once it is replaced by a new edition. The current used editions of fundamental surveying books were hovering around \$100, while if you went back one or two editions, they were at \$2-\$4 with free shipping. I bought a bunch of these books and handed them out like candy. That is the thing about surveying fundamentals: they don't change. The only thing that I had to be careful of was one edition was a little too far back as they were touting the emerging technology of something new called GPS.

We held a couple of voluntary study sessions after working hours and I would occasionally overhear a couple of guys talking about certain sample questions. All of this meant that the self-study aspect was working.

Exam day came, and we all went in together. We all experienced the same mental and physical toll that a four-hour exam does to someone. Rigorous is probably the best way I can describe it. Everyone came out shaking their head at what they just experienced, and it had me contemplating contacting the beekeeper I met on career day to see if she was hiring.



The results came back, and we had 11 of 15 people from our company who passed, including myself. I was proud of what we accomplished but prouder of how we did it. The best part was when I saw an official CST Technician window cling proudly displayed in the window of an employee's vehicle in the parking lot.

We still have a long way to go, but the current plan is to try and organize an effort for Level 2 sometime in 2020. In the meantime, I still can't believe I survived Career Day and the CST exam all in one year.

*Glen E. Boren, PS, CST 1, is Director of Surveying at DVG Team, Inc., in Crown Point. Contact him at [gboren@dvteam.com](mailto:gboren@dvteam.com). The first of his two articles, detailing his initial Career Day event, appeared in the Summer 2019 Hoosier Surveyor, [Issue 46-1](#).*



## ISPLS Career Center

New job postings in the ISPLS Career Center. Have a position to share?  
**Submit an opening today!**

### Crew Chief

Etica Group, Inc.  
Indianapolis, IN

### Land Surveyor

U.S. Army Corps of Engineers  
Louisville, KY

### Survey Manager

Surveying and Mapping, LLC  
Columbus, OH







# AIR-LAND SURVEYS

A **ROWE** Company

- AERIAL IMAGERY
- AIRBORNE LIDAR
- UAV SERVICES
- DIGITAL MAPPING
- AERIAL CONTROL
- MOBILE LIDAR
- TOPOGRAPHIC MAPPING
- VOLUME ANALYSIS

## 800.447.1627

[www.airlandsurveys.com](http://www.airlandsurveys.com)



Contact Denny Sauers, Jr., CP, directly at (616) 265-2093 or [DSauers@airlandsurveys.com](mailto:DSauers@airlandsurveys.com)



## Investigate before you Excavate

Underground utility locating  
 Diagnostic sewer inspections  
 Ground penetrating radar  
 Vacuum excavation  
 Concrete scanning

Locate water, electric, sewer, gas, communication  
 Precise location and depth  
 Locate storage tanks, plastic water lines  
 Family owned and operated for over 20 years  
 10% off

[UndergroundDetective.com](http://UndergroundDetective.com)

888.747.3799



# BLN TEAM WINS CENTRAL INDIANA CHAPTER GOLF OUTING

By Mike Davis

**S**eventeen teams turned out at Dye's Walk Country Club in Greenwood for the Central Indiana Chapter Golf Outing Oct. 3, and the winning foursome from Beam, Longest and Neff had an 18-under-par score of 53. Team members were Corey Fosdick, Scott Kluesner, Clinton Nalley and Nick Tanner. They posted eagles on the first two holes, had birdies on 14 others and parred two.

Finishing second was the HNTB team of Ted Behrens, Chris Buergelein, Rick Krutcheon and Kevin Miller, with a best-ball total of 57. Capturing third place with a score of 59 was Northpointe Engineering & Surveying's team of James Craig, Corbin Patterson, Bryson Raney and Chris Smithers.

Behrens also took the Closest to the Pin competition with a drive on the par-3, 135-yard 13th hole that stopped just two feet from the cup. John Peters of the HWC Engineering team won the Longest Drive event, outdistancing all entries on the par-5, 533-yard 4th hole.

The 68 entrants enjoyed sunny, 80-degree weather on the course designed by Pete Dye in 1961.

Proceeds from the event will go to the chapter's scholarship fund.



Beam, Longest and Neff's winning team at the Central Indiana Chapter Annual Golf Outing included (from left) Corey Fosdick, Nick Tanner and Clinton Nalley, as well as Scott Kluesner, who is not pictured. Their best-ball score was 53. (Photos by Mike Davis)

Ted Behrens of HNTB was the Closest to the Pin winner at the Oct. 3 golf outing at Dye's Walk Country Club.



John Peters of HWC Engineering had the longest drive of 68 entrants in the Central Indiana Chapter Annual Golf Outing.



## SOUTHWEST CHAPTER HOSTS MERIT BADGE WORKSHOP



Scouts and Southwest Chapter members took a break for a group photo at a Sept. 7 Surveying Merit Badge workshop at Buffalo Trace Council's Eykamp Scout Center in Evansville. Representing the chapter were Eric Obermeier, Brad Kleaving, Bret Sermersheim, Dugan Kippenbrock and Alex Daugherty. Participants earning the merit badge included a girl from Scouts BSA Troop 374G in Evansville. In addition to assisting the five Scouts who participated, chapter members also provided the equipment to be used. The chapter's most recent workshop prior to this was in 2016. (Photos by Bret Sermersheim and Alex Daugherty)



A Scout focuses on plumbing a prism pole for the lot traverse that is one of the Surveying Merit Badge requirements.



Meeting another requirement, to determine the elevation of four corner markers, a Scout pays close attention to the DiNi Digital Level.



# PURE SURVEYING

Innovation that puts the human side  
of surveying first.

[www.Pure-Surveying.com](http://www.Pure-Surveying.com)



From self-leveling GNSS antennas to scanning robotic total stations  
to manual total stations, you will find innovation at all levels.

Contact Your Local Representative

[Steve.Myer@leicaus.com](mailto:Steve.Myer@leicaus.com)

765-413-2054

**Leica**  
Geosystems



## THE LAND OFFICE BUSINESS - FINDING THE HOMESTEAD

By Jim Swift, PS

Imagine this: You are a Hoosier pioneer. The real thing. One of those fabled early Indiana settlers who attended an auction at a federal land office and purchased land directly from the United States of America. Freshly surveyed, never yet developed land. You walk out of the Crawfordsville land office on a bright spring afternoon in 1826. You have a receipt in your hand. You do not have a deed, as that will come later. One of these days you will receive a genuine, official land patent signed by President John Quincy Adams. For now, you have a receipt, given to you by the Register of Public Lands.



What do you do next? Go to the land, right? How? How do you know where it is? How do you know how to get there?

You surely must have reviewed the plats of the township and neighboring townships in the land office. The document which modern surveyors see as the ancient, basic reference would have been the current map of the time. Perhaps the only map. With no large format copiers available in the rough wood building, you would have needed to make a sketch. A reference sketch to enable you to get from where you are to the half-quarter section you just purchased. With perhaps multiple townships to cross, and a numbering system of 36 sections in a township that is not intuitive, one would need a sketch. And a plan. What route should you follow? Unless you are the very first person seeking out land in this area, someone has gone before you. Some path is beaten in the direction you are headed while basic knowledge of the area may have been gained in conversation among folks around the land office.

So off you go, brave pioneer. Perhaps on foot. Perhaps on horseback. Maybe you are on foot with a pack horse. Forget the wagon. There exists no navigable road on which to drive a wagon all the way to your new place. You may have your family with you, or they may be waiting somewhere like Cincinnati.

Let's say you purchased the west half of the southwest quarter of Section 23, Township 18 North, Range 5 West, Second Principal Meridian. The patent for this property was signed by the president on April 15, 1827, to Eliot Wilhite. It must have taken a while for a land office purchase to become an official patent deed, so let's say you are heading out in the spring of 1826. First, you need to know your starting point. The southwest corner of the Original Plat of

Crawfordsville (only a few years old) is also the southwest corner of Section 32, Township 19 North, Range 4 West. That's a good place to start.

The southwest corner of your land is, according to the sketch you made, four miles south and three miles west of this point. You head for that corner, as that is the corner of your property most identifiably marked. The initial route is not hard. Others have gone south before you in the few years since this land office opened. Trees have been cut and a rudimentary wagon road has been developed along the section lines which coincide with the route to the neighboring town of Greencastle. Follow the wagon road for four miles, noting where marks on trees, or perhaps other wagon roads, indicate the crossing section lines, informing you how many miles you have traveled.

Marks? What marks? How were the trees marked? What did the pioneer actually see? Those questions are readily answered by the Instructions for Deputy Surveyors published in 1815 by Edward Tiffin, Surveyor-General of the United States.

Per Tiffin's Instructions, "All township or sectional lines which you may survey are to be marked in the manner hitherto practiced in the surveys of the United States land, viz: All those trees which your line cuts must have two notches made on each side of the tree where the line cuts; but no spot or blaze is to be made on them, and all or most of the trees on each side of the line, and near it, must be marked with two spots or blazes diagonally or quartering towards the line." Note, the notches were horizontal hatchet cuts, also called hacks in later instructions. Two of them were made lest a random hatchet mark be confused as a line marking. Blazes were vertical marks which removed the bark and a small bit of the trunk of a tree, leaving a permanent, visible scar on the tree.

After traveling south for four miles, you head west, following the marked line. For the sake of the story, let's say you are following a line which has not yet been followed by other pioneers. No wagon road. No beaten path. Just marked trees. It is not easy going, but you and your pack horse persevere, threading your way along the forested line. In one-half mile, you see a post, three inches square standing about three feet out of the ground. A tree nearby is marked "1/4 S" and several trees have blazes with notches cut across them, indicating bearing trees. Continuing along the marked line for a half-mile, you find another post. Indeed, you find two posts about 50 feet apart, and you note that the section lines jog north at this point. Your sketch tells you that you are crossing the line between ranges four and five west and that the line to the west is 78 links north of the line to the east. The posts tell the story. Per Tiffin's Instructions,

"All mile posts must have as many notches cut on two sides of them as there are miles distant from where the town or sectional lines commenced but the town corner posts, or trees shall be notched with six notches on each side, and the half mile sectional posts are to be without any marks." Hence, the southerly post should have been marked with two notches on one side, perhaps the south side; and six notches on another side, perhaps the east side; indicating that you are two miles north and six miles west of the southeast corner of the township, being Township 18 North, Range 4 West. The northerly post should have been marked with two notches on one side (south), no notches on the other side (east), being two miles north and zero miles west of the southeast corner of Township 18 North, Range 5 West. There are also various marks on the trees quartering the two corners.

Continuing west, you pass another post which has no marks, faced by a tree marked "1/4 S." Almost immediately, you cross another rudimentary wagon road, being the road from Terre Haute to Crawfordsville. Perhaps you could have just come down this path, but you weren't sure how that would have worked, as there was no map giving that information. The road was not marked on the plats you reviewed in the land office. Better to follow the grid shown on the township plats. Crossing the wagon road and continuing west, you find a post with two notches on one side (south) and one notch on another side (east) along with various marks on trees. Pushing on, following the line marked by the trees, you pass another unmarked post and a tree marked "1/4 S." One quarter mile further west, you arrive at the southeast corner of your land, but it is not marked in any way and you do not know when you pass it. You must figure that out later. Finally,

you arrive at the southwest corner of Section 23. This is it. You observe the post with two notches on one side (south) and two notches on another side (east), indicating that you are two miles north and two miles west of the township corner, which your sketch indicates is the right place to be. You also observe the bearing trees, each of which is marked by a blaze with a single horizontal notch cut through the blaze. And you take particular note of the numbers and letters marked on the trees facing the corner. Per Tiffin's Instructions, "There shall be cut with a marking iron on a bearing tree, or some other tree within and near each corner of a section, the number of the section, and over it the letter T with the number of the township, and above this the letter R with the number of the range."

Standing at the post, you look northeast and observe a tree marked

R5  
T18  
S23

To the southeast you see a similarly marked tree indicating S26; to the southwest, S27; and to the northwest, S22. You are there. This is your land. Get to work, brave pioneer. There is much to do.

*Jim Swift is a Professional Surveyor who lives in Crawfordsville, Indiana, with his wife, Beth. He has devoted much of the last 12 years to perpetuating the section corners of Boone County, Indiana. A keen student of history, Jim spends a lot of time searching for evidence of the original survey of the PLSS and thinking about the early surveyors and pioneers of Indiana.*

# HARRISONs

are stubborn!

HARRISON markers are highly magnetic with the tenacious position-holding features that surveyors need.

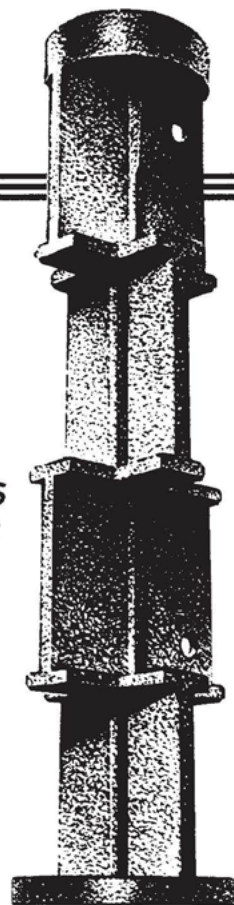
If struck by a plow the top can crack off, and the bottom will hold its position.

**HARRISON  
MARKER CO.**

Box 66, Anoka, MN 55303  
Telephone (763) 421-1445

NOTE  
THE  
MARKER'S  
UNIQUE  
SHAPE

—AND SEE  
HOW IT  
RESISTS  
SIDE AND  
PULL-OUT  
THRUSTS.





# THE TREE GALL AND THE LAND SURVEYOR

By Norman Hiselman, PS

**T**he purpose of this article is to inform and educate and not to highlight the folly of at least two other surveyors. Most surveyors who have been around the block a couple of times will say "nothing new here" — but not all surveyors, or those new to the profession, are aware of this old trick when working in rural or forested areas. It has to do with finding those old quarter section lines and corners thought to be lost.

When a fence has been in place for decades and not regularly maintained, trees grow in the fencerow and soon envelop the fence wire. The process of growing around the wire causes a deformity or gall where the tree trunk bulges out along the wire, forming a noticeable bump or scar. In 15 or 20 years, the tree will have grown completely around the wire. Often, the wire is still visible between trees and posts, but there are times when the fence is so old it just collapses

or the owner of the fence cuts it away, leaving wire in the tree. Please note that some trees do not form galls, or the tree grows enough to hide the wire and the gall disappears. Much of the land in Indiana has been timbered and the trees along the section lines are often untouched, allowing them to grow older and larger than other trees in the area. I often look for the larger trees that seem to form a line and sweep with my metal locator for wire.

When I get the opportunity to survey in wooded areas, I like to stop and observe nature, breathe the fresh air and enjoy just being out there. The surveyor side of me is also looking for clues to where the boundary, section line or quarter corner might be. I am going to touch on two surveys where tree galls have helped me find that old monument and where other surveyors did not know how to recognize or use them in their retracement work.

## CASE #1

This involved a survey on several large wooded and rolling parcels in southern Indiana. The county surveyor had perpetuated very few corners in the area. We had located a corner about 400 feet south of a winding county road and moved north to find the next half mile corner. We crossed a small brook and followed a cow path ramping upward along a ridge finger. To the east of the path the land dropped steeply into a heavily wooded ravine, to the west the path ran beside a row of cedar trees, and just a little farther west we could see glimpses of a fence line. We finally reached the area where the ground leveled into a somewhat flat pasture and close to where the corner should be. The cedar tree row ended about 50 feet to the south and had been replaced with briars and multiflora roses; to the west of that,

we could see a large fence corner post with wire running north, south and west.



I asked Bob to go over to the post and see if he could find anything, while I stayed with the total station, ready to get the shots and make sure the cows weren't getting too curious. Now Bob worked for a county surveyor in a mostly urban setting and spent a lot of time perpetuating corners, sometimes repeatedly over the years. He would usually join me in the field when I worked weekends. I think he enjoyed getting out with me in these rural settings just seeing

how the boundary puzzles came together. He often quipped that finding those old corners was "better than sex." I don't know if I agree with that, but there is something satisfying about finding an ancient monument that no one has visited or found in decades or centuries.

Bob relayed to me that a 5/8-inch rebar with cap (whose identity I shall not mention) was on the east side of the post. I dutifully located the pin, post and wires and their directions. While Bob was headed back to the setup, I looked around, enjoying the setting, and noticed that the row of cedar trees we had passed had trunk galls on the north and south sides. I went over to the first one and ran my metal locator over the galls, and sure enough it sang loudly. When I met Bob at the instrument, I said, "The rebar's not the corner," pointed out the trees and galls, and queried Bob, "Where do you think the corner is?" He pointed at the massive briar and replied, "It's in there, isn't it?" So, we hacked our way into the briar and found the top of a large rock. Once we cleared off the top to find a cut "X" on the top and dug down the side and found "S/4" etched on the side, we knew we had the corner.

I later asked the landowner about the fence, and she told me that the old fence was getting worn down and they wanted to keep the cedar row, so they just clipped the old fence off at the trees and ran a new line to the west where it was clearer. She didn't seem to mind that the new fence was on her neighbor's property. The other surveyor almost cheated his client out of about 20 feet of his property.

## CASE #2

This time I am in north central Indiana, and most of the corners have been perpetuated by the county surveyor, except for one that I needed. The parcel was mostly agricultural except for a 300- to 400-foot swath of woods across the south side of the property and continued south. The corner in question was the south quarter corner of the section. There was a farm fence along the north-south quarter section line, but it ended at the edge of the wooded area. The neighboring property had been surveyed before, and the surveyor had established the missing quarter corner at the midpoint of the line between quarter corners.

I went about the normal routine of locating monuments, fence lines and all those pieces that surveyors need to put the puzzle together. I traversed back into the wooded area to locate the pin set by the other surveyor and anything else I could find. Once I was in the area, I found the other surveyor's pin and cap (whose name I shall not mention) and stopped for a moment to reflect on nature and get a feel for the land. Then, like mushrooms, there they were, tree galls on the east and west sides of some very mature trees forming an east-west line. Wire was gone, but the galls remained. I located several of the trees and projected a best fit line through them and intersected with a line projected along the north-south fence line north of the woods. I probed and heard that oh so familiar "thunk" sound. Further digging revealed a stone with "X" about two and a half feet south and one foot west of the found capped rebar.

The message of both these examples is proration is the last method in corner perpetuation, not all fences are along deed or section lines, and large corner posts are not always at the section corners. Further investigation is always needed before blindly accepting a monument or setting something to represent a survey corner on a whim. Investigate and weigh your "evidence" carefully.

*Norman Hiselman is a project manager at Weihe Engineers, Inc. in Indianapolis and has nearly 50 years of experience in land surveying. He has been an adjunct instructor at Indiana University-Purdue University Indianapolis, teaching the fundamentals of surveying. Norm has supported the profession of land surveying by serving as treasurer of ISPLS and as the current president of the Indiana Professional Land Surveyors Foundation.*



## Donate to the IPLS Foundation

Make a \$25, \$50, \$100 or custom donation to the Indiana Professional Land Surveyors Foundation through the secure [IPLS Online Donation Form](#). Your donation helps support the Foundation's efforts to promote professional surveyors and bring new, qualified people to the profession through scholarships.

Feel free to contact the ISPLS office at 317.454.8309 or [info@ispls.org](mailto:info@ispls.org) with any questions.





# SURVEYING SECTION CORNERS IN DEVILS KITCHEN CANYON: INDIANA'S ANCIENT FOOTPATHS – THE SHINE TRACE AT SPICKERT KNOB

By David J. Ruckman, PS, PLS

**F**or the past 12,000 years or so, beast and human footsteps carved out the Shine Traces mounting the steep Floyd County Knobs, now known as the Spickert Knob Road area. As an ancient original footpath emerges from the Ohio River stone bridge at the Falls of the Ohio, it twists and turns as the best way forward on the given land contours westward across the slate bottom Falling Run Valley and begins the 500-foot ascent of the Floyds Knobs hill country. It is in this Knob Hill Country that, as a title boundary land surveyor, I can find and survey and map the scars of the ancient footfalls as they mount the east faces of the undulating ravine ridge landforms of the Floyd County Knob Hills. I will compose a new map of the 18-acre hilltop and Shine Homeplace with all corners set or found, including the southwest corner at the bottom of the canyon.

As the Shine Trace begins the ascent, it splits into two forks. The most southern fork correctly mounts and hangs on the edge of a forested south-facing warm slope on the north face of the legendary Devils Kitchen Box Twin Horned Canyon. The canyon area where the rock face is exposed in sheer cliffs was historically used by the indigenous populations to trap and then herd migrating animals over the cliffs to their demise. The contours of the stone cliffs at the northwestern head of the canyon form twin goat or devil's horns, hence the name. In 1959, my good friend Jack Lovely fell into the Devils Kitchen Canyon and died. I was 9; Jack was 10. I have carried thoughts of Jack with me all these 60 years and now, in search of old boundary stones and iron pins, I will descend into this fabled box canyon.

In the early 1800s, the Shine North Fork Trace was referred to in the old deeds as an Indiana state road because it was an early connector dirt pathway all the way across the Indiana interior and into Post Vincennes on the wild Wabash and beyond.

Neither of these two parallel footpaths up the jutting Spickert Knob are in use today, but there's clear evidence the footpath traces were widened in the 1800s as the hard outcropping ledge stones at the top of the knob were removed to build buildings and walls in New Albany and the surrounding areas. Two shale-stone-floor streams flow through New Albany, so the first residents were forced to travel with their wagons up along these ancient traces into the knobs to gather and mine building stone.

This need for hard building stone resulted in a strip mine that winds around the rim tops, east and south faces of our

precious Knob Hill Country for several miles to run along Old Hill Road, then onto Grandview. Most areas of this forested ribbon strip mine are now a winding rim trail making up the east face of Floyds Knobs through private lands with impressive views of the Louisville skyline.

In some places, the miners only removed stone alongside of these ancient footpaths, but once a ledgestone seam was found near the top, they also dug and gouged out notches in the hill face, sometimes 50 feet wide or more, as they followed and mined the contour of the geologic time seam of the thin band of hard stone ledges.

Today, tall hardwood trees cover and grow up in these ancient Indiana first footpaths that mount our knobs. They are simply amazing traces to stand in and sense the passing of time and Indiana's first families' footsteps of possibly 12,000 years past. These ancient trails are solid, wide and could be used today, but were too steep to haul freight by mule or oxen wagons to and from Vincennes and the Indiana Territory, so in the 1800s, a new roadway was carved into the north face of this Spickert Knob and is our present-day Spickert Knob Road to Skyline Drive and the village of Floyds Knobs.

In my studies and surveys of these ancient footpath traces through southern Indiana, one factor is always found to be true: there will be numerous forks of the footpath due to massive virgin black cherry, oak, elm and poplar trees falling across the footpath fork, or floods blocking the way forward, always forcing travelers around the natural dead-fall roadblocks to a parallel trace or fork like the Shine Trace does.

The access from the valley to these knob tops was most likely along an ancient footpath to the top and rim area of the knobs, as they represent the best footpath forward. Over the past 50 years, I have surveyed and mapped much of the Floyd County Knobs and have found 11 of these ancient footpath scars winding up the steeply sloped Knob Hill Country. From south to north, Floyd County has first the Farnsley Knob Road; then Blunk Knob Road; Budd-McCarthy Knob; Corydon Pike Road to south of Sycamore Island; Chippewa Trace winding through my home at Stone Mountain Road; then, possibly the oldest, the Boiling Springs Old Vincennes Trace; Fawcett Hill; Grandview; the Buffalo Trace along Binford Road; this Shine Trace at Spickert Knob; and finally the Bald Knob Road trace through Indiana University Southeast campus.

The Shine - Spickert Knob Trace has been described by my old friend George Oster as a wet weather northern trace to navigate possible swollen streams. The Shine Traces merge together at the top, where they form the present-day Spickert Knob Road as it winds west downhill, then joins Brush College Road with a fork south across farmlands into my village of Doe Creek and beyond to the west.

Recently I have been engaged to retrace and provide a title boundary survey of several tracts of land at the very top of the Shine Knob overlooking New Albany in Floyd County. I will be retracing property lines and the bent south line of Section 21, T2S, R6E, based on found pins at the top along the old trace to a stone in the belly of the canyon. While I am there, I will also survey into adjoining properties and into the Horned Box Canyon, looking for additional property corner markers.

In meeting with neighbors, I was informed that indeed there was a corner monument marker in the canyon at the southwest corner of Section 21; I will find it unless erosion has destroyed or overgrown the monument, then I will reset it.

My research found several title surveys by fellow surveyors Charles Condra, John Brinkworth, David Blankenbeker and Paul Primavera. I had previously surveyed the Todd and Barbara Sillings lands and the Haezlitt's, so I had a base file to add the discovered points to. On the knob top we found and mapped-in 19 corner pins and mag nails, all found agreeing with the prior surveys plus or minus 0.15 feet — awesome for 50-years-after retracement surveys. I so enjoy finding surveyed monuments in their deed positions; so cool, especially in rough hilly canyon terrains. I love those guys who valued their name and integrity and always gave proper measure.

Now to finish my initial GPS mapping, I will survey down into the steep canyon and find or set the southwest corner of my subject tract never really knowing what one might find at the bottom of our fabled Devils Kitchen Horned Box Canyon.

*David J. Ruckman, PS, PLS, is a surveyor at Draw Survey & Map, LLC, in New Albany, Ind.*

# SURV-KAP<sup>®</sup>

THE LANDMARK NAME IN SURVEY PRODUCTS  
Exceptional Customer Service

- REBAR & PIPE CAPS
- CONCRETE MARKERS
- SURVEY MONUMENTS
- SECTIONAL ROD MONUMENTS
- ACCESS COVERS
- WASHERS & NAILS
- SUBSURFACE MAGNETICS
- STAMPING TOOLS
- SURVEY TOOLS & ACCESSORIES



CALL OR ORDER ONLINE!



520-622-6011 • 800-445-5320 • FAX 520-792-2030 • SURV-KAP.COM





# ISPLS 68th Annual Convention Fort Wayne January 22 - 24, 2020



Grand Wayne Convention Center

## REGISTER TODAY TO SAVE

Full Convention:  
\$385

Essential Convention  
(all but awards banquet):  
\$358

One-Day:  
\$258

## 3 HOTEL BLOCKS TO CHOOSE FROM

### Courtyard by Marriott

1150 S Harrison St

Single occupancy: \$139

Deadline: December 22

### Hilton Fort Wayne

1020 S Calhoun St

Single occupancy: \$126

Deadline: January 7

### Hampton Inn & Suites

223 W Jefferson Blvd

Single occupancy: \$139

Deadline: December 22



# REGISTER AT [ISPLS.ORG/2020](https://ispls.org/2020)

## COMPLETED CAREER

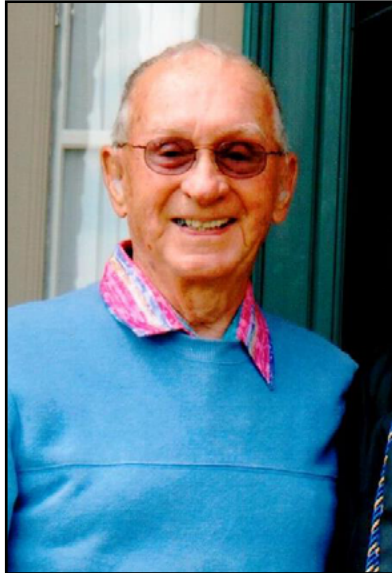
### Byron M. Brady

**B**yron M. Brady, 92, of Elkhart died Oct. 19, 2019, at his residence.

Byron was born April 11, 1927, in Elkhart to the late Edwin M. and Margery (Grove) Brady. Also preceding him in death is a son, Thomas Brady, who died in 1954.

On Jan. 20, 1950, he married Mary Ruth Holt in Sturgis, Ky. Mary Ruth succumbed to lung cancer on Jan. 24, 2005.

He is survived by three children: Edwin "Ted" (Joyce) Brady of Santa Clarita, Calif., and their children, Morgan Brady (Matthew Simon) and David Brady; Kimberly (David) Miller of Kansas City, Mo., and Nicolas J. (Bridget) Brady of Granger, Ind., and their children, Ryan and Caitlin Brady.



where he served on the board of directors, and the Michigan Society of Land Surveyors, now the Michigan Society of Professional Surveyors. He also was a past delegate from Indiana to the American Congress of Surveying and Mapping; past member of the American Right-Of-Way Association; and past member of Elcona Country Club, Bristol, Ind., where he served on the board of directors.

He also was a past member of the Hideaway Beach Sports Club in Marco Island, Fla., St. Andrews Golf Club in Punta Gorda, Fla., and the Twin Isles Country Club in Punta Gorda, Fla., and was currently a member of the Lake Wales Country Club in Lake Wales, Fla., and Elks Lodge 425 in Elkhart.

Byron was a 1945 graduate of Elkhart High School and served in the United States Navy during World War II. He attended Western Kentucky State College and also the University of Notre Dame. He began his career by working for the city of Elkhart in the City Engineer's Office for five years before founding Brady Land Surveying, Inc., in November 1958. Byron was a licensed surveyor in the states of Indiana and Michigan. He was active in the business until he sold it and retired in December 1988.

Byron was a past president of the Ellakono Chapter, Indiana Society of Professional Engineers, and a past member of the Indiana Society of Professional Land Surveyors,

Services were conducted Oct. 27 at Hartzler-Gutermuth-Inman Funeral Home, Elkhart, with the Rev. Keith McFarren officiating. Burial with military honors was in Adamsville Cemetery in Cass County, Mich.

Contributions in memory of Byron may be directed to the American Cancer Society Great Lakes Division Northwest Indiana Office, 130 Red Coach Drive, Mishawaka, IN 46545; or the Center for Hospice Care, 501 Comfort Place, Mishawaka, IN 46545.

*(Photo and obituary provided by Hartzler-Gutermuth-Inman Funeral Home)*

### Free Resource: Land Surveying Career Brochure

**NOT YOUR AVERAGE CAREER**  
**CAREER**  
 You should enjoy your work! As a Professional Land Surveyor, you'll have the unique opportunity to:

- Work outdoors and in the office
- Use the latest technology
- Protect your fellow citizens' land ownership rights
- Earn excellent pay
- Leave a lasting impact - your work will be around for centuries!

Watch this video to learn more: [bit.ly/MapTheWorld](http://bit.ly/MapTheWorld)

**HOW TO GET STARTED**  
 and join the field!  
 To become a Professional Land Surveyor, you'll need to earn a degree in surveying or a related field, pass the required exams then become licensed.

High school and college students interested in surveying should take courses in algebra, trigonometry, drafting, geography and computer science.

Universities that offer surveying education programs:

- Vincennes University
- Purdue University
- Cincinnati State Technical and Community College
- Eastern State University

ISPLS has produced an educational brochure that raises awareness to the profession and encourages students to join the field. Help us spread the word by requesting print copies or sharing the digital version of the brochure in your office, at events and seminars and with any student who may be interested in joining the field.

To request physical copies of the brochure, send an email with the quantity to [Evan Hoffmeyer](mailto:Evan.Hoffmeyer@ispls.org). Want to share it online? [Download a digital copy here.](#)



C E L E B R A T I N G 6 0 Y E A R S

# Weihe Engineers

We're proud of the role we've played over the years in serving clients around Indiana and across the Midwest. Our many accomplishments would not have been possible without the dedicated and experienced professionals on staff. We're expanding our team and invite you to learn more and apply today.

- ***Outstanding reputation for quality and responsiveness***
- ***Celebrating our 60th anniversary in 2020***
- ***Fast-growing firm***
- ***Full-service civil / site engineering focus***
- ***Top Workplaces 2019***
- ***Updated technology, tools and equipment***
- ***Consistent workload***
- ***We care about employees... you'll be valued here***
- ***Advancement opportunities***
- ***Now hiring... field and office positions***



SEND RESUME TO:

[hiring@weihe.net](mailto:hiring@weihe.net)

800 | 452 - 6408

[weihe.net](http://weihe.net)



Indianapolis | St. Louis

 **WEIHE**  
ENGINEERS  
Land Surveying | Civil Engineering  
Landscape Architecture  
*Build with confidence.™*

Copyright © 2019 Weihe Engineers, Inc. All rights reserved.

## WHY YOU SHOULD USE TERRAIN AWARENESS

By Logan Campbell, Aerotas

### BENEFITS OF TERRAIN AWARENESS IN PHOTOGRAMMETRY

**T**errain Awareness eliminates the variance in above-ground flight height and thus eliminates the discrepancies in overlap throughout sites with high topographic relief. Consistent overlap leads to more reliable data overall, and Terrain Awareness guarantees more consistent overlap.

#### WHAT IS TERRAIN AWARENESS?

Contrary to popular belief, the world is not flat. Terrain Awareness accounts for that. It is an autopilot feature that keeps the drone at a set height above the ground, as opposed to a set height above the takeoff location, following the grade changes throughout a site. Ideally, you would use this feature on sites with significant topographic relief.

But what's the point?

#### BENEFITS OF TERRAIN AWARENESS IN PHOTOGRAMMETRY

##### CONSISTENT OVERLAP

What is Overlap?

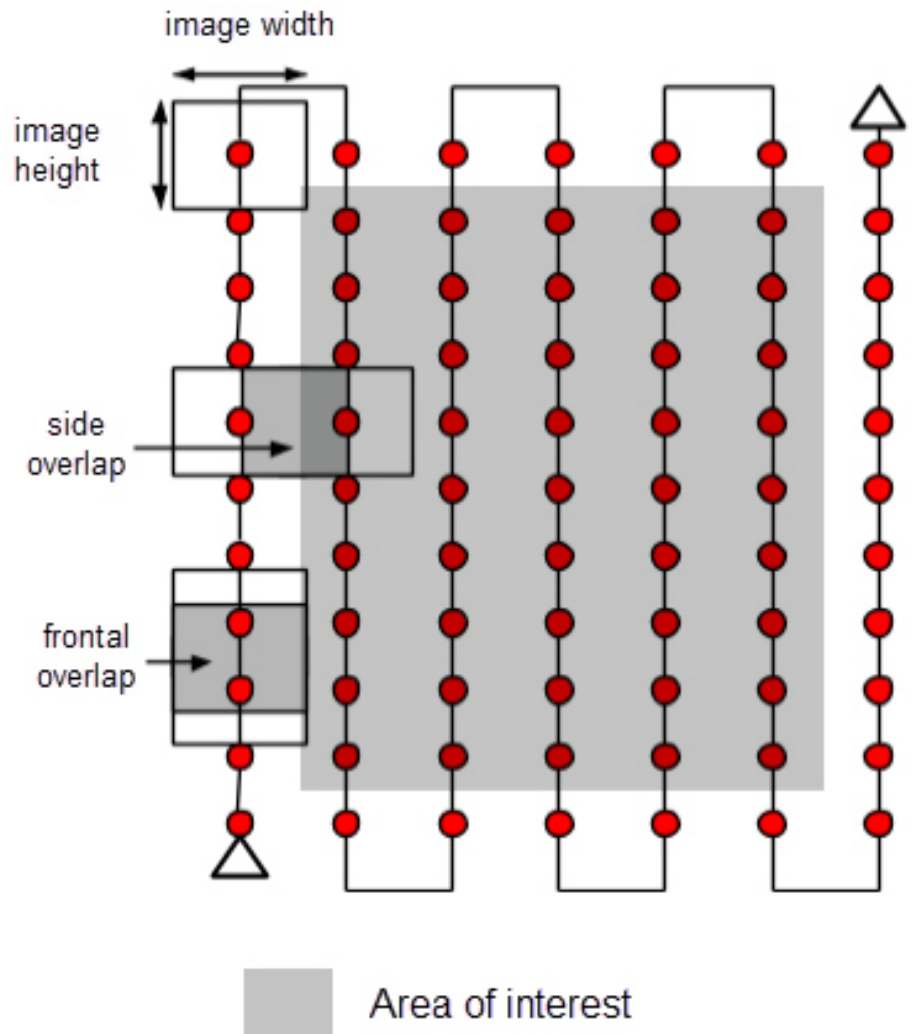
**Overlap** is the amount (in percentage) that each photo shares with its neighboring photos. It is calculated based on photo footprint and is displayed as frontlap and sidelap percentages.

**Photo footprint** is the real-world field of view of the camera. This "footprint" increases as height above ground increases. Therefore, the higher the camera, the larger the photo footprint and the further distance there can be between one photo and the next while still achieving the appropriate overlap.

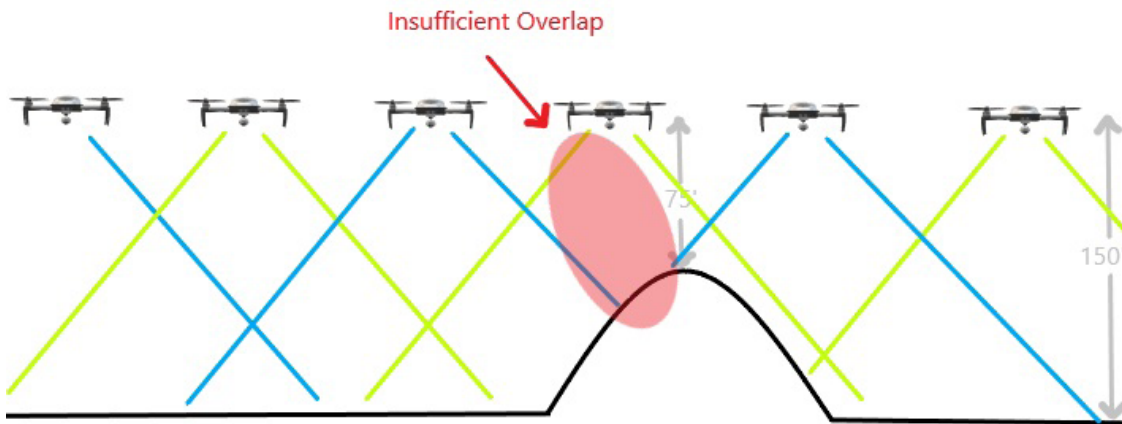
As you may know, proper overlap is a keystone in good drone data collection workflows. Most autopilot software takes into consideration the planned flight height when calculating overlap to come up with the proper spacing for your preferred overlap (we recommend 75/75). Working as designed, right?

Yes and no. This calculation only accounts for the height above ground from your takeoff location and does not account for any variance in elevation throughout the site. For example, if you take off for a 200' flight, the drone is using that takeoff location to gauge altitude, ignoring any change in elevation on the site. The takeoff location is effectively zero; the drone knows the distance it travels vertically, and that is the altitude that you plugged in, or in practical terms altitude above takeoff. E.g. 200' AGL is really 200' above takeoff. The drone is also using that exact metric to calculate your overlap and it applies that same formula to the entire site as if it were flat. For sites with little to no topographic relief, this is good enough. However, you can start to see where there might be an issue if there is significant relief.

When elevation changes on a site, the overlap calculation is thrown off because the photo footprint changes. This leads to either too much overlap (when flying over lower elevations relative to takeoff, photo footprint is larger) or not enough overlap (when flying over higher elevations relative to takeoff, photo footprint is smaller).







*Terrain Awareness, or terrain-following as some like to call it, eliminates the variance in above-ground flight height and thus eliminates the discrepancies in overlap throughout sites with high topographic relief. Consistent overlap leads to more reliable data overall, and Terrain Awareness guarantees more consistent overlap.*

missions. This ensures that the takeoff location changes and the height/overlap are recalculated with every flight. This works with the elevation change in a more gradual manner than flying the whole site at once and ending up with an altitude discrepancy of 400'+.

If you don't have Terrain Awareness, this method works fine for mapping a hillside with consistent, gradual grade change. However, as soon as you introduce multiple hilly

### CONSISTENT RESOLUTION

Aside from consistent overlap, consistent resolution is another benefit of Terrain Awareness. As you fly higher your photos become more grainy and thus will be slightly more difficult to mark and verify features, leading to variable accuracies throughout a site.

Consistent height over the land results in the same resolution overall and aids in the same expected accuracies.

### SINGLE MISSION/TIME SAVINGS = COST SAVINGS

Terrain Awareness is a cost/risk mitigation tool.

With Terrain Awareness, you can fly your entire site in one shot, with the peace of mind that your overlap is consistent throughout, compared to the worry or expense of having to re-fly the site due to overlap issues.

Terrain Awareness minimizes time spent in the field where terracing and multiple mission plans would be otherwise be required and minimize processing times, as multiple stitched missions do not process as smoothly as those with Terrain Awareness. All of this saves you money and allows you to do more with your time.

## ALTERNATIVES TO TERRAIN AWARENESS

Although Terrain Awareness is by far the best option, there are alternative methods for dealing with elevation change on a site.

### TERRACING MISSIONS

Terracing or "stepping down" your missions is one way to deal with elevation change. The idea here is to fly an area with 50-100' of elevation change at a time as separate

areas and other variable elevation features in one site, this terracing becomes increasingly difficult to plan and can often end up with more guesswork than you would ever want if you are mapping for business purposes.

### TAKEOFF FROM HIGHEST ELEVATION ON SITE

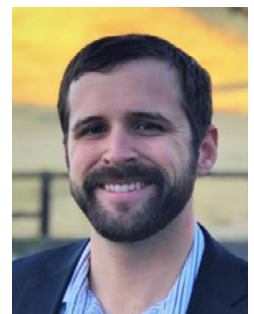
This method is useful if you have a grade change of less than 100' or so and do not have access to Terrain Awareness. Taking off from the highest elevation ensures that you at the very least, do not end up with too LITTLE overlap. At worst you will end up with higher than normal overlap where some photos may need to be disabled to process properly but this is better than having to re-fly the site due to too little overlap.

Even by that description, you can see that this is not the most efficient method when it comes to processing as there will often be hiccups due to overlap issues.

Any more than 100' of elevation change and this method becomes impractical due to overlap issues becoming more severe.

### About the Author

*Logan Campbell is the founder and president of Aerotas. He began his career as a statistician and went on in 2014 to found Aerotas, which provides drone data processing services for surveyors. Campbell holds an MBA from Harvard Business School and is a Certified Mapping Scientist - UAS by the American Society for Photogrammetry and Remote Sensing (ASPRS). As a recognized industry expert, he regularly speaks at survey and drone conferences and also writes for various land surveying publications.*





AMERICAN  
**STRUCTUREPOINT**  
INC.

**Jeff Douglass, PS**  
Survey Group Leader  
jdouglass@structurepoint.com

9025 River Road, Suite 200  
Indianapolis, IN 46240  
317.547.5580

[www.structurepoint.com](http://www.structurepoint.com)



**Brian L. Haggard, PS**  
Vice President of Surveying  
bhaggard@banning-eng.com

☎ 317.707.3719  
☎ 317.563.6246

853 Columbia Road, Suite 101 • Plainfield, IN 46168 • [www.banning-eng.com](http://www.banning-eng.com)

**ED SWEETLAND, PLS**  
SURVEY DEPARTMENT MANAGER

A TRADITION OF EXCELLENCE SINCE 1945

8320 CRAIG STREET | INDIANAPOLIS, IN 46250



P: 317.849.5832  
M: 317.443.7812  
800.382.5206  
esweetland@b-l-n.com  
[WWW.B-L-N.COM](http://WWW.B-L-N.COM)



3521 Lake Avenue, Suite 2  
Fort Wayne, IN 46805-5533  
[www.donovan-eng.com](http://www.donovan-eng.com)

**GREGORY L ROBERTS, PS** [260] 424-7418  
PRESIDENT Fax (260) 424-1918

**Surveying the State of Indiana for over "50 Years"**



Survey Department Manager  
**Rodney Kelly, PS**  
rkelly@eticagroup.com

**Corporate Office**  
7172 N. Keystone Ave. Suite G  
Indianapolis, IN 46240  
O: 317.466.9520  
Surveying  
Engineering  
Construction Inspection  
Building Envelope  
Architecture  
Certified WBE | DBE  
[www.eticagroup.com](http://www.eticagroup.com)

Indianapolis • Fishers • Avon • New Haven



**David G. Croft, P.S.\***  
SURVEY MANAGER

T 317.436.4823  
M 219.477.7580  
E d.croft@gaiconsultants.com

Fishers  
9998 Crosspoint Boulevard  
Suite 110  
Indianapolis, IN 46256

[gaiconsultants.com](http://gaiconsultants.com)

\*P.S. (IN, KY, WI)

**L. Edward Rinehart, Jr., PLS**  
Vice President

GRW

801 Corporate Drive  
Lexington, KY 40503  
Tel 859.223.3999  
Fax 859.519.4507  
erinehart@grwinc.com



engineering | architecture | geospatial


**John H. Stephens R.L.S. Inc.**  
19 N. Wabash St.  
Wabash, IN 46992  
P: (260) 563-8800  
E: [jhstephens1953@gmail.com](mailto:jhstephens1953@gmail.com)

[www.jhsrls.com](http://www.jhsrls.com)

**Want to see your company here? Become an ISPLS Firm Member!**

**Contact Brian Lewis, ISPLS executive director, at [blewis@ispls.org](mailto:blewis@ispls.org) or 317.454.8309 ext. 3**





**Shakeel Baig, PE, Regional Engineering Manager**  
Cell: (317) 715-0088  
**Sammy Van Pelt, Project Manager**  
Cell: (502) 269-5418

Ask us how you can use visual tools based on drone data to manage and measure a construction site.

- Construction Layout
- Topographic Survey
- Hydrographic Survey
- Monumentation
- Tunnel Alignment Survey
- Subdivision Platting
- Land Records Research
- UAV Services
- Stringless Paving
- AMG Modeling
- 3D Modeling
- LiDAR Scanning
- Parcel Mapping
- As-Built Surveys
- Property Boundary Surveys
- Transportation Design Surveys
- Zoning Maps/Descriptions
- Transportation Design Surveys
- Building Information Modeling
- GIS

Indiana • Illinois • Wisconsin • Iowa • Kentucky | [kapurinc.com](http://kapurinc.com)



**Sean Suttles, PS, CFedS**  
Chief of Surveying - Associate

[SSuttles@lochgroup.com](mailto:SSuttles@lochgroup.com)  
T 812.759.4164  
C 812.459.6211

6200 Vogel Road  
Evansville, Indiana 47715

[www.lochgroup.com](http://www.lochgroup.com)



**Chris F. Marbach**  
Professional Surveyor  
President  
[chris@marbach.us](mailto:chris@marbach.us)

*Marbach-Palm, Inc.*  
8888 East U.S. Hwy 20  
P.O. Box 960  
New Carlisle, IN 46552  
Phone: (574) 654-3450  
Fax: (574) 262-3040

*Marbach, Brady & Weaver, Inc.*  
3220 Southview Drive  
Elkhart, IN 46514  
Phone: (574) 266-1010  
Fax: (574) 262-3040

[www.marbach.us](http://www.marbach.us)



**Bret A Sermersheim PS**  
Vice President Surveying, VP Midwest

812.464.9585 office  
812.464.2514 Fax

4800 Rosebud Ln.  
Newburgh, IN 47630

[brets@morleycorp.com](mailto:brets@morleycorp.com)  
812.499.6892 Mobile



**David Stoepfelwerth, P.E., P.L.S.**  
president & ceo

ofc: 317.849.5935  
dir: 317.849.5935  
mbl: 317.577.3402  
fax: 317.849.5942  
[dstoepfelwerth@stoepfelwerth.com](mailto:dstoepfelwerth@stoepfelwerth.com)

7965 East 106th Street  
Fishers, IN 46038-2505  
[www.stoepfelwerth.com](http://www.stoepfelwerth.com)



Design Services Corporation  
**Engineering and Surveying**

**John C. Nagy, PLS**  
Vice-President

105 N. 10th Street  
Lafayette, IN 47901  
[www.tbirddesign.com](http://www.tbirddesign.com)

Phone: (765) 742-1900  
Mobile: (765) 479-8320  
[nagy@tbirddesign.com](mailto:nagy@tbirddesign.com)



8440 Allison Pointe Blvd.  
Suite 200  
Indianapolis, IN 46250

O 317.895.2585  
C 317.443.1244  
[www.ucindy.com](http://www.ucindy.com)

**Tim Coomes, PLS**  
Manager  
Survey Department  
[tim.coomes@ucindy.com](mailto:tim.coomes@ucindy.com)



**SURVEYING**

**ENGINEERING**

**NATURAL RESOURCES**

**LANDSCAPE ARCHITECTURE**

[V3CO.COM](http://V3CO.COM)  
317.844.3333

**Want to see your company here? Become an ISPLS Firm Member!**  
Contact Brian Lewis, ISPLS executive director, at [blewis@ispls.org](mailto:blewis@ispls.org) or 317.454.8309 ext. 3



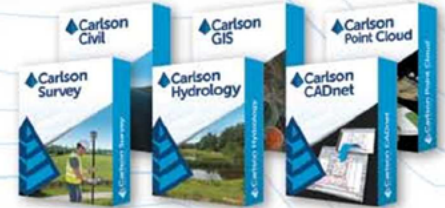
# End-of-Year Specials!

## For Carlson Software and Hardware

### Carlson Pick 4 Suite

Pick Any 4 Modules: Survey, Civil, GIS, Hydro, CADnet, or Point Cloud Basic Maintenance to August 1, 2020

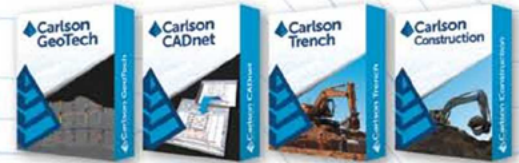
**\$3,125\***  
Save \$1,220



### Carlson Takeoff Suite

Takeoff Suite + Maintenance  
Maintenance to August 1, 2020

**\$5,995\***  
Save \$2,255



### PhotoCapture, P3D Topo, Point Cloud

CPC 50GB + P3D Topo + Point Cloud Basic + Maintenance for **\$3,500. Save \$1,495**  
Maintenance to August 1, 2020

CPC 50GB + Either: P3D Topo or Point Cloud Basic + Maintenance for **\$2,500. Save \$570**  
Maintenance to August 1, 2020



### Carlson Survey OEM

**\$2,695\***  
Save \$300



### BRx6+, Surveyor2 & SurvCE

BRx6+ + Surveyor2-Std + Surveyor2 Cradle, Pole, Pole Clamp + SurvCE GPS & TS

**\$12,995\***  
Save \$2,840



### BRx6+, RT3 & SurvPC

BRx6+ + RT3 GEO + RT3 Cradle, Pole, Pole Clamp + SurvPC GPS & TS

**\$12,995\***  
Save \$3,200



### BRx6+, Mini2 & SurvCE

BRx6+ + Mini2 GEO + Mini 2 Cradle, Pole, Pole Clamp + SurvCE GPS & TS

**\$12,995\***  
Save \$2,445



For details visit [carlsonsw.com/specials](http://carlsonsw.com/specials) \*Offers expire 12/31/19 or while supplies last. Valid in the United States & Canada only. All pricing shown in USD.

## Go West 2020

Get training on the best, from the best at Go West 2020.  
Early bird special \$995.00. Sign up at [carlsonsw.com/uc20](http://carlsonsw.com/uc20)

Carlson Software User Conference • April 20-22 • Portland, Oregon



### Carlson Midwest, LLC

4142 E US HWY 136 ■ Pittsboro, IN 46167  
317-223-7653 ■ [www.carlsonmidwest.com](http://www.carlsonmidwest.com) ■ [mjspark@carlsonmidwest.com](mailto:mjspark@carlsonmidwest.com)

© Copyright 2019 Carlson Software, Inc. All rights reserved. Carlson Software is a registered trademark of Carlson Software, Inc. All other product names or trademarks belong to their respective holders.







# SEILER

GEOSPATIAL  
[www.seilergeo.com](http://www.seilergeo.com)

**Providing high accuracy products, superior training, and support since 1945**

- GNSS and total station solutions designed with the surveyor in mind.
- Field and office software that supports your workflows.
- Scanning and leading aerial mapping solutions that capture and deliver precise data faster.
- Training solutions that show you what to do with all your data.
- Experienced and knowledgeable staff to support your needs.
- Service and repair solutions to keep equipment in peak service.

Authorized Distributor for Trimble, Spectra Precision, GeoSLAM, DJI, Esri, Bluebeam, Microdrones, Delair, Seafloor Systems, Nikon and many more!

**Looking to try before you buy? Contact us about our Take Five Rental Program!**

## CONTACT US - Indiana Indianapolis

Todd Jamieson - (317) 503-5925

BJ Rhea - (317) 260-3645

Technical Support: 844-602-9314

Toll Free: 888-263-8918

Email: [solutions@seilerinst.com](mailto:solutions@seilerinst.com)



Sales • Service • Rentals • Training • Financing • Repairs