Missouri Surveyor

A Quarterly Publication of the
Missouri Society of Professional Surveyors

Jefferson City, Missouri

June 2021

What's in this issue...

CALENDAR OF EVENTS

2021

June 24, 2021
Webinar Series Dr.
Dick Elgin, PS, PE

July 10, 2021
Board Meeting
MSPS Office, Jefferson City, MO

July 29, 2021
Webinar Series
Scott Howe

August 16-18, 2021
Review Course
Jefferson City, MO

August 19, 2021
Webinar Series
Kevin Closson

October 14-16, 2021
64th Annual Meeting and Convention
Tan-Tar-A Resort, Osage Beach, MO

December 4, 2021
Board Meeting
MSPS Office, Jefferson City, MO

Additional Dates for Spring Workshop
April 27-May 1, 2022
May 3-May 7, 2023
May 1-May 5, 2024

Cover: Crew Chief Steve Perry and Technician Mark Schlesinger of ABNA Engineering working on the restoration of the Turkish Pavilion at Tower Grove Park in St. Louis.

Donald R. Martin, Editor

Notes from the Editor's Desk

Donald R. Martin

Greetings all and welcome to the June 2021 *Missouri Surveyor*. As we have busily put things together for this edition, our ol' pard Tripod, the three-legged ground hog has been busy as well. What at first appeared to be the little whistle-pig's annual spring cleaning turned out to be a purging of his COVID personal protective equipment. When last seen, Tripod was burning his medical face mask. It was an act of liberation. Maybe now, we are all free from the scourge that is this Sino-based syndrome which spread symptoms and sickness over our sphere, spanning seas and shores while socially separating suffering souls.

Check out the *cover* of this edition! Looks like a merry-go-round survey? Member Jonathan Rowsell and the folks at ABNA Engineering shared this photograph. Some of their teammates were working on a pavilion restoration in a municipal park when this unique image was taken. Thank you, Jonathan. In our *President's Message*, Earl Graham shares reflections from the *Spring Workshop* and advises all on good communication etiquette. Next you will find a *nomination form* for this year's MSPS Awards. Please nominate those you deem worthy. The form is followed by a note of caution from attorney Edwin Frownfelter in *Beware the "Signing Professional" Trap*. Edwin is the Legal Counsel to the Board of Registration; you best listen to him. After that, we have *NCEES Explores New Avenues for Surveying Outreach* by David Cox. It's a short piece about NCEES outreach efforts on behalf of surveying. Part II of last edition's article, *Retracing the Osage Treaty Line* picks-up Joe Clayton's saga of recovering mile markers and mounds of the 1816 survey of the Missouri Territory's western boundary. Beginning with a foray into Arkansas, Joe's story offers not only news of finding historic artifacts of the ancient survey, it offers advice and "how to". It's worth reading – you may want to pull out the last edition for story continuity.

Our friend and member Larry Bollinger made a great contribution to this edition. In his article, *Higher or Lower?*, he shares recollections from his time as an instructor of college courses for surveying. Don't overlook his tale. It is both funny and reflective. Larry, thanks so much for letting us publish your story. About halfway through the edition is a photo montage, *Thank You to Exhibitors*. Don't ignore it, and do recognize the treasure MSPS has in our fine corps of venders and exhibitors to our meetings and the Society in general. You know, I don't think it would be a *Missouri Surveyor* edition without a feature from Steve Weible. Once again, Mr. Weible has come through with another masterwork on the milieu of land, history and surveying in *Preemption in Missouri: Squatter Claims to Land*. It's a lesson in the migration of Americans into the "territory of Missouri" in the early 19th Century and the governance of land title processes. That feature is followed by *Surveying & Surveyors in the News*. Its part fun and part serious. Readers should treat as "serious" the two leading reports (Page 32) in this feature. These two stories of legal challenges made against surveying registration boards is a cautionary tale to surveyors. The threats extend beyond the authority of our boards. These matters pose threats to our privilege of practice. Take a good, close look. We wrap-it-up with the latest in "big picture" news with *NGS News & Events*.

With that, I best break-it-down and bunch-it-up so I can start getting ready for the next edition …I'll get back with ya' then…

Donald

THE MISSOURI SURVEYOR

Published quarterly by the
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President's Message

Earl E. Graham, PLS

Well, it's one of the first warm days of summer and from the Weather Forecast I think it's time to put the flannel away and break out the cotton. I'm not a summer kind of guy. The thought of sweat, ticks, mosquitoes and such doesn't make me very happy. On that note, my Brother-in-law just spent five days in the hospital with Lyme Disease. He is still on an IV and from what I am seeing this does not look like much fun. Please be carful with those tick bites and stay hydrated.

I had such a great time at the *Spring Workshop*. Normally I don't go to the spring workshop so others in the office get a chance for some continuing education, but this time I had a small part in the program so I went. I'm not sure, but it seems like there is a different crowd at *the Spring*. I think there were more of the working folks and not as many managers. Plus, I saw a couple of "older" gentlemen that I hadn't seen in over thirty years. This get-together for me personally was a much more free-spirited time; being vaccinated for COVID, I wasn't as uptight about being around people. In general, I think everyone was in a more relaxed mood. Now I am looking forward to the *MSPS Annual Meeting* this fall! Hopefully most of these COVID issues will be behind us and we can relax and get down to business.

One item that was discussed at the *Spring Meeting* was simply returning phone calls. It is getting harder and harder to keep up with the increasing numbers of phone calls. I am as bad as anybody about letting my messages get away from me and I am sure that I have culled a few that I shouldn't have. From a public relations standpoint for the individual and the profession, we have got to keep up with our messages. I know a lot of the answers will be, "I can't do it right now", but any kind of returned call is better than ignoring people. A few weeks ago, I got a call from a local Realtor asking if one of my competitors had closed up shop. She had called numerous times with no answer. Then in talking with others who happened to cross my path I was asked the same question. I began to think he was sick or maybe he had retired, so I asked around. He didn't return my call either. I found out that that he just doesn't return calls. It may work for him in this environment, but some day it will cost him. Oh! On sort of the same note, since we went strictly cell phones, I am completely amazed at the times people will call. 10 o'clock on Sunday morning is my favorite. What service company would be open at that time?

One last Item, I don't think any of the legislation we were interested in made it to a vote. I understand that with COVID and other distractions, there wasn't much movement at the Capitol. We will try again next session.

Earl

Award Nomination Form

to be awarded at the

64th Annual Conference

of the

Missouri Society of Professional Surveyors

October 14-16, 2021
Margaritaville Lake Resort
Osage Beach, MO

Person Nominated: _____

Name of Award: _____

On a separate page highlight the reason(s) for your recommendations/nomination.

Mail or fax completed form to the Missouri Society of Professional Surveyors, 722 East Capitol Avenue, Jefferson City, MO 65101 or Fax to 573-635-7823, no later than August 15, 2021. If you have questions contact Susanne Daniel, Awards Committee Chair.

AWARDS

Surveyor of the Year Award has been given since 1987. This award is given to an MSPS member who has given freely of his/her time and efforts to the organization and toward the betterment of the surveying profession.

* Must be a Current Member of MSPS
* Should enjoy an outstanding reputation for his/her knowledge, integrity and professional competency.

Robert E. Myers Service Award has been given since 1990. This award is given to an MSPS member who, over an extended period of time (ten years minimum) has given exemplary service and dedication to the surveying profession and in particular to the Society.

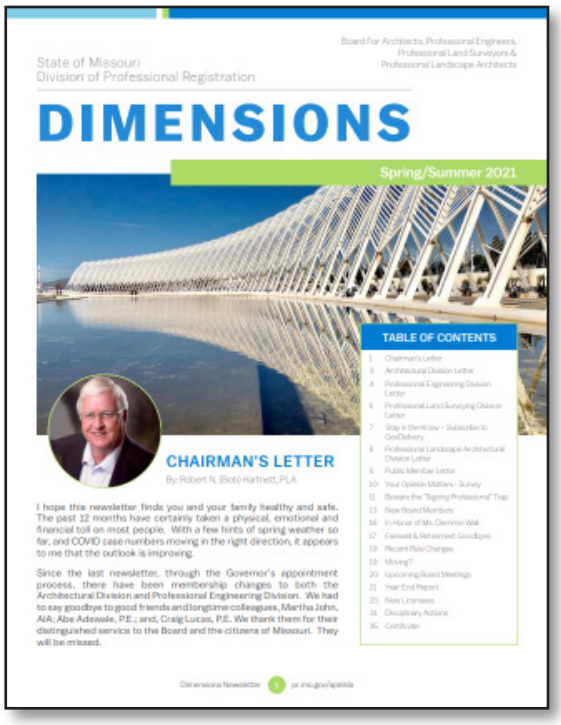
PAST RECIPIENTS

Surveyor of the Year Award - Steve Weible, Mark Wiley, Gerald Bader, Joe Clayton, Richard Elgin, Stan Emerick, Robert Ubben, Darrell Pratte, Chris Wickern, Mark Nolte, Ralph Riggs, John Teale, Shane Terhune, Mike Gray, Don Martin, Dan Lashley, Richard Cox, Jim Mathis, Jim Anderson, Robert S. Shotts, Troy Hayes, Craig Ruble, Gerald Harms, John A. Holleck, John Stevens, Richard Barr, Erwin Gard, Charles Kutz, Robert Myers, Dan Govero, Jim Anderson, Mike Flowers, Bob Pirrie, and Jerry Day.

Robert E. Myers Service Award - Gerald Bader, Joseph Paiva, Joseph Clayton, Darrell Pratte, Robert Ubben, Gary Bockman, Sharon Herman, Troy Hayes, Rich Howard, Stan Emerick, Don Martin, Robert Myers, Charlie Kutz, John Teale, Jim Mathis, Robert S. Shotts, Stan French, Gaylon Smitth, Dan Lashley, Gerard Harms, John A. Holleck, J. Michael Flowers, Erwin Gard, Rich Norvell, David Krehbiel, Richard Elgin, Dan Govero, Jim Anderson, Rich Barr, Norman Brown, and Harold Schulte.

Beware the "Signing Professional" Trap

by Edwin Frownfelter, Legal Counsel, Spring/Summer Edition of Dimensions, Missouri Board of Registration (APEPLSPLA)



The Board was recently informed that a Missouri professional land surveyor received a solicitation from an employment agency on behalf of a professional land surveyor seeking employment as a "signing surveyor." The person offered to sign and seal plats working remotely from information developed by others and sent to him for sealing.

Such an arrangement raises serious concerns under the Missouri rules regarding immediate personal supervision. This presents another opportunity to review the requirements of immediate personal supervision as specified under Missouri law.

The term "immediate personal supervision" comes from the statute at Section 327.411.1, RSMo, which states:

> *Each architect and each professional engineer and each professional land surveyor and each professional landscape architect shall have a personal seal in a form prescribed by the board, and he or she shall affix the seal to all final technical submissions. Technical submissions shall include, but are not limited to, drawings, specifications, plats, surveys, exhibits, reports, and certifications of construction prepared by the licensee, or under such licensee's immediate personal supervision. Such licensee shall either prepare or personally supervise the preparation of all documents sealed by the licensee, and such licensee shall be held personally responsible for the contents of all such documents sealed by such licensee … [emphasis added]*

Further, the Board's rule at 20 Code of State Regulations 2030-3.060(9), regarding seals, states that "the signing and sealing of technical submissions not prepared by the licensee or under his/her immediate personal supervision is prohibited."

Chapter 13 of the Board's rules, 20 CSR 2030-13.010 and 13.020, define the terms of immediate personal supervision at length. For architects, professional engineers, and professional landscape architects, Subsection (4) specifies that the requirement of immediate personal supervision is satisfied only if four criteria are met:

1. The client must request the preparation of the technical documents directly from the licensee or an employee under the licensee's organizational structure, and not through a third party;
2. The licensee must provide initial direction in development of the design, must supervise each step of the preparation of the technical submissions, and must have input into their preparation prior to their completion;
3. The licensee may not be employed solely for the purpose of reviewing and approving technical submissions prepared by an unlicensed person, employee, or contractor of the client; and,
4. The licensee must review the final technical submissions and be able to make changes, and must do so if necessary and appropriate.

There are additional provisions for situations where a licensee may take responsibility for a project when the original licensee in responsible charge becomes unavailable, where the work is a site adaptation of a standard design drawing, or where the work is a design drawing signed and sealed by an out-of-jurisdiction licensee.

(continued on next page)

Beware the "Signing Professional" Trap *(continued)*

Supervision requirements for professional land surveyors are set in a separate rule, 20 CSR 2030-13.020. These requirements parallel the language of 20 CSR 2030-13.010 in most respects, but incorporate the kinds of documents generally prepared by professional land surveyors. An additional subsection (5) sets forth specific responsibilities of a supervising surveyor:

a) Supervise and review prior to making the survey the acquisition of all necessary records and data including, but not limited to, deeds, maps, certificates of title, abstracts of title, section line, and other boundary line locations in the vicinity;
b) Supervise and review prior to making the survey the analysis of all the record data in order to determine the most nearly correct legal boundaries of the tract to be surveyed;
c) Supervise and review the investigation of the selection of the ground control (such as section corners, block corners, survey corners, or other corners or monuments found) as a result of the filed survey to be used to position the survey on the ground; and
d) Supervise and review the execution of the survey, the survey computations, and the preparation of the drawing.

In addition, Subsection (6) reminds the professional land surveyor that all survey documents must be signed and sealed according to Section 327.411, RSMo.

The kind of "signing professional" arrangement proposed by the person mentioned above does not appear to take into account the supervision requirements of these sections. It assumes that the clients whose work the signing professional reviews would communicate with the persons referring the documents, not with the professional or his staff. He proposes to review work already initiated and completed by others, in violation of the requirement of initial direction and ongoing supervision of each step of the process, and in specific violation of the prohibition on employment solely for the purpose of reviewing the work of others in Subsection (4)(C).

The Board has prosecuted and imposed discipline in many cases involving "plan stamping," in which a licensed professional merely reviews and seals the work of a draftsperson, contractor, or other unlicensed person without establishing any relationship with the client or conducting any supervision of the project before the completed plans are presented for sealing and signature. The Board firmly insists on the requirements that the sealing professional provide initial direction and oversight of each step of the design process, and not merely place a stamp of approval on someone else's work after the fact.

There is nothing inherently wrong with performing professional services remotely. 20 CSR 2030-13.010(2) provides that a licensee may communicate with the persons performing work under review in a number of ways, including "direct face-to-face communications; written communications; U.S. mail; private express package delivery; electronic mail; facsimiles; telecommunications; or other current technology." In the era of COVID much work that would previously have been performed in person has shifted to remote technology. Such adaptations are acceptable under the supervision requirements of Missouri law, as long as the licensee "retains, maintains, and asserts continuing control and judgment" over the work product from the outset of their employment.

Business practices in the professions licensed under Chapter 327, RSMo, are constantly evolving, and the Board maintains an ongoing process of review to make sure that its rules and procedures are consistent with the changing environment while still maintaining principles that protect the public. The Board is currently conducting a review of the supervision requirements of 20 CSR 2030-13.010 and 20 CSR 2030-13.020 to be sure they anticipate and reflect sound practice in each of the professions.

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NCEES Explores New Avenues for Surveying Outreach

by David Cox, NCEES Chief Executive Officer

As we begin a New Year in this ever-changing environment, we remain constant and steady at NCEES with our initiatives. We have learned to adapt and modify many of the plans and procedures on which we typically rely. Our exams and meetings may look a bit different right now, but we continue to fully support and serve our member boards and customers.

Even in a time of great change and challenges, we have found ways to ramp up our strategic initiatives to continue to serve the needs of the professions that we support

Even in a time of great change and challenges, we have found ways to ramp up our strategic initiatives to continue to serve the needs of the professions that we support. In the August 2020 issue of Licensure Exchange, I shared that the promotion of surveying licensure and recruitment of the geomatics profession is a strategic initiative for NCEES.** Over the last six months, we have been able to continue supporting efforts from other surveying organizations while also increasing our own surveying outreach efforts.

Expanding outreach through SCORE

While NCEES has always contributed to the promotion of the surveying profession—with our involvement in activities such as the DiscoverE Future City competition, TrigStar, and Teaching with Spatial Technology (or TWiST)—we saw a need to expand our outreach efforts even more. In August 2020, we formally launched the SCORE initiative and hired a dedicated surveying marketing and outreach coordinator to promote the geomatics profession.

SCORE was created by a coalition of surveying organizations—including the National Society of Professional Surveyors (NSPS) and state surveying societies from Georgia, Maryland, North Carolina, Tennessee, and Virginia—to address recruitment in the geomatics profession, with an emphasis on increasing diversity. The NCEES board of directors supported this project and saw the need for this outreach not just on a regional level but on a national level as well. With that, the board approved funding for the SCORE initiative in August 2019, and we are developing a national marketing and outreach plan around this program.

Since August, we have begun to gain traction in promoting the value of surveying licensure. We've also been able to bring more awareness about the surveying profession to increase the number of people entering the geomatics field.

Virtual activities

In a typical year, we would be attending many in-person events and career fairs to achieve these goals. However, because of the pandemic, most of our marketing and outreach efforts have been virtual.

We recently launched two initiatives to expand our virtual outreach. Through the online Engineering and Surveying Profiles and "Advance: An NCEES Podcast Series," we feature energetic, compelling, and unique licensed engineers and surveyors and their stories. We publicize new profiles and podcast episodes on our social media channels—including Facebook, Twitter, and LinkedIn—and full details are available at ncees.org/engineer-and-surveyor-profiles and ncees.org/podcast.

We are participating in other organizations' podcasts as guests to talk about our surveying outreach efforts at NCEES, diversity and recruitment, and how others can become involved in the promotion of the profession. We are partnering with surveying societies, like NSPS, and sharing relevant surveying content and stories over our social channels. We are also using social media and other virtual platforms to promote NCEES activities and initiatives, from exams to our Engineering and Surveying Education awards.

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NCEES Explores New Avenues *(continued)*

To further its virtual outreach, NCEES launched "Advance: An NCEES Podcast Series" in September 2020.

Research for better insight

In November 2020, we launched a surveying and engineering research project with McKinley Advisors out of Washington, D.C. The project will help us uncover the types of resources, information, and initiatives that will ultimately raise awareness and boost workforce development numbers for both the surveying and engineering professions. It will include conducting objective, third-party qualitative and quantitative research to develop evidence-based recommendations that will help guide NCEES marketing and outreach efforts in 2021 and beyond.

While the COVID-19 pandemic has transformed how we live and work this past year, we remain hopeful for progression toward a positive resolution and a return to normal in 2021. We will continue to serve our member boards, professional engineers and surveyors, and licensure candidates. We will also continue to promote the engineering and surveying professions and the value of licensure.

This new year can truly be the year of change. In order to bring more young talent and diversity to the surveying profession, I invite you to join us in helping to share the value of licensure and the benefits of a career in geomatics. Whether you are mentoring, speaking to K–12 or college students, participating in a career fair, or even sharing social media posts around the industry, NCEES can arm you with tools and activities for any occasion. To see growth and diversity, we all need to do our part to impact the surveying profession.

Surveying marketing and outreach

The promotion of licensure is a core strategic initiative for NCEES. One metric of particular interest to NCEES is the number of individuals taking the Fundamentals of Surveying and the Principles and Practice of Surveying exams. NCEES has supported—and will continue to support—surveying outreach initiatives spearheaded by other organizations, and it will continue to develop and lead its own. As NCEES has increased its outreach efforts, it has become clear that more staff is needed to best manage outreach opportunities.

At its August 2019 meeting, the board of directors reviewed a request for $1.3 million over four years to support the development of Surveying Candidate Objectives for Recruitment and Education (SCORE), a regional pilot program to promote the geomatics profession. SCORE was devised by a coalition of surveying societies—including the National Society of Professional Surveyors, Maryland Society of Surveyors, North Carolina Society of Surveyors, Surveying and Mapping Society of Georgia, Tennessee Association of Professional Surveyors, and Virginia Association of Surveyors. These organizations are working together to address recruitment in the geomatics profession—including the recruitment of women and racial minorities, who are underrepresented in the field, as well as engineers who may become dual licensees—and thereby to strengthen licensed professional representation in an evolving geospatial world. The coalition requested the funding to support the study and implementation of recruiting, marketing, and public relations strategies for the geomatics profession.

***(excerpt from the August 2020 issue of Licensure Exchange)*

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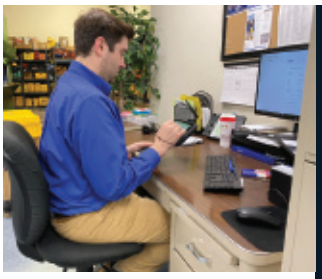

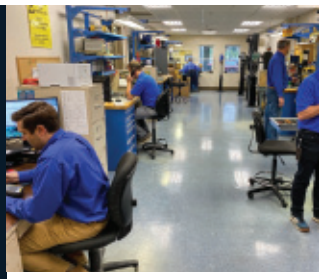

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Retracing the Osage Treaty Line: The Story Continues

by Joe Clayton and Don Martin

In the March 2021 edition of *Missouri Surveyor*, the tale of Joe Clayton's work in recovering the Osage Treaty Line was featured. A continuation of MSHP's 2016 commemoration of the survey of the Osage Treaty Line by Joseph Brown in 1816, Clayton has continued to research and retrace the line. The first part of the story detailed his development of research maps, his utilization of Brown's original citations, and his first recovery of original accessories of the line, the raised mounds left by Brown at Milepost 54 and 55. The story continues…

The Cave

While success was welcomed with the recovery of mounds at Mileposts 54 and 55 in Bates County, Missouri, I still felt more was needed to "brace" my recovery line. To have two positions, one mile apart on a line of almost 255 miles seemed shaky at best. It was akin to extending a traverse line of five miles ahead based on a 100' backsight. As an associate of mine used to say, "a long one is a strong one" when referring to backsights. I needed to get further away, go further afield, and lengthen the line.

I would set my sights south of the border – the Missouri and Arkansas border that is. As I did early on, I would turn to Brown's citation of the cave south of Fayetteville, near Round Mountain. Earlier in my research, I had relied on this call to help "calibrate" my compiled strip map. I now would seek the cave and nearby mounds to calibrate the coordinates along my search line. As a good Saturday's work of finding the mound at Milepost 55 came to its end, I set my course for the south. A rising sun of the following morning would find me being an Arkansas traveler. I may have even hummed the tune.

The next morning, I was up before dawn. It was a cold morning with a light frost. Perfect weather for another acorn hunt! My friend Jim Herre had agreed to join me that day, contributing his time and truck to retracing the Osage Treaty Line. We met at Jim's rural home where amid quaint spring-feed ponds and a tranquil herd of deer feeding, we loaded tech and tools into the truck. The local weather report had our temperature at 30 degrees with a climb of 40 more by afternoon! It was forecasted to get warm in Joplin that day. Probably even warmer where we were going. On that day, a 70-degree afternoon in Joplin would be well behind us, and well north of us. Jim and I were bound for the hills south of Fayetteville, Arkansas. We were going to find another of Brown's citations. A "call" he made and logged into his notes in 1816 as he pushed the Treaty Line south to the Arkansas River. It was a call to *the cave*!

Jim's companionship helped the two-hour drive pass quickly. We soon arrived at our destination nine miles south of the University of Arkansas campus in Fayetteville, in the western reach of the Ozark Mountains. There, the valley of the White River is well populated, pastured and cultivated. But the mountaintops and their highland slopes have remained timbered; undisturbed. In this area I had hope of finding mounds. Our search commenced upon our arrival. We scoured the southern half of a quarter section. While there we tied in a ¼ corner and an interior $^{1}/_{16}$ corner, but we hadn t found the cave. Having covered a mile or better, climbing uphill both ways, the temperature too climbed to almost 80 degrees. With only the northwest most portion of the ¼ to check, we moved closer to a fence line where exposed rock

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Retracing the Osage Treaty Line: The Story Continues *(continued)*

outcrops looked promising. It was then the barking of dogs alarmed by our presence drew the attention of a young man living nearby. Hollering up to ask what we were doing, we told him we were looking for a cave. It s up there came his reply! I ve been in it! His report made my day. I was about to bear witness to the cave. Then there, just above Dye Creek, about a mile west of the White River and 219 miles south of Fort Osage, it was. The cave, described by Brown as "An extensive cave did not explore it." The cave, which for me served as the father point to my search and research. The cave, which had been the beacon calling me back to continue that which was started in 2016 with the commemoration of the Osage Treaty Line. The cave, 71 chains from Milepost 218. The cave.

The zeal of finding the cave went somewhat unrealized momentarily. It was to be saved for recovery of a mound. The feat of finding the cave was followed by Jim and I benignly making our way nine chains south, where we came upon a mounded pile of rocks. Milepost 219 had been found. I now had a nice, long line based on field recovered positions. A 164-mile segment of the Osage Treaty Line could now be braced. It was no longer a "try" line hinged on citations and calls found within the pages of notes and on the faces of plats. It was a line anchored on ancient artifacts left at the time of its birth more than 200 years ago.

(continued on page 26)

Surveyors Joe Clayton (L) and Jim Herre (R) make their "trophy" poses after they bagged their query, the cave cited in the 1816 field notes from the survey of the Osage Treaty Line. The cave is 218 miles and 71 chains south of Ft. Osage (Ft. Clark in 1816) where the line began.

Higher or Lower?

An article for surveyors and non-surveyors

by Larry L. Bollinger, Missouri PLS #1671, February 22, 2021

On June 19, 2007, I informed my employer, St. Louis County, with whom I had spent my last 13.5 years with, that my last work day would be July 31, 2007. I had a very long, and for the most part, enjoyable and challenging career as a Professional Land Surveyor. I got hooked on surveying way back in my college years. I continued working in this arena till I retired, which consisted of three years, mostly overseas, while serving in the military, working for The Elbring Surveying Company (later acquired by Volz Engineering and Surveying Company), in private practice (Bollinger Surveying Co.), government employment with St. Louis County, and as a college instructor at both Meramec and Florissant Valley Community College in St. Louis, Missouri.

I did retire and moved from St. Louis County to our current residence in Bollinger County. I did this for several reasons. I was a country boy at heart, the county name had an appeal to me, it was close to other family members and near our cattle and grain farm, as well as and my Church. I have enjoyed rural life to the fullest for the past 14 years with outdoor activities, fund raising events held by the Patton Lions Club, filling in as teacher "as needed" at two local high schools (Meadow Heights and Marquand), working in my shop, and writing articles for The Banner Press, a local newspaper.

Most of us old surveyors have a lot of war stories to tell and I am no exception. Today, I would like to share with you one of them. I would like to do so because I think the underlying theme is as applicable today as it was then, and in my opinion, it may be a guiding light for those who follow in our footsteps. This event happened while I was teaching a class entitled "Plane Surveying" at Florissant Valley Community College. Therefore, without further delay, let's get started.

The Plane Surveying class averaged over 20 students each semester that it was offered. The class consisted of a large range of backgrounds. About half of the class were freshmen working towards their engineering degree; a required class for them. The other half were those in the workforce desiring to obtain their required classes for their endeavor to obtain their licenses as a Professional Land Surveyor. Therefore, the lecture portion was held at night and the lab. (field-portion) was held on Saturday mornings in an attempt to meet the needs of both groups and kept the enrollment up a sufficient amount that it would be profitable for the college to offer the course. A good percentage of the students resided outside of the St. Louis area and had a considerable amount of travel time just to get to class. We even had two students from Iowa and also a group from the Farmington, Missouri area to mention a few. Yes, I am proud to bring to your attention that Gerald "Duck" Bader was one of them, a past president of the Missouri Society of Professional Surveyors and recipient of the 2020 Robert E. Meyers Service Award. I remember Gerald calling me shortly after he passed his survey exam for his PLS license. He was appreciative of the college's role and indicated that without the classes he would have not been able to pass such an exam. These are the words that a teacher likes to hear!

Well, I will try to stay out of the tributaries today and stick with the main flow of the river, being the "*Higher or Lower*" issue. Therefore, I am going to assume that some surveyors and readers have some experience and are knowledgeable about the procedure called "Differential Leveling". In an attempt to keep this article a little shorter for you, you may want to skip over and ignore the three paragraphs that follow – they are designed for the non-surveyor. Regardless, please hang in there with me and I promise I will address the *High and Low* issue, our main theme for today. But then again maybe it isn't. Regardless, keep on reading. If you are one of the many people that are in a non-surveying category and needs a layman's explanation of differential leveling, the 3 paragraphs, so designated hereafter, are for you.

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Higher or Lower? *(continued)*

Hey, maybe it's time for a short break. Feel free to get yourself a snack before continuing. I think I will.

Paragraph 1 for the non-surveyor - I am not going to attempt to teach a surveying class to you. My desire is to make sure you understand the concept of what "Differential Leveling" is all about. Let's assume you need to go down to your basement and for some strange reason, the carpenter who made your steps decided to make each step at a different height. Maybe the first step down is 8 inches, the next is 6 inches, … and the last one is 12 inches. If you add up all of the steps down to the basement, it may total up to 96 inches. We have just done a differential level problem of sorts. Your basement floor is 96 inches (8 feet) lower than your first floor. This is somewhat the process that a surveyor does with their special equipment.

Paragraph 2 for the non-surveyor - You are now in the basement and you desire to go up your basement steps and return to the first floor. Remembering your bottom step is 12 inches and you lift your foot up 8 inches, that's not going to work and you will stub your toe. You now try raising your foot up 14 inches and try to walk on air. I don't think that most of us will be able to do that either. We must return in the same increments, reverse order as when we went down the steps. If we went down the steps, 96 inches, it only makes common sense that in order to get back up to the first floor, it will require 96 inches for this to happen. This is somewhat the process that a surveyor uses as they stair step back up and it must be 96 inches. If the going down and the coming up figures don't add up, we know that some mistake has been made and the data needs to be checked for the step or steps that are not the same magnitude.

Paragraph 3 for the non-surveyor - You are not happy with your steps that vary in height. You desire a carpenter to tear out your old steps and rebuild you some new steps that have a constant height difference between each step. The carpenter must have the correct height difference between the first floor and the basement floor in order for this to happen. In this case the carpenter may be capable of doing his own measurements; but for more complex problems, the surveyor may be called upon to determine the difference in elevation for a particular purpose. Maybe the change in elevation data is needed for a proposed sewer or maybe for the design of an overpass. Since others will be using the data in making further decisions, it is absolutely essential that the data be correct. The surveyor needs to build checks into their work to ensure that reliable data is provided. A surveyor is schooled in the use of special surveying equipment to meet such a need.

Now, let's get back to my survey class at Florissant Valley Community College. We spent class time learning about a Dumpy level, reading a Philadelphia rod, keeping proper field notes (no erasures allowed), and working text book problems that pertained to differential leveling, etc. The class was then semi-prepared for Saturday's lab, when they will check-out some survey equipment and actually attempt to do some differential level work.

If you recall, there were some students already working for surveying companies. Those that so desired could quiz-out of the Saturday Lab portion of the class. In order for this to happen, they had to pass my field proficiency test first. I was happy to let them do a quiz-out for several reasons: 1) I could see it was a hardship for a working person, maybe with a family, to work 5 days a week, attend night class and then attend a Saturday Lab and not really learn anything beneficial or new; 2) By allowing those experienced students to quiz out, it would allow more time for the other students to use the survey equipment, etc. Actually, not very many students were able to quiz-out of the lab and some did not like me very much for not letting them do so. They actually thought that I was being unfair. Several years later one of those unhappy students came up to me at a survey convention and said, "Mr. Bollinger, thank you for making me take that Saturday Lab., I learned a lot and it proved to be very beneficial to me". Again, these are the words that a teacher likes to hear!

I had prepared the class on the procedure for checking out survey equipment for the Saturday Lab. I also assigned the members for each crew; generally, four people. Yes, it was a mix of experience, gender and race, etc. Each crew was responsible for picking their leader, a crew chief; however, all crew members were to take turns using the Dumpy level, taking notes, and holding the level rod, etc. Let me tell you that initially, they were not a well-oiled working machine!

OK, let's get to the "*Higher or Lower*" issue. I drove a 2"x 2" wooden hub, into the ground outside of the Engineering building. Each crew was to use it as a starting bench mark; the top of the hub was assumed to be an elevation of 100. Using the assigned equipment, the students were to run a differential level loop to the base of the flag pole at the other end of the campus and then return, through the same points and check into the starting bench mark. They were to reduce their field notes and check to see if they had any blunders. If so, they were to isolate where the blunder occurred and obtain additional data to correct the blunder. Then determine if the base of the flag pole was "*Higher or Lower*" than the starting bench mark and by what magnitude. Each crew would have different data but their answers should be very close to the same.

Now let me tell you, reading a text book and doing a few classroom problems pertaining to differential leveling, is a far cry from actually doing it in an outdoor environment. The students struggled with getting the instrument set up on a tripod and leveling it. The focusing aspect of the level was strange to them, as was reading that crazy rod. They struggled with elements of nature, a mean dog arriving on the scene (who doesn't care for surveyors one bit), keeping legible field notes with flies buzzing in their faces, working as a team member when one member is lazy and doesn't take a bath very often, there is only one pencil in the group and the pencil lead breaks, and oops … "I need to go to the bathroom somewhere fast." These are some of the factors a student may encounter. Yes, they did struggle but they got better with each Saturday Lab. The field time and hands on experience with the equipment, in my opinion, was an essential ingredient for this class. Needless to say, some decided then and there that the arena of surveying was not for them! They did however, gain an appreciation of what it took to obtain reliable field data which was good for them to know and understand.

Then, when all of the students were out of sight, I would pick up my sledge hammer and give that hub (our bench mark) two hard licks and drove it closer to ground level. Why would I do such a thing? I will explain more about this later.

Paragraph for the surveyor - Please do not get upset with me for over simplifying what surveyors actually do and for not using surveying terms like: turning point (TP), height of instrument (HI), backsight (BS), foresight (FS), waving or rocking the rod, using hand signals if you do not have a radio, using the rod vernier, raising the rod for "red", curvature and refraction, etc. For the non-surveyor it is not essential. They don't need to know, and actually do not desire to know and understand everything that is under-the-hood. Keeping it simple is probably a good approach for a mutual understanding.

Paragraph for the non-surveyor - A surveyor is an expert in taking measurements. The accuracy requirement determines the method and equipment needed to obtain the desired results. Generally speaking, it is a waste of time and money to obtain very accurate measurements when not needed. Sometimes just pacing a distance is sufficient. You must also realize that no measurement is exact. All measurements have errors. There are many reasons for errors which we will not pursue today; it's a detail that your surveyor will handle for you. Now, mistakes or blunders are another thing! They must be eliminated and resolved. Another thing you should understand is that surveyors will adjust their field measurements. Why in the world would they do such a thing? Let me explain it this way. A surveyor measures three angles with his equipment for a full circle. He adds up the three angles and they are shy of 360 degrees by a small amount. You see, there is a little error here. The surveyor will add a small amount to each angle to make it 360 degrees exactly. It's perfectly OK to do this, and it is an attempt to distribute the error, to a known exact amount. Now, if the sum of the three angles added up to 390 degrees, this would undoubtedly be a mistake and new measurements are needed. The bad data is lined through in the field book (never erased) and not used in any other computations.

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Higher or Lower? *(continued)*

Let's get back to the survey crews and how their Saturday Lab was going. In checking on them, I notice that one crew (named "Speed O") was way ahead of the pack while another crew (named "Turtle") was lagging somewhat behind. I let each crew give themselves a name rather than simply calling them Crew #1, Crew #2, etc. I felt that in letting them name themselves, this would help support the "team effort" concept of working towards a common goal.

You guessed it. Crew *Speed O* finished in record time. "That was a lot of fun, Mr. Bollinger, we are ready to check in our equipment and get out of here". I asked how things went. They responded, "Great". I said "Let me take a look at your field notes". They reluctantly gave them to me. I knew that their work would not check out as I had already messed with their starting bench mark. I said, "Let's go over here under the shade tree and I will take a look at your field notes before you check in your equipment". I found erasures in their field book and they had also doctored up their figures to match the starting bench mark prior to me altering it. I explained to the *Speed O's* that their work was not acceptable and that they would have to redo the field exercise until I received reliable data from them. They argued, "We don't have enough time to do it over". My response, "Better get started, and you can continue working on it next Saturday until you provide me with reliable field data".

In addition to crews *Speed O* and *Turtle*, there were three other crews and they were named *PK*, *Hot Stuff* and *Hound Dog*. Harry and Alice were members of the crew named *Hot Stuff*. Harry came to me and asked if he could be assigned to another crew. I asked why. He said, "Alice was impossible to work with, she called me stupid, and that I could not read the rod correctly." He also expressed that she had a very colorful vocabulary to go along with her criticism.

Well, I sat down with crew *Hot Stuff* to discuss Harry's request. Alice spoke right up, "I need this course to get a pay raise. I don't have time to put up with his stupidity". I noticed that Harry, a pre-engineering student had rather thick glasses. Harry did indicate he was having trouble seeing the rod and the cross hairs. I pointed out to them that when the instrument is in focus for one person, it may not be for another person. I also pointed out the eyepiece focusing ring for the cross hairs may be an issue which we had not discussed in class. I told them we were all there to learn, and if Harry was having a little trouble, his fellow team members needed to "step up" and assist him. I also informed the *Hot Stuff* crew that they were not required to love each other, but being a team player was required. I felt that Harry would undoubtedly encounter bosses, coworkers, and such that were less than desirable to work with in his upcoming career.

Learning to tolerate conditions not completely to his liking may be beneficial for him and I told Harry that he would remain as a member of the *Hot Shots*. Additionally, campus rules to refrain from certain language would be enforced. Alice did agree to be less vocal and eliminate certain words from her vocabulary while on campus.

None of the crews were able to finish the assignment the first Saturday. Actually, the *Turtle* crew finished their work first, and got out of class early the second Saturday. Crew *Turtle* had a good mixture of students, some with prior field experience who were willing to assist the pre-engineering students. As a group they were interested in getting it right and realized that it wasn't a mad dash to the finish line that would receive the victory flag. The other crews, *PK*, *Hound Dog*, and *Hot Stuff* had some mistakes but they hung in there and all three crews were able to correct the areas where they had made blunders. Low-and-behold the *Speed O* crew came in dead last, barely finishing the assignment the second Saturday. There was something about them that was different this week, "Mr. Bollinger, do you want to see our field notes? We got it right this time." They were proud of themselves and I was also.

One student on the *Turtle* crew named Trent came up to me and asked a question. "I took those first readings the first time we set up the Dumpy level, and I felt sure that I had read the rod correctly. James recorded them in the field book and he read the numbers back to me just to make sure. Mr. Bollinger, did you drive that bench mark hub into the ground when we were not looking?" I smiled. He said, "I thought so! You did it on purpose to make us hunt for a

mistake in our work, didn't you?" I answered, "Trent, the exercise wasn't really to determine how *High or Low* the flagpole was. It was to determine how far I drove the hub into the ground and I now know because I have looked at your field notes". We both smiled!

As for Harry and Alice? Well, I don't think Harry asked Alice out on a date or anything like that, but they learned to work as team members and I was happy about that.

As I mentioned earlier, old surveyors love to tell war stories and it is commonly known that they may juice-them-up a bit. That is considered okay and not out of bounds to do so. However, the above are based on true events. The names have been changed to protect the innocent or guilty parties.

> **Kind of a side note here** - With all of the goings on up there in Washington D. C., maybe some type of Plane Surveying class is needed for all of our politicians to take and successfully complete prior to going there to do our business. Maybe they would be more inclined to tell us something that has fewer blunders in it! They would understand more fully that they don't necessarily have to love every one of their colleagues, but it is essential for them to learn how to work and play well with each other. It could also make them better stewards of our tax dollars. Using a differential level principle, assume for example that the government receives $100 million in tax revenue. If the government spends $150 million, that's $50 million more than it has. Using survey rationality, this type of activity would fall into the arena that would be considered a blunder and that a big mistake has been made! If such over spending continues the hole will only get deeper. Maybe some shovels need to be taken away. Maybe that's something we should think about prior to voting in the next election. Possibly, this principle should also apply to our everyday lives as well. Ouch! Before I get into big trouble, I had better get out of this political arena and bring this article to a close.

I have a friend by the name of Paul. Several years ago, he wrote a letter to some dear friends of his. In his letter, Paul encouraged his friends to think on what is true, noble, right, pure, lovely, admirable, excellent, and praiseworthy. In this my closing paragraph, having each of you in mind, I hope all of us will adhere to Paul's suggestions and that we keep these worthy measures foremost in our minds.

What do you think?

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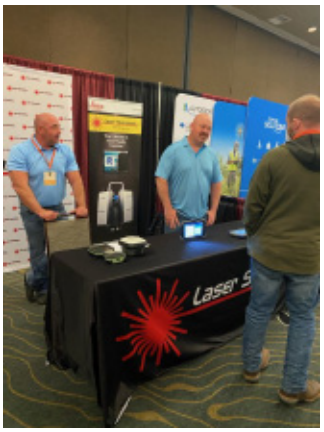

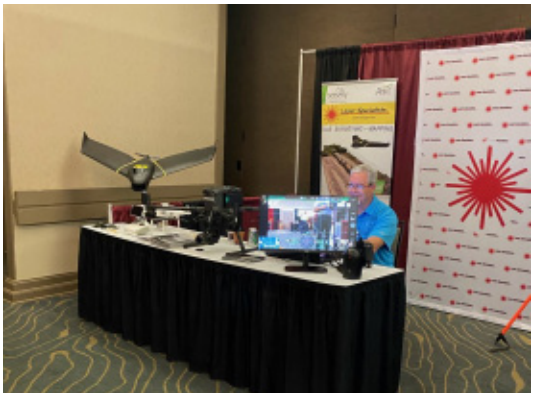

Preemption in Missouri: Squatter Claims to Land

by Steven E. Weible, PLS, March 2021

In the late 1790's families from the United States were encouraged by the Spanish to come settle in Upper Louisiana. Generous grants for fertile land and the prospect of mineral riches were hard to resist (Stoddard, pg 249). So the settlers came. By the time the United States acquired the province of Louisiana from the French in 1803, the number of Americans in the province had increased considerably. In a letter to the President, dated October 5, 1803, Thomas T. Davis, a judge in the Indiana Territory, remarked that the Americans were settling fast in Upper Louisiana (*Territorial Papers*, Vol. 13, pg 7). In a report sent by President Thomas Jefferson to the United States Congress on November 14, 1803, it was estimated that at least two-fifths of all the settlers in Upper Louisiana were Americans (ASP:MISC Vol. 1, pg 348).

Unlike the Spanish, however, the United States government was jealous for its newly acquired land and wanted to restrain new settlement until the land was ready to sell. Section 14 of the Act of March 26, 1804, chapter 38, *An Act erecting Louisiana into two territories, and providing for the temporary government thereof* (U.S. Statutes at Large, Vol. 2, pg 283), made it unlawful for any person to attempt a new settlement, to designate boundaries or to make a boundary survey of the lands of the United States within the limits of the former Province of Louisiana. Violators could be removed from the public lands by military force, fined up to one thousand dollars and imprisoned for up to twelve months.

President Thomas Jefferson emphasized to the Secretary of War the necessity of preventing squatters from settling on the public lands. The Secretary of War then gave instructions to the District Commandants to prohibit unauthorized settlements. When unauthorized settlements were discovered, any fixed improvements on the land were to be destroyed (*Territorial Papers*, Vol. 13, pg 19, 53, 54).

New settlers continued to come, however, and where else could they settle but on the public lands? It became difficult for the Commandants to distinguish unauthorized settlers from those having some kind of claim under the Spanish government (*Territorial Papers*, Vol. 13, pg 82). Some, who had made a settlement after the United States had taken possession of Upper Louisiana in March 1804, filed notice with the recorder of land titles, claiming a settlement right. For example, Francis Clark claimed 250 arpents of land on a branch of the St. Francis River based on a settlement and cultivation made in 1804 (ASP:PL Vol. 2, pg 550). George Horn claimed 300 arpents based upon permission to settle given by Captain Amos Stoddard in 1804 (ASPL:PL Vol. 2, pg 443). Jonathan Vineyard came from Georgia and claimed 500 arpents of land that he had settled in September 1804 (ASP:PL Vol. 2, pg 469).

The Act of March 3, 1807, chapter 46, *An Act to prevent settlements being made on lands ceded to the United States, until authorized by law* (U.S. Statutes at Large, Vol. 2, pg 445), stated that anyone attempting to make a settlement, designate boundaries or conduct a boundary survey on the public lands after the passage of the act, forfeited any right, title or claim to the land. Anyone who had settled without authorization on the public lands before the passage of this act was to be given three months' notice before removal was to be enforced. To avoid removal the settler could apply for permission at any time before January 1, 1808 to continue to occupy up to 320 acres of public land as a tenant at will. Applying for permission, however, required a relinquishment of any claim to the land.

In 1809 President Jefferson reiterated his view that unauthorized settlements should be rigorously prohibited (*Territorial Papers*, Vol. 14, pg 248). Enforcement, however, remained problematic.

The Act of February 5, 1813, chapter 20, *An Act giving the right of pre-emption in the purchase of lands to certain settlers in the Illinois territory* (U. S. Statutes at Large, Vol. 2, pg 797), allowed settlers in the Territory of Illinois a preference in the purchase of the land that they had actually and continuously inhabited and cultivated as long as the land was not claimed by anyone else. The purchase preference would be at private sale as opposed to public sale and the tract would be limited to one quarter section per individual purchaser. The person claiming the preference had to deliver a written notice to the register of the land office at least two weeks before the public sales.

Section five of the Act of April 12, 1814, chapter 52, *An Act for the final adjustment of land titles in the State of Louisiana and territory of Missouri* (U. S. Statutes at Large, Vol. 3, pg 121), extended the purchase preference to the Territory of

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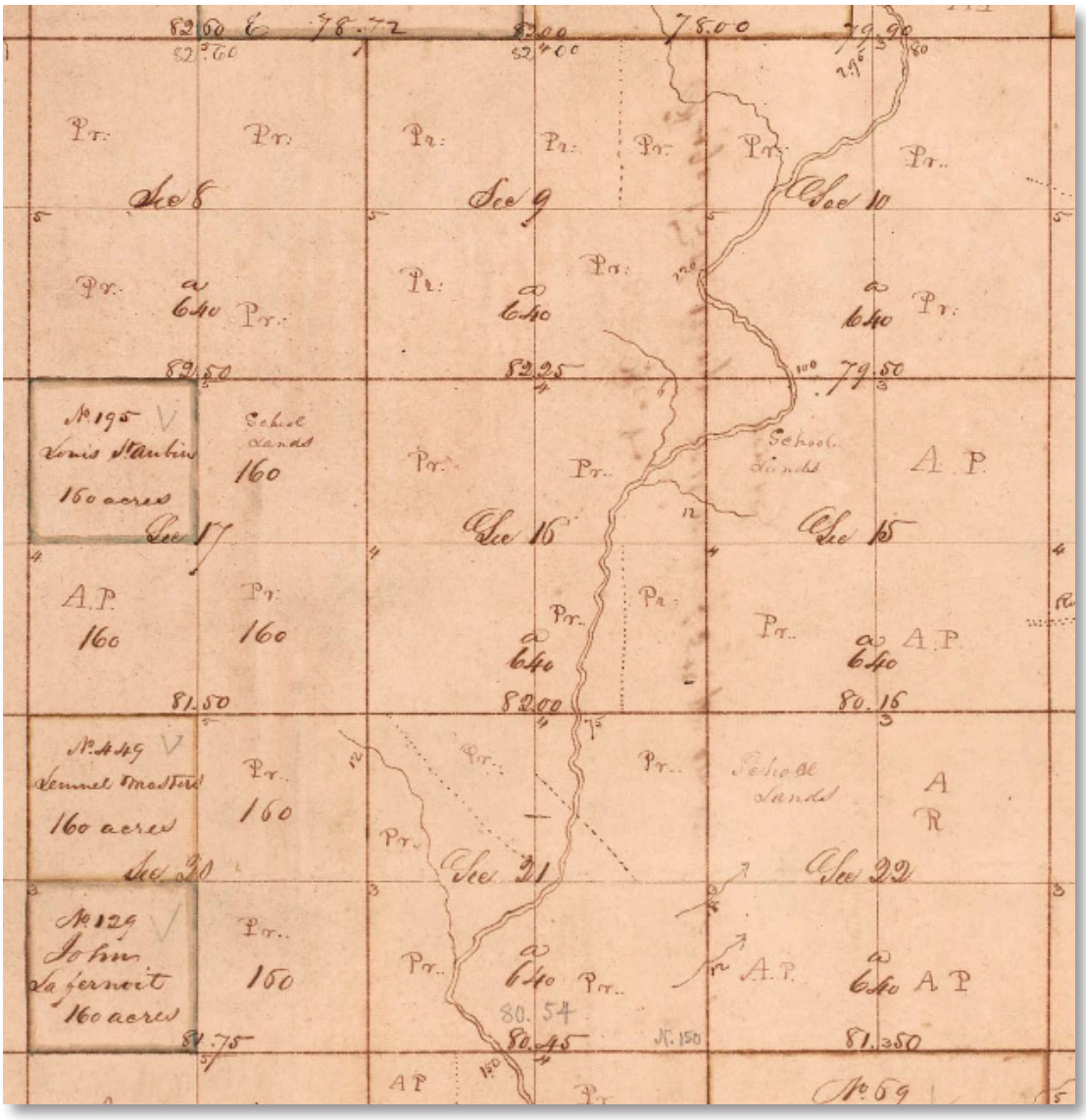
Missouri under the same restrictions, conditions, provisions and regulations as approved for the Territory of Illinois.

Settlements on the public lands continued, now with the hope of a preference in the purchase of the land (*Territorial Papers*, Vol. 15, pg 34). The United States government continued to oppose these settlements, however, and President James Madison issued a proclamation on December 12, 1815, ordering that all unlawful occupants should be removed (*President Papers*, Vol. 2, pg 557). The Secretary of War declared to Governor William Clark that "*the premature occupancy of the public lands can be viewed only as an invasion of the sovereign rights of the United States, and must be repressed by the most prompt and energetic measures*" (*Territorial Papers*, Vol. 15, pg 113).



This extract from the marked-up 1816 township plat (the old plat) for Township 49 North, Range 16 West shows tracts of land marked "Pr." to indicate claims by preemption. Notice that the northeast quarter of Section 9, the southeast quarter of Section 16 and the northwest quarter of Section 21 were divided between two settlers. The northwest quarter of Section 21 was patented as "the northeast corner" (100.5 acres) and the "south part" (59.5 acres). Also notice that three quarters of Section 16 were claimed by preemption and replacement lands for the support of schools were designated in Sections 15, 17 and 22. New Madrid claims were located in Sections 17 and 20.

According to Section 8 of the Act of May 10, 1800, chapter 55 (2 Stat 73) the register of the land office was to place a letter "A" on the township plat when application was made and 1/20 of the purchase price was paid. A letter "P" was placed on the plat when 1/4 of the purchase price had been paid. A letter "R" was placed on the plat when the land reverted to the United States, because of a failure to pay 1/4 of the purchase price within three months after the date of application. See also Territorial Papers, Vol. 15, pg 608.

The General Assembly of the Territory of Missouri responded in January 1816, protesting the President's order and requesting a suspension until the public lands could be surveyed and offered for sale. They felt that such a drastic order deeply affected "*the Interest and Welfare of a considerable portion of the Inhabitants of this Territory by taking from them their dwellings which atho' they do not hold under the sanction of Law they had reason to believe from the indulgence which has been almost uniformly given by Congress not only by their [acquiescence] in such settlements but by extending to them the right of pre'emption they would be permitted quietly to occupy until the public Lands should be surveyed and offered for sale* " (*Territorial Papers*, Vol. 15, pg 108). And, of course, enforcement was still problematic. Alexander McNair, Marshall of the Missouri Territory, in writing to Josiah Meigs, Commissioner of the General Land Office, on January 27, 1816, commented that "*five Militia men of this Territory would not march against the intruders on public lands* " (*Territorial Papers*, Vol. 15, pg 110, 111).

The United States government relented somewhat with the Act of March 25, 1816, chapter 35, *An Act relating to settlers on the lands of the United States* (U. S. Statutes at Large, Vol. 3, pg 260). This act allowed those who had settled on the public lands before February 1, 1816 to apply for permission before September 1, 1816 to continue to occupy up to 320 acres of public land as a tenant at will. The act would remain in force for one year.

The Act of February 17, 1815, *An Act for the relief of the inhabitants of the late county of New Madrid, in the Missouri Territory, who suffered by earthquakes* (U. S. Statutes at Large, Vol. 3, pg 211), brought a new threat to those hoping for a preference in the purchase of the land that they occupied. This act allowed the New Madrid claimants to locate a tract of land "on any of the public lands of the said territory, the sale of which is authorized by law" to replace their previously confirmed claims. Since those eligible for a preference of purchase could not designate their preemption claim until the public lands were surveyed, a land office was opened and the land made available for sale, it was possible for the New Madrid claimants to locate a claim on public land that was already occupied and improved (*Territorial Papers*, Vol. 15, pg 238). A New Madrid claim was not certain to prevail, however, since the right of preemption was authorized before the relief to those who suffered from the earthquakes (*Territorial Papers*, Vol. 15, pg 244; ASP:PL Vol. 4, pg 872).

By 1817 those eligible for a purchase preference were becoming very anxious. The register of the land office at St. Louis was daily receiving requests to enter preemption claims. No preemption claims could yet be accepted, though, because the register did not yet have the township plats on which to identify the preemption claims. The surveys had not yet been completed and land sales had not yet been authorized (*Territorial Papers*, Vol. 15, pg 282).

The first public land sales in the Territory of Missouri were authorized by the President in 1818 (*Territorial Papers*, Vol. 15, pg 385). The Act of February 17, 1818, chapter 12, *An Act making provision for the establishment of additional land offices in the territory of Missouri* (U.S. Statutes at Large, Vol. 3, pg 406), established additional land offices and defined the land district that each office would cover. New land offices were to be established at Franklin in the county of Howard, at a convenient location in the county of Arkansas (for lands located between the Base Line and the north boundary of the State of Louisiana), at the seat of justice in the county of Lawrence (for lands located between the Base Line and the north line of Township 15 North) and at Jackson in the county of Cape Girardeau. The first land office had already been established at St. Louis (Act of March 3, 1811, chapter 46, U.S. Statutes at Large, Vol. 2, pg 662).

In July 1818, Samuel Hammond, the receiver of public moneys at the land office in St. Louis, reported to Josiah Meigs that he and the register, Alexander McNair, had received the preemption claims for the first thirty townships authorized for sale. Most of the claims were clearly within the provisions of the law and there were only a few conflicting claims. There were some issues, however, as some claims turned out to be located in Section 16, which was reserved for the support of schools, and some were located in private claims that had not been confirmed (*Territorial Papers*, Vol. 15, pg 420).

As the land sales approached and the preemption claims were being considered, questions arose as to what constituted "inhabitation" and "cultivation" so as to qualify for the preference of purchase (*Territorial Papers*, Vol. 15, pg 423, 429). How much inhabitation and cultivation were required to qualify for the preference? Was a cabin and a garden patch enough? At what point should the inhabitation and cultivation have been established before a preference could be granted? Did it have to commence before April 12, 1814, when the right of preemption was extended to the Territory of Missouri? If a settler was industrious and extended his improvements into what turned out to be more than one quarter section, could he claim a preference for the full extent of his improvements?

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To add to the confusion, the Act of April 29, 1816, chapter 162, *An Act concerning pre-emption rights given in the purchase of lands to certain settlers in the state of Louisiana, and in the territory of Missouri and Illinois* (U. S. Statutes at Large, Vol. 3, pg 330), allowed anyone who qualified for a preference of purchase that had settled on a fractional section or fractional quarter section of less than 160 acres to "*have the privilege of purchasing one or more adjoining fractional quarter sections, or the adjoining quarter section, including their improvements, or the fraction improved by them, at their option*." The Act also provided for an adjustment when two qualifying settlers had settled on the same quarter section or fractional quarter section of land, so that each settler would secure his improvements. The Act concluded by stating that "*where the improvement of such person shall be upon two or more quarter sections, such person shall be entitled to purchase the quarter sections upon which his improvement shall be*."

There was considerable correspondence between the registers and receivers in the land offices, the Commissioner of the General Land Office and the Secretary of the Treasury, trying to work through the confusion, which was compounded by delays in delivery of the mail (*Territorial Papers*, Vol. 15, pg 432, 440, 460, 463, 470, 473, 484, 486, 499, 502, 509, 511, 522, 524, 525, 528, 536, 542, 550, 599, 602, 608, 647, 659, 662, 702). Added to that confusion were protests and demands sent to Congress by the General Assembly of the Territory of Missouri (*Territorial Papers*, Vol. 15, pg 489, 495, 502, 594, 656).

The Act of March 3, 1819, chapter 86, *An Act explanatory of the act entitled "An act for the final adjustment of land titles in the state of Louisiana and territory of Missouri"* (U. S. Statutes at Large, Vol. 3, pg 517), cleared up some points of confusion. There had been some uncertainty as to whether or not the right of preemption applied to the county of Howard, since it was unclear when it had officially ceased to be Indian territory and had become an organized part of the territory of Missouri (*Territorial Papers*, Vol. 15, pg 440, 460, 463). Section one of this act explicitly extended the right of preemption to the county of Howard as it had been established by the territorial legislature on January 23, 1816. Section three of the act allowed the right of preemption to those that had settled and improved land that ended up being in Section 16 after the surveys were completed. Replacement lands for the support of schools would be selected in the same township.

As in other instances where relief was provided by Congress to those that qualified, there were those who tried to take advantage of the situation to gain a preference, while doing as little as possible to justify it. Ultimately, it was up to the register and receiver of each land office to evaluate the preemption claims presented to them and to extend the relief intended by Congress (*Territorial Papers*, Vol. 15, pg 599, 602, 608, 662). Charles Carroll, register, and T. A. Smith, receiver for the land office at Franklin in Howard County, explained their proceedings in a letter, dated November 6, 1820, by saying, "*We considered the sectional line a Barrier in all cases but one embraced in the first section of the Law of 29th April 1816 & then only permitted them to cross the sectional line to give them the quantity contemplated by Law. A different construction would have allowed an artful & cunning man to have spread over a Township & once pass the barrier & there is no limit. Where two Persons were Settled on one quarter or fractional quarter we gave to each an adjoining qr & half of the quarter they were settled on & where more were settled we divided the section between them. We certainly required Cultivation for the support of a family & did not consider shelots which are indigenous to the country, or the marking of Trees, or planting a few peach Stones or sowing a few appleseeds or putting out a few Scions evidences of cultivation or the Encampment on the ground for a night "actual Inhabitation", where proof was offered of growing any Crop for the Sustenance of man, even "Turnips", it mattered not how they were put in whether with the plough, a cane or the hand it was deemed sufficient & the Preemption was granted*" (*Territorial Papers*, Vol. 15, pg 662).

SOURCES

A Compilation of the Messages and Papers of the Presidents
American State Papers: Public Lands (ASP:PL)
American State Papers: Miscellaneous (ASP:MISC)
Stoddard, Major Amos, *Sketches, Historical and Descriptive, of Louisiana*, 1812
The Territorial Papers of the United States, compiled by Clarence Edwin Carter, 1948
U. S. Statutes at Large

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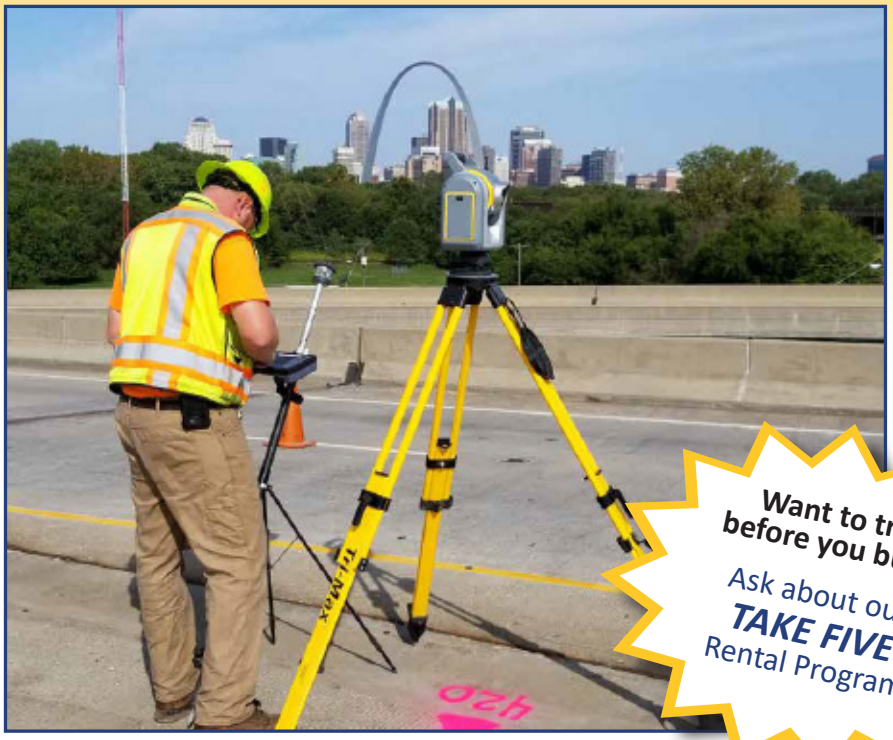

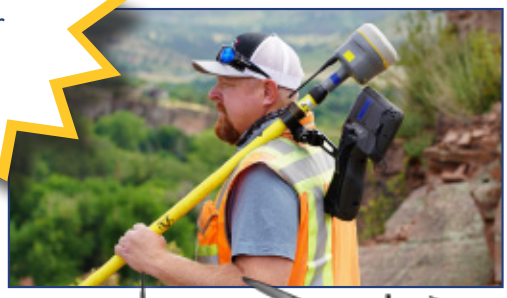

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Being quite proud of ourselves we decided to celebrate with a meal and to replenish our fluids before returning home. Arriving in Fayetteville, Jim and I capped-off the surveying portion of our day by going to University of Arkansas and tying in triangulation station University. My mind was scattered with recollections and reflections of that day in Arkansas. A stop at the University's campus brought on memories of lessons learned from Dr. David Knowles during various seminars and sessions. I also recalled Brown's notes for the Osage Treaty Line as he passed near this locale; he noted what he called the "Smart Mountain." Reflections of the day's finds, a cave and a mound, in this proximity once trod by the great surveyors Brown and then Knowles was topped-off with a toast made with tall, cold beers. There, Jim Herre and I cooled ourselves with the drinks and had a late lunch. It was a good day!

It was a good day; and it was also a good week plus one day. In the span of the last eight days and the recovery of three raised mounds I verified a "fit" that could guide me to mounds throughout the 219 mile course from Ft. Osage to this Arkansas cave. For the first time since 1816, the Osage Treaty Line (or at least the northerly 86% of it) existed as one entity. Not segments, not pieces, not one mound here…it was present. It was "findable". The artifact became the real article. The lore became a line. It still required more research and more field investigations. I was sure some of the search locations I had developed would yield more milepost mounds.

Refining the Method

At this point, I had found original monuments (the mounds) east of Adrian, Missouri, along Mile 53 and Mile 54, and south of Fayetteville, Arkansas, at Mile 218. I wondered how things were fitting together. Since I was relying on GLO plat layers to graph and compute try locations, I wanted to compare my found mounds to the records I was relying on. I checked the distance from my first mound at Milepost 54 and compared it to a computed "mound" I created mathematically based on GLO ties made by William Ashley's surveyors of 1821. It was the computed location we used in 2016 to place a replica stone on the line near present day Stark City. An inverse between the two yielded 109 miles. It should have been 107 miles. A 2% overage was actually pretty close.

Wanting to narrow things in closer than that for my search, I turned to my digital map. Knowing that Brown made calls to all of the rivers and streams he crossed in 1816, I would check the distance from my mound for Milepost 53 to a nearby water crossing noted in 1816. As those original surveyors of the treaty line made their way southerly, their "next" water crossing would have been at Deep Water Creek, about 11 miles east of present-day Butler, Missouri. That would be 10 miles and 43.5 chains south of Milepost 54. By a drag of the stylus, using my ESRI "measuring" tool on the digital map, it came out to be 10 miles and 41.12 chains. That was 157' short of the distance between Brown's calls.

There were a lot of variables which could have accounted for the measurement conflicts. For one thing, distances to the "computed" mound near Stark City were not to an actual monument on the treaty line. For another, my digital aerial photos were subject to all kinds of georectification issues for which I couldn't necessarily correct. Mix with that a fair presumption of water-course meandering over the past 200 years. The variables kept mounting! About the closest thing to a "fix" I could think of was this; each of Brown's water-course calls was within a mile of two mileposts – one north, and one south. I would need to use the water crossings to "localize" for each search area I would develop. I could anchor my line to extend southerly from Milepost 53 to the 1821 GLO calls near Stark City, while scaling the distances recorded in the 1816 field notes between mileposts and streams. Once identified I could find good search point areas with the map sitting at the desk.

That took care of setting up try locations, but there had to be the right conditions in field and flora. Combining citations from the 1816 survey, and measurements from my newly recovered locations, the written word and mathematics narrowed the range. Then I applied a simple life rule of the fall – hunting spots are in the woods! Just like game, my prey had better chances for survival in the woods. The open fields of western Missouri have been turned through many cycles of cultivation and grazing. In Brown's time, he named the open expanses of level ground not interrupted by timber as "prairie". As with wild game, the open country was dangerous to my query. Two centuries of plow, disc and hoof had taken a toll.

Notes from the 1816 survey of the treaty line called out terrain and vegetation. Thus, they were then plotted to the GLO plats. The same plats I now had as a GIS layer, laying atop digital aerial photos. It was amazing how much the ancient calls to forest, prairie and stream matched contemporary locations of the same. It was the streams, Brown's water crossings that put things in place best. Those were good calls. And there was another call nearby that offered hope as well.

More to Find

Where next? The fall calendar was moving quickly as it always seems to do. It's as though the holidays and the cold weather just can't arrive soon enough. It is a time to get things done, a time of shortening daylight, a time to be close to home. I wanted to search for mounds nearer to Joplin.

In 2016, part of the MSPS commemoration of the Osage Treaty Line Bicentennial was the placing of a replica stone along the line where there was a GLO call to the Osage Treaty Line. Surveyors working under a contract held by Deputy Surveyor William Ashley set a standard line for Township 25 in 1821. While doing so they made a call to Brown's treaty line at Milepost 160. This was the site near Stark City where Bob Shotts and I set a replica stone in 2016. I decided to compare that point, to some of the water crossings Brown noted in the area. A mere five to six miles north, the treaty line's crossing of Shoal Creek was cited. One of my criteria! The area was also the nearest stand of timber still intact as it was 200 years prior. That's another favorable condition. At about twenty miles southeast of Joplin, it was close to home. Check!

It was November 16th and I was off to Ritchey, Missouri. With a search area in mind, and try-points loaded in my database it was time to see if method would lead me to another mound. My excitement was tempered only by the unknown variable; landowner mood. As I traveled I was preparing my own elevator speech to seek access to private land. My usual tact when confronted by those "stay off my property" types was to dance a little sidestep and mesmerize them with my iPad and ESRI map. Show 'em where their house is on an aerial photo and talk about the history works like a now-you-see-now-you-don't. Next thing you know, I'm on their ground. Well, we always imagine things to be more trouble than they are. That day, just as a sour-looking property owner looked like he was not interested in my pitch, everything changed when I told him I was looking for a raised mound. "My wife has always said there's a body buried on this land."

The next thing I knew, I was being chauffeured across the fields by the landlord. He was taking me to the grave of the unknown. He was thrilled to find out it was really a raised mound from 200 years ago. It marked where the Osage Treaty Line crossed his property. That was better than a grave to him. It was to me as well. I had Milepost 150 and I had my search method working. As my friend Jim Herre would say, "I was dialed in!"

The next morning, I had another location just a few miles north from Ritchey I wanted to check out. I projected my presumed line north from the mound at Mile 150 and plotted try-points inside of timber stands. Looked like another good place to hunt. About a mile and a half west of Avilla, Missouri, was about a mile stretch of the line in the woods. These locations were just south of Old Route 66. Access to the property came easy with a tenant on the site being an in-law to the owner. With permission granted, I walked into the woods the few hundred feet it plotted to be. No stumbling, and little searching, the raised mound at Milepost 136 was more obvious than my first find up north at Milepost 54. Within the mounded stones was vacant area in the center, as if a wooden post had rotted out.

Dialing In

I now had no-doubt about the existence of milepost mounds. I was finding them; they are still out there! My method of mixing a projected line along the course of previous finds with water calls and "localization" was producing results. But my field search time was running out on me. It was deer season. I wasn't too keen on being in the woods and fields with bullets flying about. Not wanting anyone to lament, "he should have known better," I went home and gave it a rest. My continuing search would have to wait until another day. Besides, those mounds weren't going anywhere! Their 200-year slumber could last a few more days or weeks. Once the hunters in orange were done, I'd be back.

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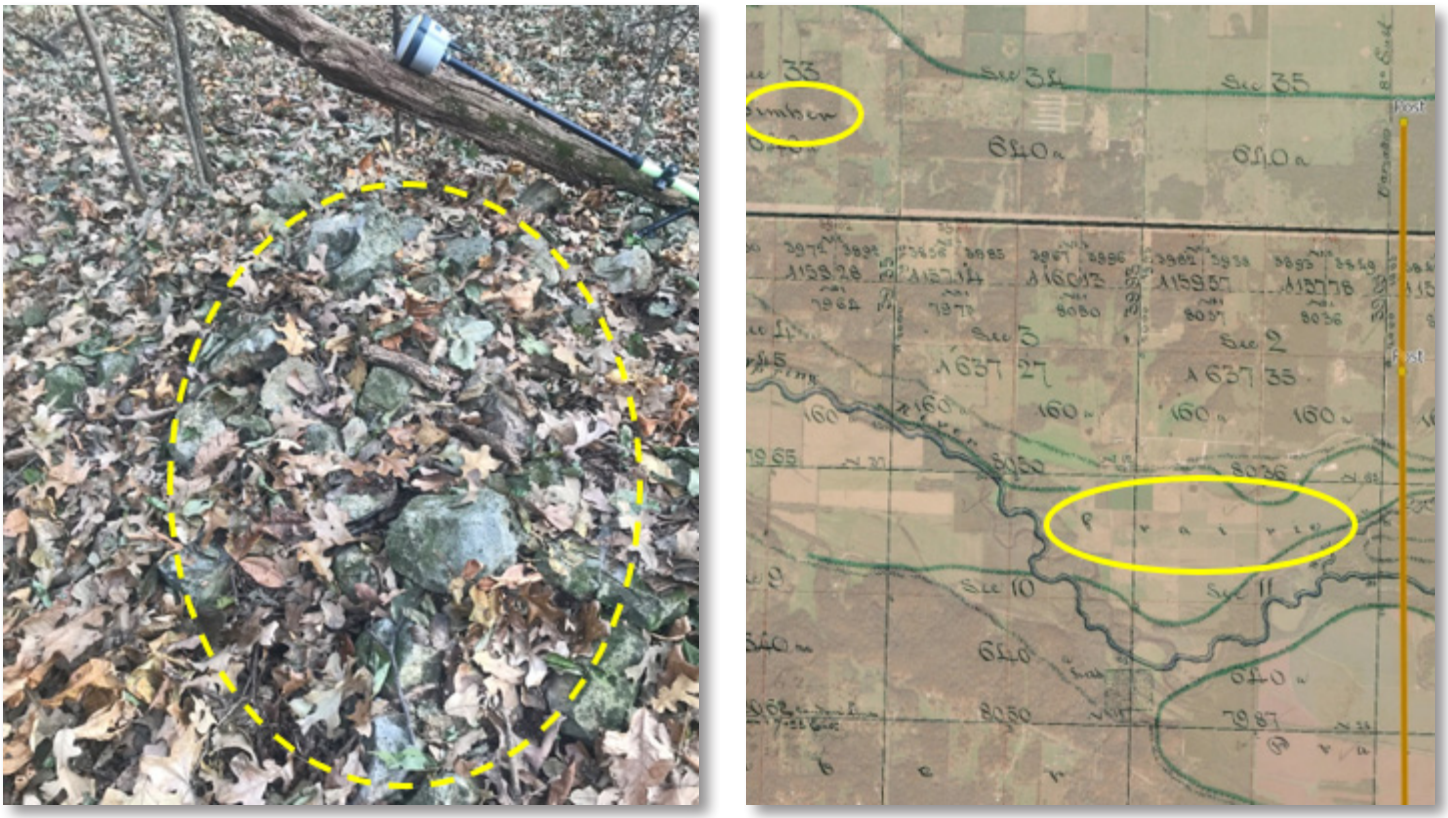
Retracing the Osage Treaty Line: The Story Continues *(continued)*



The "obvious" raised mound of stone at Milepost 136 (l). GLO plat overlay on aerial photo (r) of the vicinity west of Avilla, Missouri. In the far right of the photo is the try-line projected north from the previous found mound at Milepost 150. Note the descriptive text; in the upper portion of the image is "Timber", while in the lower is a note stating "Prairie".

I had a few new search locales lined up, with owners willing to grant access to their land for my searches. By December 1st, bitter winds out of the northwest were gusting to 40 miles-per-hour. That's fine when walking with the wind to your back. But any return trips would make you wish you had stayed in the truck. That is how it was that day near Reeds, Missouri. About eighteen miles east of Joplin, I had attempted to find mounds in this area previously with no luck. But as retracement surveyors know, sometimes you have to keep going back. This time, my search was braced by my previous recoveries. This site also had the benefit of belonging to my former neighbor, Kenny Coppenbarger. Kenny's family had long ties of tenure on their lands near Reeds. Their ownership may have extended back in time to the first settlers of the vicinity. Kenny had sold-out back in Joplin and was now enjoying the good line on the land of his ancestors. It happened to be land bisected by the Osage Treaty Line.

Kenny was there and waiting, just as we had planned. He even brought a surveying technician with him; his dog Junior. Out we went, the three of us, onto ground I had searched before. Now, I was "dialing in" with the help of previous finds. It wasn't long before another raised mound from Brown's survey rested at my feet. The honor went to Kenny with Junior helping; he gently gripped the layout staff of the GPS unit and put the fish-eye in the circle. Plumb and as steady as any veteran surveyor, Kenny tagged the position of the mound at Milepost 142.

Next, I returned to Avilla, where I had relinquished my efforts to deer hunters weeks ago. The mound for Milepost 136 had joined my collection of "found mounds". Being familiar territory with a mound one mile north already recovered, my confidence was up. Less than ten minutes out of the truck and the mound for Milepost 137 was in the bag! There, with a fallen tree resting on it was another of the treaty lines mounds. I was on to something good. Two mounds in a row –

136 and 137. Looking up from this artifact of 19th Century history, I returned to the 21st Century by calling up my GIS images on the iPad. With this new mound plotted, I moved my stylus across the screen to compare dimensions. Record versus measured was 3 ½ links, or 2.32 . If Brown s party had been using a 33 that variation was less than 0.02' per pull of the half-chain. Good enough for treaty work. Damn good.

From where I stood near the mound, an elevation profile of the Osage Treaty Line would begin a gentle descent into the bottom lands of White Oak Creek and the Spring River. In 1816, Brown noted this locale on September 16th with calls to both water crossings, and entrance into a small prairie. He also reported on discomfort among the crew; some were ill, "hands sick & must stop" was the entry. I hope the Spring River Valley was a nice camp spot for his ailing party members.

Kenny Coppenbarger and Junior making a GPS observation on the mound at Milepost 142 near Reeds, Missouri.

Takeaways

I would go on to recover the second mound south of the Spring River. As it was at the fallen tree two miles to the north, it was an easy find. I have gone on to search both sides of the Missouri-Arkansas border in search of more raised mounds. Nothing found there to report; I'll be returning. That is one of the many "takeaways" bundled into my lessons learned from retracing the Osage Treaty Line. Sometimes, you just have to keep going back. There were other lessons too.

First, move past the old arguments of what real surveying is. Chaining 66' *vs*. radio signals across 12,500 miles. Old plats *vs*. aerial photographs. RLS'ing *vs*. GIS'ing. Retracing calls *vs*. waypoints. Field *vs*. office. They're all real surveying! Instead of being juxtaposed, these things are all mutually compatible and beneficial. Where I had my successes, I brought together the traditional with modern, the analog with digital, and the cited with the measured. At times I called upon GIS programs to scroll through screen after screen of aerial photo mosaics in the same evening I was using paper and scissors to make my localization scales. In the day, I would be watching for physical evidence noted centuries ago and then walk a prescribed course plotted before my eyes on an iPad's display. I put GLO plats together with vertical photographs, "married" them as an Italian chef would marry a pasta to a sauce. All these things I did, and these things were surveying.

Second, move beyond the standard tools and technologies. Often, when surveyors do embrace and utilize the wonders of our age, they limit themselves to things proclaimed to be "survey grade" or some-such. While our unique profession does have times and tasks which call for finer calibers of equipment, procedures and abilities, there are those circumstances which are a bit more lax. Of benefit during my retracement of the treaty line, I found that I could achieve GNSS signal reception better with GIS grade receivers (married to the MoDOT and ARDOT virtual networks) than I could with survey grade equipment in rough terrain, under tree canopies and in the shadows of hills. And the GIS programs I ran were as capable as CAD with cogo.

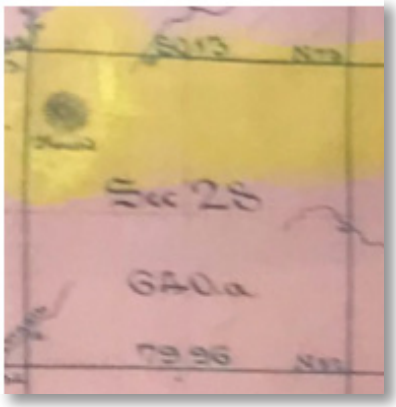
Third, while I have touted the merging of tools, procedures and ways of thinking, never forget the fundamentals. Once all is brought to bear on calculating, plotting and visualizing, the purpose is to find the places in the real world. Locations on the ground, and evidence across time. Said simply, the map ain't the thing – the mound is the thing. When it came down to it, all displacements and conflicts were resolved not in a program, not on an image, not in the archive. They were resolved on the ground with the physical evidence. That is fundamental.

(continued on next page)

Retracing the Osage Treaty Line: The Story Continues *(continued)*

Finally, it is diligence and skill that guided me to these ancient mounds. Yes, I had advantages of GPS systems, trucks, computers and more. But none of those things did the work. I did, Jim Herre did, Scott Wagoner did. There is no outsmarting hard work.

I do plan to continue recovering the Osage Treaty Line as time and life allows. But if I may, I encourage others to join the effort. All I have done and compiled will gladly be shared with you for your own surveying of the line. I have left enough out there for others to pick-up. Go and find it. Heck, go and find my mistakes! Original evidence is still out there, and as I have learned, it can still be found. I close with a final thought; don't get too caught-up in looking down, down to the ground. A large-scale survey, such as the Osage Treaty Line, crosses a lot of ground, a lot of streams and takes a lot of time. To see it all, and find some of it, look around the terrain, the horizons. Sometimes we do need to look down and search for stump holes, but sometimes we need to raise our gaze and find the mounds.



In 1827 GLO draftsmen plotted Brown's call to "...large Mounds West" made during the 1816 survey of the Osage Treaty Line. That mound, noted as being "3 ¾ Miles distant" from the treaty line in Section 28, Township 41 North, Range 30 West as seen from Route D in Bates County, 7 miles northeast of Butler, Missouri. On the way to the treaty line, you can look up today and see the mound on the horizon.

Nominations are now being taken for the **2022 MSPS Board of Directors**. Please contact MSPS at msps@missourisurveyor.org or the Nominating Committee Chair, Susanne Daniel.
Deadline for nominations is July 3, 2021.

Surveying & Surveyors in the News

Lenders Embrace Property-mapping Tech, Defying Critics

American Banker, by Mirian Cross, February 3, 2021

The Mississippi company Vizaline, the software firm that markets a program which converts land descriptions to boundary lines plotted as an overlay on aerial photos has prevailed in its case with the Mississippi Board of Licensure for Professional Engineers and Surveyors. Resolved in December the case was heard in the 5th U.S. Circuit Court of Appeals. It clears the way for Vizaline to move in as the main provider of these services for lenders; previously this was exclusively within the purview of surveyors.

The celebratory article comes from *American Banker* which quotes a state-level banking society stating, "Vizaline provides an innovative risk assessment tool that is useful for many … bankers." The article goes on to report that software users from multiple banks describe the product as **"…more cost-effective than a formal survey."**

Vizaline is doing business in the darker blue states with expressed intentions to expand.

The service is touted as a way to avoid the risks of "…loan[ing] money on a property, they build the house and build it partly on their property and partly on someone else's,". That customarily has been a risk managed by having the property surveyed. The service works by bank clients submitting a property description to Vizaline through their website. Software then converts the text of the written description into linework overlaid on vertical imagery from Google. The company proudly proclaims their service to be "…less expensive than a survey", without the delays and cost of a survey. They report surveys take "two to three weeks" and cost "$1,000 to $4,000" whereas their "Viza-Audit", quickly maps the description within 48 hours for $150.

While Vizaline is now operating in southern states, CEO Brent Miltion "…aims to extend its reach in the Midwest…"

https://www.americanbanker.com/news/lenders-embrace-property-mapping-tech-defying-critics

Drone Operators Challenge Surveyors' Turf in Mapping Dispute

The Associated Press, Raleigh, N.C., April 25, 2021

A drone operating enthusiast from North Carolina, Michael Jones, decided to start a business of taking photographs and shooting videos. Sounds innocent and kind of fun, right? Well, being a good little business man, Michael wanted to serve the requests of his growing client base. It seems that by coincidence, his customers desired images with property lines plotted on them. Still sound innocent?

As the *Associated Press* described it in the article titled above as, "good use of emerging technology that met an obvious consumer demand." The North Carolina Board of Examiners for Engineers and Surveyors didn't agree with the *AP's* assessment. It seems they somehow twisted the toy pilot's good use of tech into **surveying without a license**. They even threatened to prosecute Mr. Jones. As you can guess, Mike did not concur with the Board's contention. No, no, no. He knows what he's not doing, ""I myself don't feel like I'm offering any surveying, and more or less, I'm telling people this is not accurate mapping…". You know, he even sounds like a surveyor – "more or less."

(continued on page 34)

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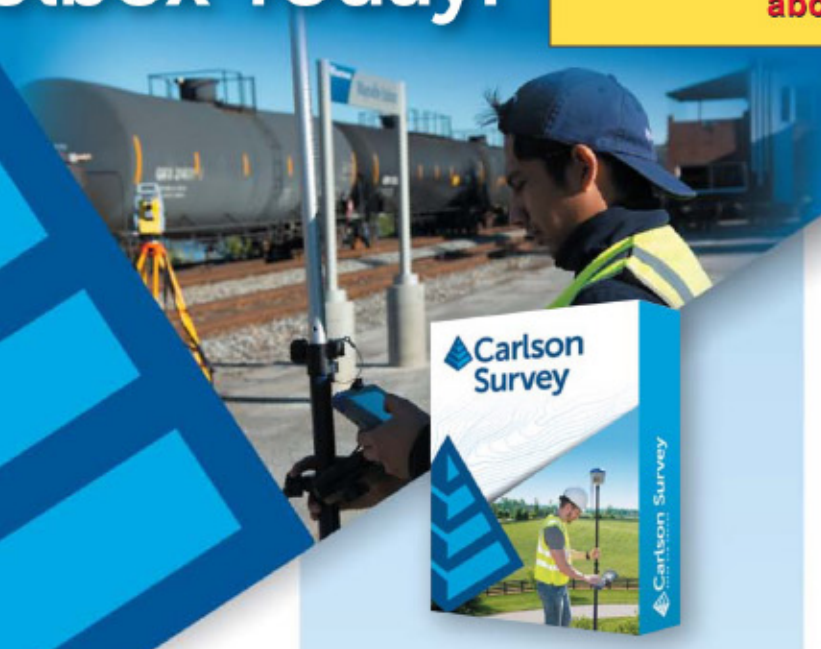

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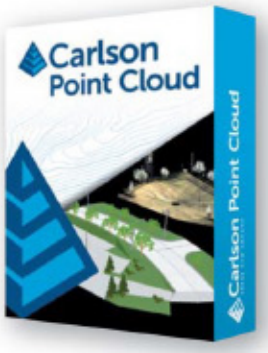

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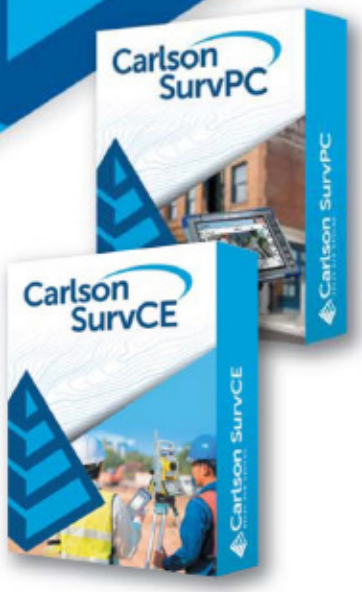

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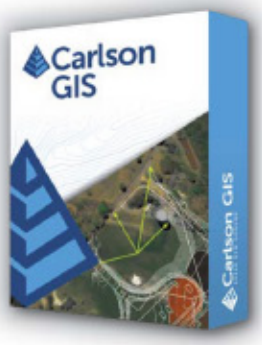

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The captain of the toy chopper has now filed suit against the Board. He has realized the $10,000 loss to business by being "grounded" (that's is where he flies from; the ground) by the Board is a violation of his rights. Specifically, his First Amendment rights. His lawyers describe the basis for the land-bound Lindbergh's claim is that "…taking photos and videos and producing artwork for clients…" is the freedom of speech. Artwork! Kind of makes him a property line Picasso.

Wisecracks aside, these are the same grounds on which the Vizaline case in Mississippi was based. Keep an eye on this one. The article is available at:

https://www.kansas.com/news/business/article250930214.html

Ask A Land Surveyor About Mapping Boundaries

Wisconsin Public Radio, Keegan Kyle, May 5, 2021

Ed Harvey, **President of the Wisconsin Society of Land Surveyors**, was a guest on "The Morning Show" of his regional NPR station. Touted as bringing "…decades of experience to answer your questions…", Mr. Harvey ably handled the interview portion of the show as well as answering questions from listeners. A digital recording of the broadcast is available at:

https://www.wpr.org/ask-land-surveyor-about-mapping-boundaries

Understanding Fence Law Can Prevent Fence Fights from Turning Neighbors into Enemies

The High Plains Journal, Lacey Newlin, May 9, 2021

A fine article touching on the simple fact that fences may serve their functional purposes well, but occasionally they serve as a source of conflict between farmers and ranchers. "Fence disputes can really get nasty in some situations and it can really create some bad neighbors if you've got a bad fence and you're trying to figure out who's responsible for repairing it," said Roger McEowen of Washburn University. The real gem in the article was when Agricultural Law professor McEowen offered, "If landowners are installing a new fence, it is a good idea to **have the property surveyed** before starting construction so the fence is correctly placed on the property line." Take that drone pilots! Check it out at:

https://www.hpj.com/ag_news/understanding-fence-law-can-prevent-fence-fights-from-turning-neighbors-into-enemies/article_f521de90-af5f-11eb-b8e7-2f8fff966a39.html

A Belgian Farmer Moved a Rock and Accidentally Annexed France: The Weird and Wonderful History of Man-made Borders

The Conversation, Imogen Wegman, May 5, 2021

A Belgian farmer in the town of Erquelinnes caused an international incident when he found his tractor's path was obstructed by a stone. Not to be dissuaded from his ploughing, the **farmer moved the standing stone** to another location…in France! It seems the stone was a monument along the border between Belgium and France set in 1819. *Sacre bleu!*

By moving the stone out of his way, 2.29 *metres*, the farmer made Belgium bigger! I guess that means a lot in a small country. You

know what they say, the bigger the Belgium, the bigger the bully. With it's new found status as a geographic giant in Europe, the home of the Walloons and the world's best waffles has ignored French demands. Not to be pushed around, the French have dispatched a lovelorn skunk to the border with threats of retaliatory spraying unless *le farmer* puts things back as they were. For now, it is all quiet on the western front.

The article is actually a very good and interesting treatise on borders and boundaries. It may be found at:

https://theconversation.com/a-belgian-farmer-moved-a-rock-and-accidentally-annexed-france-the-weird-and-wonderful-history-of-man-made-borders-160342

92 Years Old and Still Serving Pendleton County

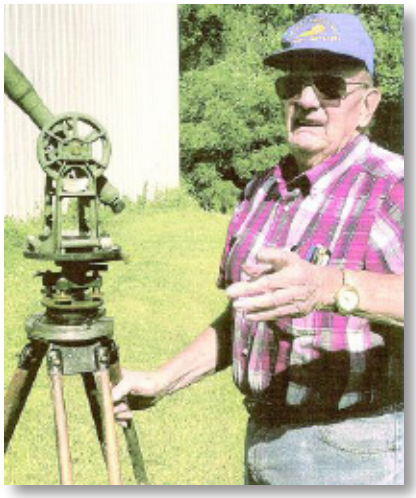
By Brenda Higgins, The Falmouth Outlook, February 9, 2021

From Kentucky comes this report of the Pendleton **County Surveyor Howard Johnston**. Honored with his own "day" on February 3rd, Johnston is the oldest serving elected official in the county. He also has held his office longer than anyone else, having first been elected in 1989!

Mr. Johnston described his love of the outdoors and his excellence in the study of math as the driving forces in guiding him to a surveying career. He has been licensed as a surveyor since 1966.

When asked about memorable projects, Johnston told of being sent to a locale which already had three surveyors attempt to conduct surveys. All three had been shot during their work!

https://www.falmouthoutlook.com/local-news/92-years-old-and-still-serving-pendleton-county



92 year-old County Surveyor Howard Johnston of Pendleton County, Kentucky.

Topcon GNSS, Land Surveying Instruments Helping Build Bridges in Rwanda

GeoDataPoint by Point of Beginning, November 28, 2020

GeoDataPoint (and Yahoo Finance) reported on the work of Bridges to Prosperity (B2P) in the eastern African country of Rwanda. B2P works around the world to build safe, "structurally sound trail bridges". The bridges connect poor and rural underdeveloped communities to healthcare, education and employment.

The Topcon Positioning Group has stepped in to assist B2P with a **donation of modern surveying equipment and technology** to be used for design and construction of these foot bridges. The contents of a shipping container sent to the group in African included GNSS receivers, total stations and data collects. Stepping up further, Topcon will be provided training for users.

https://www.pobonline.com/articles/102282-topcon-gnss-land-surveying-instruments-helping-build-bridges-in-rwanda

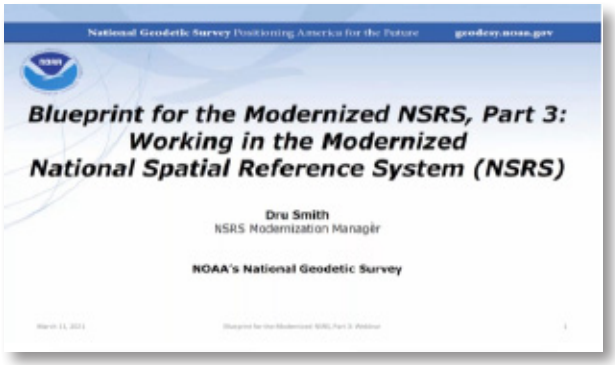
National Geodetic Survey

Positioning America for the Future

NGS News & Events

NGS Updates Guidance on Modernized National Spatial Reference System

May 7, 2021



NGS has updated the guidance it gave to geospatial professionals and engineers in three foundational documents that provide a blueprint for the modernization of the National Spatial Reference System (NSRS). Originally published from 2017 to 2019, the three volumes of **Blueprint for the Modernized NSRS** have all been revised to reflect an updated timeline for modernization; the Geospatial Data Act of 2018; new standards put forth by NGS and the United Nations; new technology introduced both by the geospatial industry and by NGS; and new concepts and expectations for how modernization will be implemented. Use cases have been added to part 3, which covers working in the modernized NSRS. Part 1 still covers technical and policy decisions regarding the replacement of the North American Datum of 1983, and part 2 still discusses the planned replacement of all vertical datums in the NSRS.

NGS Participates in Western Regional Survey Conference

April 30, 2021

Five NGS employees participated in the **2021 Western Regional Virtual Survey Conference** including four NGS regional advisors and the manager for the State Plane Coordinate System of 2022 (SPCS2022). Surveyors and professionals from seven states took part in the regional conference: Alaska, Arizona, California, Montana, New Mexico, Nevada, and Washington. On the final day of the conference, NGS representatives provided presentations to a group of more than 300 attendees, speaking about SPCS2022, the modernization of the National Spatial Reference System, and the deprecation of the U.S. survey foot.

NGS OPUS Receives Record Number of Shared Observations

April 16, 2021

Citizen scientists across the U.S. used NOAA's **Online Positioning User Service (OPUS) sharing utility** in record numbers this March, adding 1,649 new geodetic control observations between local surveys and the National Spatial Reference System (NSRS), the nation's coordinate system. Historically, it took more than three years for users to share the first 3,000 observations when the utility was launched 13 years ago. At this rate, users could exceed 3,000 observations in two months. Local users have been encouraged to update observations at traditional passive control stations as part of NGS's **GPS on Bench Marks** campaign, which will feed geophysical models linking the nation's current latitude, longitude, and height system to the modernized NSRS, which is coming in a few years. These crowdsourced data are crucial to achieving the NGS mission of modernizing the NSRS.

NGS Adds GPS Data Publishing Feature to OPUS Projects

April 9, 2021

The U.S. surveying community and citizen scientists have a new tool for anchoring local GPS surveying projects into the nationwide geodetic control network. NOAA's free **Online Positioning User Service (OPUS)** enables users to convert their GPS observations into precise positions. An upgrade to NGS's OPUS Projects, coming in a few weeks, will provide an easy and efficient path to contribute GPS data to the National Spatial Reference System (NSRS) and thereby establish local survey control. This empowers local communities to create geodetic control marks, which have generally been the purview of federal geodesists. Users will be able to create geodetic control when and where they need it, with little thought to the complex data processing, quality control, archival, and display requirements. At the same time, NGS will receive more crowdsourced data and fieldwork to maintain the integrity of the NSRS.

NGS Provides Online Geodetic Digital Leveling Training

April 2, 2021

Staff at the NGS Testing and Training Center near Fredericksburg, Virginia, along with two regional geodetic advisors, provided **virtual training on geodetic digital leveling**. This class was previously only held in person and has been substantially redesigned for a virtual audience. This session included recorded videos of equipment setup procedures and instructions for level runs. The 28 attendees were from NOAA's Center for Operational Oceanographic Products and Services, the U.S. Geological Survey, the Army Corps of Engineers, state departments of transportation, and private sector companies.

NGS Provides Update to United Nations Geodetic Working Group

March 26, 2021

NGS provided an update for a working group of the **United Nations (U.N.) Committee of Experts on Global Geospatial Information Management**. NGS staff updated the working group for the Americas on the progress of establishing the Geodetic Reference Frame for the Americas. This update was part of the 2021 annual meeting of the Pan American Institute of Geography and History – United States National Section. In 2015, the U.N. adopted a resolution on a Global Geodetic Reference Frame for Sustainable Development, and subgroups from each region are working on reference frames in their areas.

UN-GGIM:Americas

NGS Releases New Homepage

February 26, 2021

NGS has developed a new homepage to make it easier to find information and resources. Top tasks and frequently accessed web content have been relocated near the top of the page to make them more apparent. The new homepage is responsive and scales to different device types, including mobile, tablet, and desktop. Navigation improvements have been implemented and a rotating image carousel will provide important system updates, keep users informed of the modernization of the National Spatial Reference System, announce new NGS products and services, and promote conferences, trainings, and webinars. These changes are part of an ongoing effort to modernize the NGS website and make it more responsive to user needs and requests.

https://geodesy.noaa.gov/web/news/new-homepage.shtml

Missouri Society of Professional Surveyors

Surveyor's Review Course

August 16-18, 2021

Best Western Capital Inn, Jefferson City

PROGRAM

Monday, August 16 ~ 1:00 - 5:00 pm (In-Person ONLY)
SURVEYING MATH (Bring your NCEES-approved calculator)

- ❑ Calculator Use & Basic Algebra
- ❑ Trigonometry and Geometry
- ❑ Traverse Calculations and Coordinate Geometry
- ❑ Surveying Math Applications

This course is appropriate for those who will be taking any part of the surveying licensing exams, or for those already licensed and wish to review surveying topics and receive PDUs.

Tuesday, August 17 ~ 8:00 am - 5:30 pm (In-Person ONLY)
SURVEYING FUNDAMENTALS

- ❑ Errors Analysis
- ❑ State Plane Coordinates
- ❑ Route Surveys, GPS & GIS
- ❑ Exam Preparation, Legal Principles & Definitions

Wednesday, August 18 ~ 8:00 am - 3:30 pm (Also Available via Web Stream)
MISSOURI PRACTICE

- ❑ Missouri Standards & Board Rules
- ❑ Missouri Survey GLO System, Resurveys on Missouri's GLO system (RSMO Chapter 60)
- ❑ Calculation Problems on the USPLSS
- ❑ Other Missouri Statutes, Riparian Boundaries

INSTRUCTORS

Dr. Dick Elgin, PLS, PE, works for Archer-Elgin Engineering, Surveying & Architecture (Rolla). He authored "The U.S. Public Land Survey System for Missouri." **Mike Flowers**, PLS, is the former Missouri State Land Surveyor. He is a former member of the Missouri Board of Architects, Professional Engineers, Professional Surveyors and Landscape Architects. **Dr. Joseph Paiva**, PLS, is a geomatics and business development expert and a former university educator, who is now CEO and Principal of GeoLearn (www.geo-learn.com), an online education company specializing in courses for professionals and technicians in the geospatial industry. All are well known surveying professionals. Joe Paiva helped found the Review Course and for years all three have previously taught parts of it.

This course has been approved for continuing education credits from the Missouri Board for Architects, Professional Engineers, Professional Land Surveyors and Landscape Architects for the following hours:

Monday — 4.0 PDUs Tuesday — 8.5 PDUs Wednesday — 6.5 PDUs

Note: If you are currently licensed in Missouri, all 6.5 PDU's on Wednesday are applicable for the 2 hour PDU requirement for license renewal per 20 CSR 2030-8.020 (Missouri Standards and Statutes).

Be a Magazine Cover Model or News Maker!

Highlight your work! Impress your friends! Make your momma proud! Prove to the bankers you are using that commercial loan!

"How" you may ask? By sharing photos, stories and news with Missouri Surveyor! It is really that simple. Just as this edition's cover features Missouri surveyors you and your work may be featured as well. All content is welcome! For the cover, high quality images in landscape format at an aspect-ration comparable to 17"x11" work best; stories and articles merely need to be in Microsoft Word.

Missouri Society of Professional Surveyors
722 E. Capitol Avenue
Jefferson City, Missouri 65101