Missouri Surveyor

A Quarterly Publication of the
Missouri Society of Professional Surveyors

Jefferson City, Missouri

September 2024

What's in this issue...

CALENDAR OF EVENTS

2024

October 3-5, 2024
67th Annual Meeting and Convention
Margaritaville Lake Resort
Osage Beach, MO

December 7, 2024
Zoom Call, Board Meeting
MSPS Office, Jefferson City, MO

May 1 & 2, 2025
Spring Workshop
Lodge of Four Seasons, Lake Ozark

October 2-4, 2025
Annual Meeting
Stoney Creek Inn, Independence

Cover: 'Introducing Land Surveying to a New Generation' is more than a motto or *meme* for the team from Powell CWM of Independence – it's a commitment. Here they are fulfilling that charge as participants at the *iBuild Showcase* in Kansas City this past spring. This event is an annual exposition inviting middle and high school students to come and connect with construction related businesses and trades. The Powell CVM team shared information and equipment demonstrations with attendees

Donald R. Martin, Editor

Notes from the Editor's Desk

Donald R. Martin

The 4th U.S. Circuit Court of Appeals has upheld a trial court's decision which found the free-speech protections of Michael Jones and his 360 Virtual Drone Services business weren't violated by the state's requirement for a license to offer surveying services. This was the case of the drone pilot seeking to expand his business by capturing bird's-eye imagery of buildings and lots which he in turn plotted line work and symbols upon. The North Carolina board of registration investigated the actions and services of Jones followed by voting to have the drone pilot cease engaging in "mapping, surveying and photogrammetry…" They went on to specifically cite examples of Jones plotting location data and dimensions to the images he sold.

Believing it was simply enough to disclaim any intent for such maps to be substitutes for proper surveys, Jones sued the registration board. Represented by *The Institute for Justice*, the drone pilot contended the board's attempt to stop his endeavors as an infringement on his First Amendment right of free speech. Writing the unanimous opinion, Circuit Judge Wynn spoke of a compelling interest by the state to regulate surveying and described licensing practitioners as a means of protecting consumers *and a public interest* from the "…potentially harmful economic and legal consequences that could flow from mistaken land measurements."

We live now in an era where issues of free speech are seemingly more salient to our day-to-day lives than ever before. These matters are made more challenging because increasingly the expressions of speaking freely are more often limited through the auspices of commercial communication interests and fellow citizens who assume a role of monitoring.

Now is also an era of notions that regulations serve primarily has impediments to commerce and attempts to restrict the creative and innovative impulses of the smart and talented to utilize emerging technologies and make simple the work of previously complex matters. Yes, regulations may well impose limits as claimed, but that is not all they do. Regulation in the name of professional standards and licensing is an expression of assuring our common good is protected through the careful authorization of professional practice to those uniquely qualified and capable through their experience, education, and knowledgeable execution of their duties.

So, in the case of the drone pilot, he was not prevented from free speech expression through offering his maps. The right to unpopular or dissenting opinions was not infringed upon. Nor was his access to lawful commerce impeded on. No, none of these contentions were able to stand…because he mistook his *ability* to map and measure as a qualification to map and measure. It was not. The ability to do something does not supersede the responsible protection of a *public interest* by licensure. The ruling affirms that it is land surveyors, through qualification and authorization who are entrusted with the measuring and mapping of our individual and public interests in our lands.

There is something in this story of law which becomes a recognition of the crucial roles and abilities of surveyors. It also validates society's need for regulated professions in particular endeavors. Reflecting on this tale is your entry into the September edition of *Missouri Surveyor*. There is more for you inside these pages, so please proceed.

Well, 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

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EDITOR

Donald R. Martin
105 S. Capistrano
Jefferson city, MO 65109
Phone (573) 619-8702
E-mail: editor@missourisurveyor.org

PUBLISHER

Sandra Boeckman
722 E. Capitol Avenue
Jefferson City, MO 65101
(573) 635-9446 FAX (573) 635-7823
E-mail: msps@missourisurveyor.org

*The **Missouri Surveyor** is published quarterly by the Missouri Society of Professional Surveyors, to inform land surveyors and related professions, government officials, educational institutions, contractors, suppliers and associated businesses and industries about land surveying affairs. Articles or opinions appearing in this publication do not necessarily reflect the viewpoints of MSPS but are published as a service to its members, the general public and for the betterment of the surveying profession. No responsibility is assumed for errors, misquotes or deletions as to its contents. Articles may be reprinted with due credit given.*

President's Message

Bob Anderson, PLS

Well, this is it. The last President's message for me. It truly has been an honor to have been given the opportunity to serve on the MSPS board and ultimately as President. I have great appreciation for the work my predecessors have done, and I can't even begin to express my gratitude for all of Sandy's efforts. She makes all of our events seamless. As I prepare to pass the proverbial torch to Chuck Quinby, I know our board is in good hands. Chuck has been a constant presence as long as I have been around the board and has gone the extra mile to advance the profession.

This past year has simultaneously seemed very long and seemingly flown by. We did not face many challenges this past year, mostly thanks to the work the board has done in recent years. Much of the legislation we have taken interest in has been settled prior to this year. There are a few bills that we are watching. However, with the unrest in the state congress, there was little movement with any bills of interest. One of the items of interest we have been working on is the renaming the land survey program building as the "Robert E. (Bob) Myers Building." Don Mayhew introduced a bill to rename the building. Unfortunately, he couldn't get the bill passed. So, the Department of Natural Resources has agreed to name the building without passing a bill. We are currently working on the plaque to be displayed on the building. On another positive note, Mark Nolte won his primary election. Hopefully he will win his November election, and we'll have another surveyor in the legislator. Our lobbying efforts are beneficial. Adding surveyors to the legislator that can speak on how legislation will affect our profession is invaluable.

This being a presidential election year, I'm sure we are all anxiously awaiting the results and what effect that will have on our lives and livelihoods. We are certainly in tumultuous times and have strayed far from what our founders envisioned. If we had more surveyors as presidents, we wouldn't be in the mess we're in. I think it's time we *Make American Presidents Surveyors Again*. While that won't happen now and we have little sway over what happens at the federal level, we can have an impact on our state and local policies. Now is a good time to get to know the candidates to be your local and state representatives or run for office yourself. The best thing we can do is take dominion over the things in our lives that we can and leave the rest to God.

Thank you for the honor of serving our community, and I will continue to serve the capacity that I can.

Bob Anderson

Midwest Geospatial Academy: The School for Surveyors by Surveyors

by Joseph V.R. Paiva, PHD, PS, PE

Introduction

Midwest Geospatial Academy (MGA) was established as a public benefit non-profit corporation in Missouri in April. Our goal is to support the surveying profession by offering educational opportunities to technicians already in surveying and individuals seeking to enter the field, including high school graduates, college graduates, and those in between.

Fall 2024 Courses

MGA will offer its first courses for the fall semester beginning August 26th. These courses are:

- **Surveying I**
- **Land Records: Interpreting and Using**
- **Elements of Surveying Practice**

Registration Details:

- **Soft Registration:** Opened in late July
- **General Registration:** Opens August 3rd
- **Last Day to Add/Drop:** September 3rd

Surveying I Requires a strong mathematics background, including trigonometry. Starting in fall 2025, a math proficiency test will be required. Failure to pass will delay registration until the math requirement is met. We will announce when this proficiency exam is available during the next few months.

A course equivalency chart is provided in the sidebar for those familiar with State Tech's course naming and numbering.

Spring 2025 Courses

For spring 2025, MGA plans to offer:

- **Surveying II**
- **Legal Aspects of Boundary Surveying**

Depending on demand, we may also offer **Elements of Surveying Practice**. MGA is committed to responding to the needs of the profession and students as resources allow.

Tuition and Fees

MGA's tuition and fees are slightly higher than State Tech's, with a combined cost of $850 for both online and hybrid courses. We will review tuition after operating for a year or two to explore potential reductions.

We appreciate the support from employers and institutions offering scholarships, including MSPS and its chapters. MGA plans to expand scholarship partnerships and welcomes suggestions for funding sources such as workforce development grants.

Course Equivalency

Title	State Tech	MGA	MGA Semester
Surveying I	SUR240	SUR201	Fall
Surveying II	SUR241	SUR202	Spring
Land Records: Researching and Using ‡	SUR242	SUR301†	Fall
Legal Aspects of Boundary Surveying	SUR243	SUR302†	Spring
Elements of Surveying Practice	SUR244	SUR303†	Fall

‡ *This course is called Land Records: Researching and Rules of Construction at State Tech*

† *These courses have been determined by the board to meet the requirement for courses on Legal Aspects of Boundary Surveying*

- All MGA courses are three semester credit hours and have been approved as acceptable land surveying courses by the Missouri licensing board.
- Courses must be taken in sequence unless a waiver is granted by MGA academic staff.

Future Plans

We will share updates in future issues of the *Missouri Surveyor* regarding our strategic vision to expand opportunities for land surveying licensure and knowledge enhancement. We are researching state and federal grants to fund summer institutes for science and math teachers, as well as guidance counselors.

MGA plans to offer a Basic Certificate in Land Surveying to students who complete our 15-hour course requirement as outlined by the Missouri Board. Students with equivalent courses from other institutions may also qualify if they meet the grade requirements and have at least completed SUR303 with us.

Board and Staff

MGA's board includes myself (Chairman), Bob Anderson (Vice Chairman), Kellan Gregory, Ray Riggs, Chuck Quinby, Mike Zahner, Wil Anderson (Kansas), and Michael Daniels (Arkansas). Our goal is to promote MGA to surveyors in Missouri and neighboring states.

I serve as President and CEO, with David Parker from Vanguard Business Services and Sam Gahm of GeoLearn as Treasurer and Secretary. Our first formal hire will be Mike Oetterer as Land Survey Program Advisor and instructor for Surveying I and II.

(continued on next page)

Surveyors Materials, Inc.

8875 Frost Avenue
St. Louis, MO 63134
Voice: 314-521-9041
Fax: 314-521-9043

Edward Owen
Vice President

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Midwest Geospatial Academy: The School for Surveyors by Surveyors *(continued)*

We are currently seeking a Chief Administrator. This part-time role will support the daily operations of MGA. Temporary and part-time contractors are assisting until the position is filled.

We are actively seeking those who may be interested in teaching courses as instructors, assistant instructors, instructor interns and lab assistants. Contact me at joe@geospatialacademy.us for information and to see if you qualify. Just as we, as a profession, have had limitations on supporting opportunities for surveying education in the past, we have had even more for the development of competent instructional staff. We really need this help for the college to be successful, so please take this request seriously! You can self-nominate or you can recommend others.

Contact Information

For more information, visit our website at www.geospatialacademy.us. Students or interested parties can email general inquiries to info@geospatialacademy.us.

- **Mailing Address:** PO Box 22453, Kansas City, MO 64113-0453
- **Toll-Free Number:** (844) 778-1776

We welcome questions, suggestions, and offers of assistance. Once our non-profit status is certified, we will begin outreach for donations to support the school.

In Memory of Gary George, PLS

Gary Burless George, 71 of Eldon, passed May 2, 2024, in Jefferson City, Missouri.

He was born March 16, 1953, in Rolla, Missouri, the son of the late Burless and Ruth (Mitchel) George. He was also preceded in death by his brother Maurice.

Gary married the love of his life Rita (Trimble) Howser on December 24, 1989. They had been married for thirty-five years. As Rita had a stroke, she was unable to communicate well, but they talked daily by phone while he was hospitalized.

Survivors include daughter, Kimberly and her family; and sister, Virginia Berry (Kenneth).

Gary owned and operated his survey company for thirty-five years. He excelled in his work and was very respected for it.

Gary kept his faith in God and left this world peacefully after a long battle with cancer.

Grover Mitchell officiated a graveside service at the Dixon Cemetery in Dixon, Missouri on May 6th. Barbara Keys sang *The Anchor Holds*.

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Announcing! A new school for surveyors, by surveyors

MIDWEST GEOSPATIAL ACADEMY

Board approved courses: Surveying I, Land Records: Researching and Using and the "new" fifth course, Elements of Surveying Practice offered in **fall semester**.

Surveying II, Legal Aspects of Boundary Surveying offered in **spring**. For spring 2025 only, we will consider offering Elements of Surveying Practice if there is sufficient demand.

Fall registration opened August 3. **Classes start August 26th**. Late registration open through September 3.

Land Records, Legal Aspects of Boundary and Elements courses are all approved to meet the Missouri Board's "Legal Aspects of Boundary Surveying" requirement.

MGA is looking for instructors, assistant instructors, instructor interns and lab/grading assistants. • Experience is nice, but not required. • We will support and train you.

MGA is also looking for new ideas for course, credit and non-credit, from 1 to 3 hours on workplace-related courses for registered and non-registered surveyors. • Put your ideas together and send them to us. • Check out our course descriptions for ideas for new ones.

We want to be the best school for surveyors in the region

We welcome all inquiries. • Watch for announcements from us; check us out on Facebook, Instagram and LinkedIn as well as the website.

www.geospatialacademy.us
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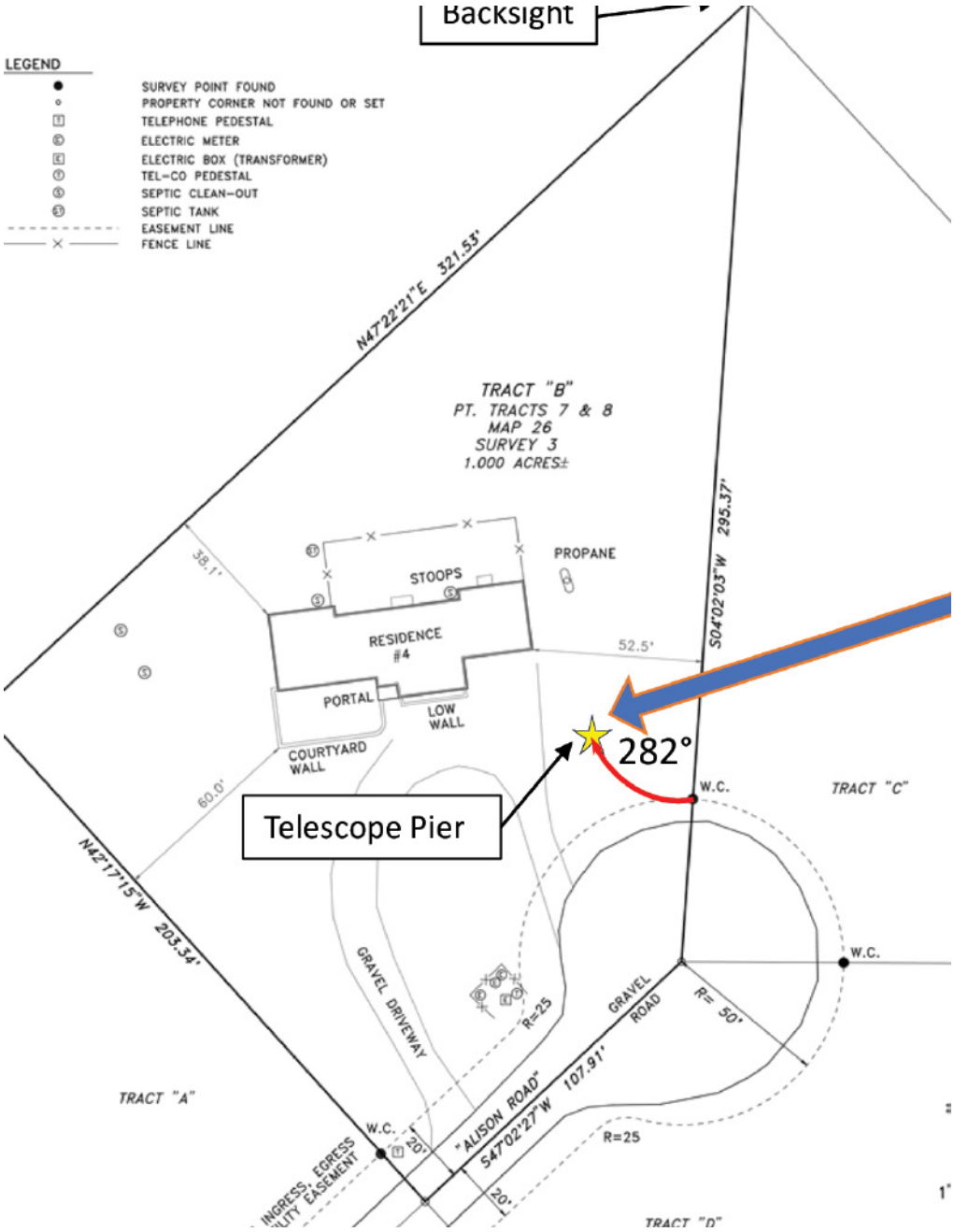
Shooting Polaris

by Martin Gutoski, PS, April 24, 2024, American Surveyor

Note: Martin has written for American Surveyor several times, most notably about Icehenge, a recreation of Stonehenge in ice, and Wienhenge, an outrageous sun dial project. You can search our website to find all of Martin's articles.

Although I may be preaching to the choir on some of the aspects of equipment with a major digression into things astronomical regarding surveying, it is necessary in part to familiarize you with the whole picture of my venture.

Surveyors' equipment before the advent of GPS, went through the gamut of optical devices ranging from compass configurations to EDM and total stations. All of these were using some form of a telescope that was a classic refractor mostly on a mount that gimbled in altitude and azimuth/ bearing readings for the older transits or with horizontal and zenith angles for the theodolites. The range of magnifications was anywhere from maybe 20 to 40 powers with objective lens diameters from an inch to 50 or 60 mm.



This is the setup with the Sokkia TM-6 theodolite used to set the bearing of the azimuth line from the north property line to the telescope pier. Note the use of a plumb bob even though it had an optical plummet tribrach it was easier to use over the center mark of the bolts on the concrete pier.

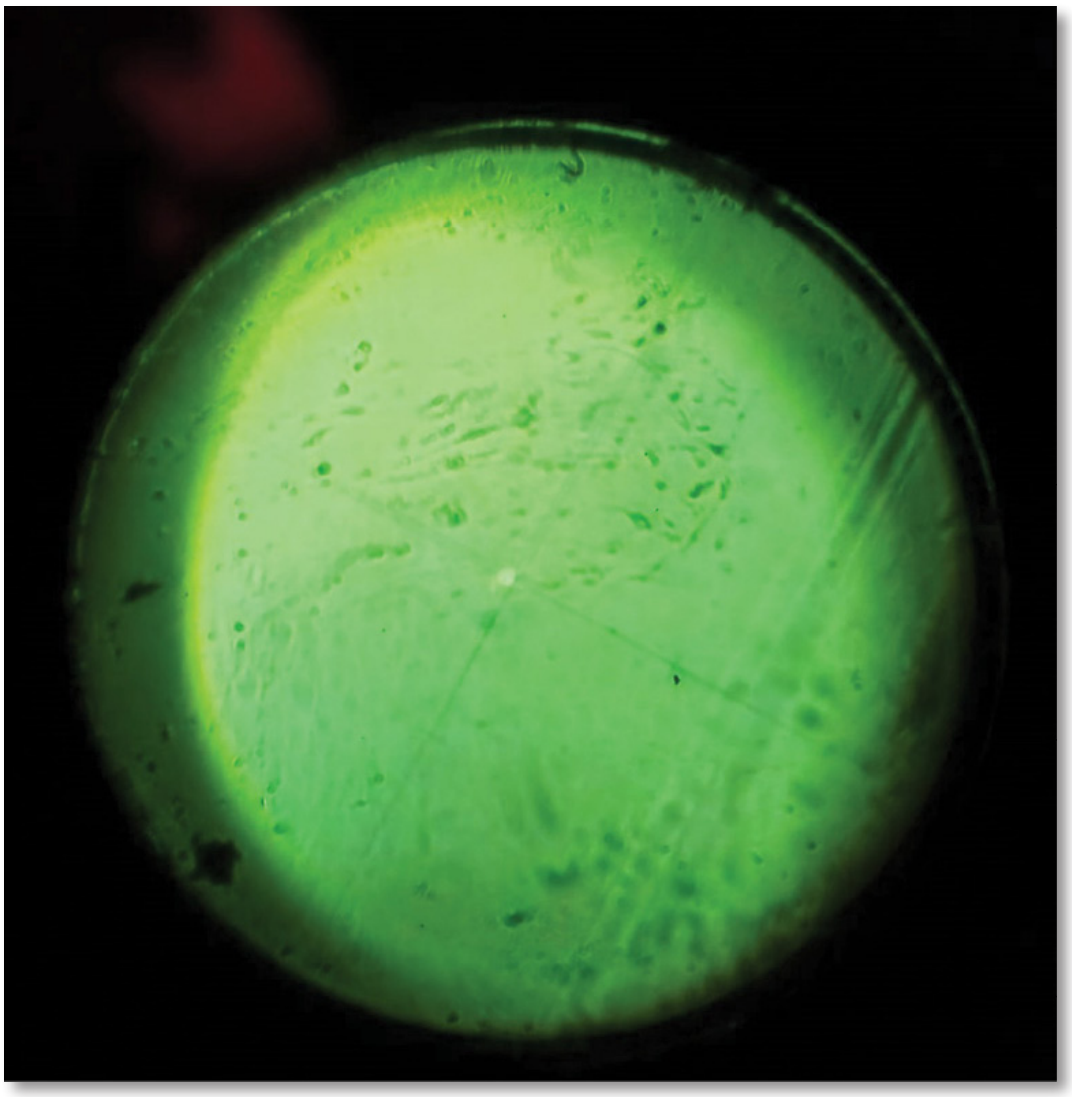
Over the decades I have owned a classic K&E Engineers transit in its hard wooden box, Wild's (Swiss pronounced VILT not wild animals) theodolites, Leitz, Sokkia and Sokkisha before they were bought out by Topcon, and a few Leica's. Some of these were also available with zenith eyepiece attachments to see above 50 degrees altitude and solar filters for sun shots. I had a solar reticle for my Leitz TH-43 that had not only the standard cross hairs but a circular outline of the diameter of the sun, so you didn't have to choose between the upper or lower and the eastern or western trailing sides of the sun. This made shots safer because I employed a projection method using a piece of white cardboard or a transit book to shine the sun onto. Solar shots too could be accommodated with a very dangerous dark glass filter that attached over

(continued on next page)

Shooting Polaris *(continued)*

the eyepiece. I say the dark filters were dangerous because if cracked from the heat of the sun you could spot weld your retinas in a second. But the projection method was hard on the eyepiece such that it delaminated the lens in the eyepiece making it cloudy in the process. Accordingly projecting the sun though an EDM or total station would probably fry the light pipe in the optics for the fiber optic connection of the infrared distance measurements. Probably today if you want to take sun shots it can be safely done with an aluminized mylar filter that subtracts 99% of the sunlight over the objective lens rather than at the eyepiece.

I own a pair of zenith eyepiece attachments where you must unscrew the standard ones for the separate focuser and window to read the angles to install the 90-degree prisms. They can be used on any Sokkisha or Sokkia theodolites of which I have a TCM-20 second gun and a TM-6 second one. I am building a concrete pier for one of my telescopes at an observatory I have constructed in Taos, NM that needs to be polar aligned to track the stars accurately with a computer driven motor drive.



This is a shot of the image through the TM-6 that shows how murky and fuzzy it was because the cross hairs were illuminated by a small prism in the light path behind the reticle. It lit up all the dust in back of the graticule. Polaris was set slightly out of focus to make it easier to see for centering.

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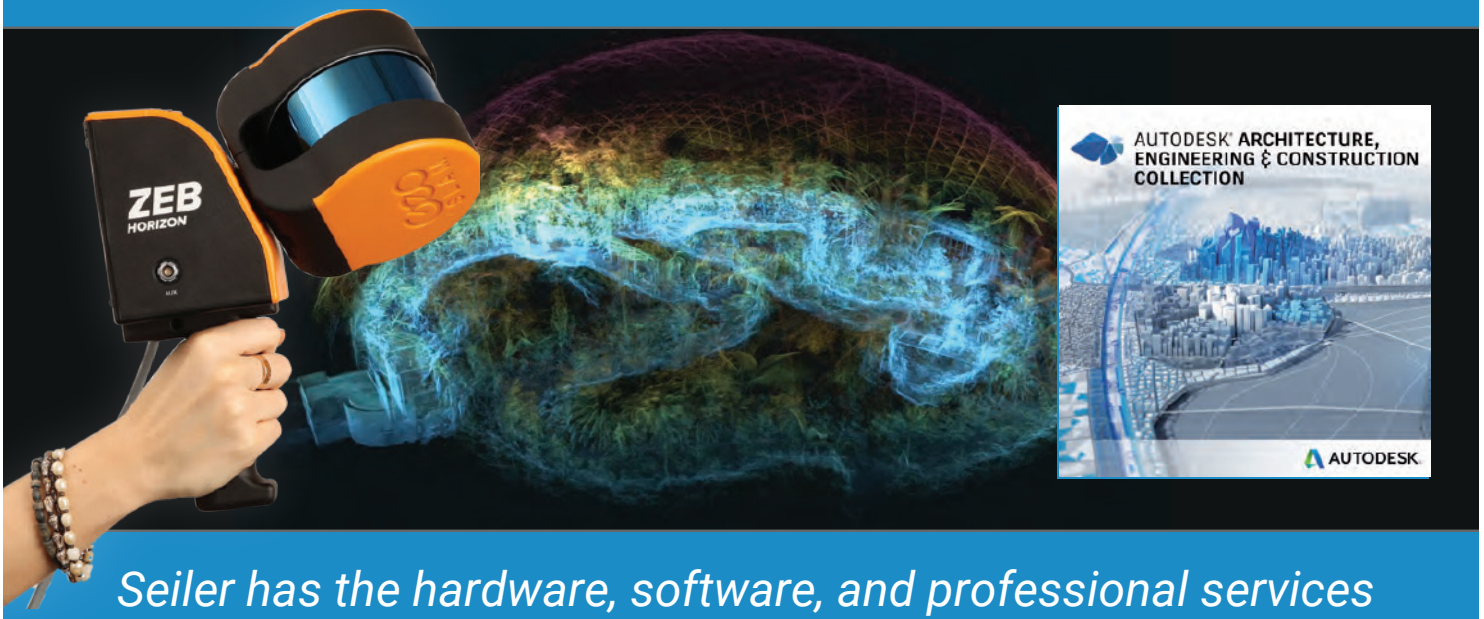

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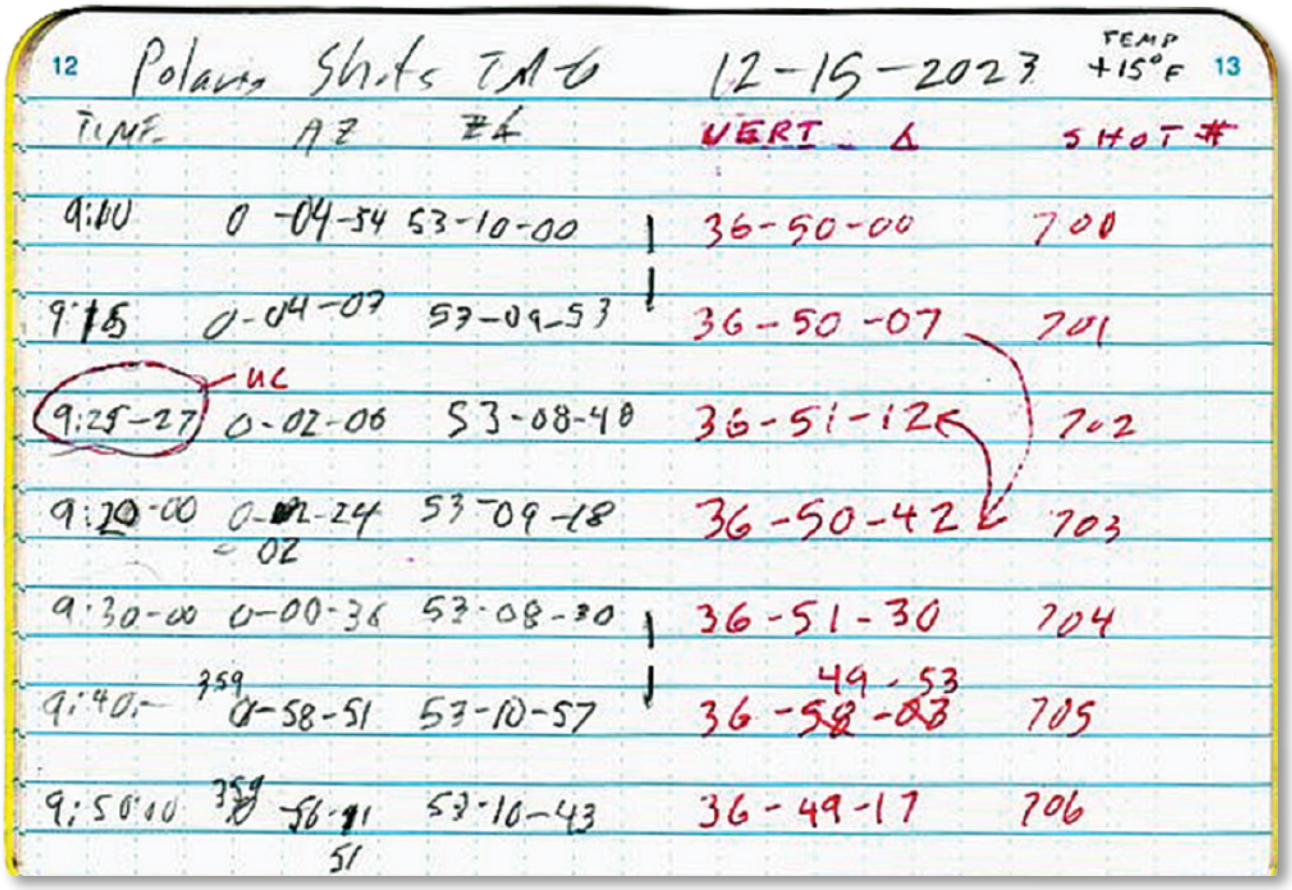
Shooting Polaris *(continued)*

Let's digress a bit into telescope mounts and types. I have five flavors all of which have different mounts. Although there are mainly two types of telescopes; refractors and reflectors they can be mounted differently. There are also different ways in which these two types of optics can be configured.

One reflector type uses mirrors to bounce the light around that can be at what's called Cassegrain focus with a second mirror to shoot the reflected image back through a hole in the primary mirror and out the back. These are called Schmidt Cassegrain's or folded optics. A Newtonian, named after Isaac Newton in 1668 who made the first one, the primary mirror shoots the light up the tube that's intersected by a right-angle prism in the middle and out the side into the eyepiece.



Raw field notes for shots Dec 15, 2023. Zenith angles converted to vertical angles in red. Book was 3" x 4-1/2" mini-notebook using gloves making it hard to write at 15 degrees F in the dark for one hour.

A classic refractor hasn't changed much since Galileo used one to observe Jupiter and its four major moons in 1609 with his dinky one inch, 8 power magnification. About the only thing that's changed over the centuries is glass and magnification. The same could be said for the Newtonian. Only recently in the 1960's has the Cassegrainian design been perfected for the amateur market as affordable. A really, really good refractor (an apochromatic three element design versus an achromatic two element configuration) still costs about a thousand dollars per inch while the other mirrored scopes are half that. But that expense for both continues to plummet as we speak. The optics in most surveyors' lenses are still achromats but with special coatings to reduce glare and internal reflections from the glass elements of their two-element construction. Also, they are not usually used at night and can get by with small apertures and relatively low magnification.

Now let's talk about the mounts which is where my experiment using an old theodolite comes into play. Amateur astronomers have various methods to find the true north. So do surveyors but it is not usually in the amateur arsenal because they do not possess the equipment nor expertise.

I indicated that my stock of telescopes comes in five types. First, I have a 12" Newtonian (remember that when I say inches it means the size of either the primary mirror in a reflector or the objective lens on a refractor). It is on what's called a Dobsonian mount which is the least expensive because it is basically a lazy Susan alt/az in a rocker box1.

Second is a 12" Cassegrain in my eight-foot diameter observatory dome that is also on an alt/az fork mount. Next is an 8" Newtonian on a German equatorial mount which is one of the most popular but also the most difficult to align2.

Fourth follows with another 8" Cassegrain but is a modified alt/az fork mount that is on an equatorial wedge which you angle the telescope for your latitude to roughly point at Polaris3.

Fifth is a classic 6" refractor that is a long four-foot tube on another German equatorial mount. A refractor like this is why there are so many more of the reflectors because they do not fold the optics with mirrors but shoot the light down a long narrow tube to the eyepiece a long way in back. They are the hardest on your neck because of their length for the resulting focal ratio.

All of these except the 6" refractor have computer drive systems to roughly track the stars. The 12" Newtonian and 12" Cassegrain have GPS controlled drive systems while the pair of 8" reflectors have just the drive systems that have to be aligned on Polaris every night for a setup. It is the 8" on the equatorial wedge that I am building a pier mount to try to polar align with a theodolite.

(continued on next page)

Wilson Surveying Company
Surveying, Engineering & Land Planning

1835 S Stewart, Suite 124
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Wilson Surveying Company is seeking an additional PROFESSIONAL SURVEYOR to perform property boundary surveys.

The Professional is expected to:

- Conduct deed and previous survey research on the subject tract and adjoining/nearby properties.
- Plan the project based on the research.
- Conduct a field search for existing monuments.
- Make measurements to determine the relative positions of the existing monuments.
- Determine the boundary.
- Prepare a plat of survey.
- Make appropriate records of the work.

The Professional may work with the client to develop a scope of services and a fee for the services. The Professional is expected to manage the project, so that a profit is realized, including providing assistance in the preparation of billing. The firm principals and administrative staff will assist with the business tasks.
The Professional in this position will have the opportunity to assist the Principals in managing additional professionals as the firm grows, and may have opportunity to become a principal.

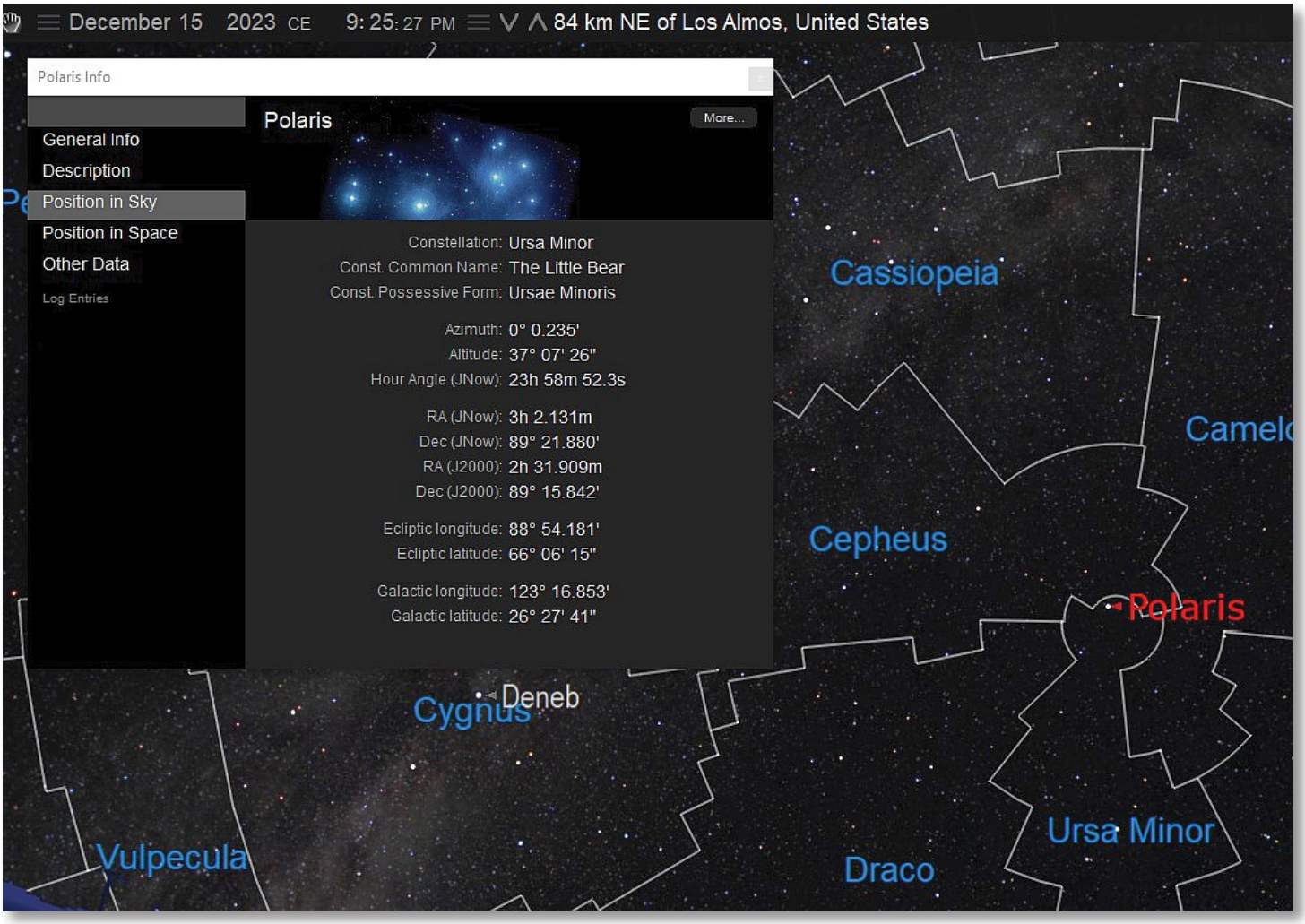
We are a surveying firm with Land Planning and Engineering Services. Wilson Surveying focuses on property boundary work and work associated with development projects. The work includes meeting the requirements of planning and zoning and development regulations in our area. The provides opportunity for more challenging work and occasionally provides the opportunity to assist in boundary dispute resolution. There is an opportunity to conduct construction staking or construction control on the development projects, but we do not pursue construction staking on "heavy civil' work.

Experienced professionals seeking a change are encouraged to apply.

Wilson Surveying is located in Springfield, Missouri. Our clientele is concentrated in Greene & Christian Counties, but we also offer project services in the surrounding counties.

Forward your resume or inquiries to Mark Young, PLS & PE: Mark.Young@WilSurveyInc.com

Shooting Polaris *(continued)*



Starry Nite Pro ephemeris data for Polaris on Dec. 15, 2023, at Upper Culmination (UC in red @ field book azimuth).

Most precision polar alignment techniques use a process called the star drift method that is long and cumbersome for hours at the scope sighting stars for long periods of time to see which way they drift in the eyepiece up and down. The "simplified manual" on how to do this is over twelve pages long!

Getting lined up on Polaris is just the first step in precise polar alignment for a telescope to track the stars for more than about a half hour at high magnification without drifting out of the field of view. Today's CCD chip cameras need more accuracy to shoot for hours at a stretch. Polaris varies from the true north celestial pole by a little over a one-degree circle in 24 hours. This is where my theodolite that reads to six seconds of arc may come in. Also, at longer play is the precession that makes the apparent pole star wobble in a twenty-six-thousand-year 23.4-degree circle to come back to where they started on Polaris. But this long-term spinning top only changes about every 50 years to affect ephemeris tables significantly. The star positions in standard ephemerides changed from 1950 calculations to 1980 when Polaris was closest to true north and now adjusted to epoch 2000 as the separation is now increasing.

But for my purposes I have several planetarium software programs that will give you tables for every celestial object to the nearest second using the current ephemeris tables. So first I lined up my instrument on the two intervisible survey caps

of my lot that were set in 2007 using differential GPS positions for bearings off a 300' backsight. I then turned an angle to the center bolts of the concrete pier to establish a new bearing. The short 30-foot foresight distance was irrelevant because I was just interested in the azimuth.

Now that I had a pretty good azimuth, I occupied the four bolts center position to turn an angle to Polaris for that night. Since upper culmination occurred about a half hour before midnight (Polaris also has lower culmination when it is below the north along with greater eastern and western aspects, but they are in six-hour segments). So, shooting Polaris later in the morning was not an option and at 5:30 pm was too early to be seen. I shot it on five different nights using half hour timings starting at 10 pm and later just took shots around upper culmination once I got comfortable with the process

What was the resulting positional accuracy using all the data and my layout for a true north line for the telescope? That'll be in the next chapter of a future article once I set the telescope on the pier and give it a test drive.

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https://amerisurv.com/2024/03/24/shooting-polaris/

Martin Gutoski has been an amateur astronomer since 1974, an Alaskan Professional Land Surveyor since 1988 and holds a BA and MA in Archaeology from the University of Alaska Fairbanks in 1992 and 2003, respectively. He has lived in Alaska since 1960 but overwinters (snow birding as it is called) in Taos, New Mexico since 2017 to avoid any more winters there but returns to Fairbanks from Memorial Day to Labor Day to do archeology and land surveying when the snow is gone and the sun is up 24/7.

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Nominees for 2024-2025 Officers

President – Chuck Quinby

Chuck Quinby originally From Northeast Ohio, Chuck joined the Army as a Field Artillery Surveyor at age 18. He earned his High School Diploma from Saint Louis High School in Hawaii, an Associate in Arts and A Bachelor of Science from the University of Maryland while on active duty. Progressing through the surveying "ranks" ranks as Chainman, Recorder, Instrument Operator, Computer and Party Chief he served in South Korea, Germany, Fort Bragg North Carolina, Fort Stewart Georgia and Fort Sill Oklahoma. He attained the position of Chief Surveyor in the 3rd Armored Division, customarily an E-7 positions while still an E-5. His service included being an instructor of Surveying and Land Navigation as well as a Training Developer before closing his Army career in 1993. Chuck began his civilian surveying career in Snyder Oklahoma as an Instrument Operator. Working his way back to Ohio he returned to school to enhance his transition from Army surveying to civilian land surveying at Columbus State Community College. An opportunity with ABNA Engineering brought him to St. Louis in 2001. He is presently Surveyor of Record at Engineering Design Source Inc. in Chesterfield Missouri. A four time President of the Saint Louis Chapter of MSPS, and their current Treasurer.

President-Elect – Mark W. Wiley

Mark is a second-generation land surveyor and has contributed to the Missouri Surveyor newsletter with articles; "Who remembers the Golden age of surveying?" and "Direct & Reverse, Surveying?"

He has presented at several MSPS workshops and Annual Meetings addressing the following topics:

- Survey Cost Analysis
- Understanding the Boundaries of the Profession Ethics and the Professional Surveyor
- Reading and writing Boundary Descriptions
- Safety for Surveyors
- He revised the Safety Manual for Surveyors, originally prepared by MARLS in 1973

Licensed in Missouri and Illinois, he has completed surveying related courses at St. Louis Community College, Mineral Area College and the University of Missouri -Rolla (Missouri S & T). He began his career prior to 1978 working for his father during the summers and on weekends. He has continued in the surveying profession ever since.

He opened and operated Advanced Land Surveyors Inc. in Ste. Genevieve from 1994 to 1999 and worked at Heideman and Associates Inc. from 1999 to 2021.

He has worked in Metro St. Louis, Springfield and the counties of Jefferson, Ste. Genevieve, St. Francois, Franklin and Washington during his 45+ year career.

He currently manages the Surveying Studio for SWT Design Inc.

He has donated time and effort over the past years with the MSPS Legislative and Standards Committees, believing that "all evil needs to succeed is for the good people to do nothing.

He serves as Pastor of three Presbyterian congregations in the towns of Ironton, Hillsboro and Park Hills.

He is active in his community serving as President of the Belews Creek Watershed Partnership, a group of local folks working to make a difference in the watershed by both cleaning and stabilizing the creek.

Vice President – Chris Ferguson

Chris Ferguson is the Boundary and Title Program Manager for the Mark Twain National Forest, headquartered in Rolla. The Forest covers nearly 1.6 million acres and is comprised of more than 7200 miles of Ozark boundary line throughout 29 counties across South Central Missouri.

Chris began his surveying career by enlisting in the U.S. Marine Corps and served over 23 years in active and reserve status. His final posting was as the senior Artillery Survey Officer for the 4th Marine Division. Meanwhile, he worked his way from rodman to manager at various St. Louis area firms. That led to running his own company for over a decade highlighted by projects such as Busch Stadium, STL-Lambert International Airport Expansion and the Gateway Arch grounds. He joined the USDA-Forest Service in 2009 as the Rolla District Surveyor.

Along with Missouri registration, Chris holds licensure in other Midwestern states remaining active in Kansas and Arkansas and is also a Certified Federal Surveyor (CFedS) and a Certified Floodplain Manager (CFM®).

He is proud to be an involved member of MSPS as the current Secretary/Treasurer and Chairman of the Membership Committee. Previously, he was the St. Louis Chapter President (2004) in addition to serving on or chairing various committees over the last thirty years. Although retirement beckons to finally spend more time with his lovely wife Beth and their kids and grandkids (and maybe a few more chances to fish, hunt, and golf), Chris welcomes the opportunity to give back to the profession that has given him so much and serve as your Vice President.

Secretary-Treasurer – Matthew P. Thomas

Matthew (Matt) is a sixth-generation Missourian and a second-generation Land Surveyor. He's currently the Professional Land Surveyor for Great River Engineering working out of their Jefferson City office. Matt has been surveying full time since 1988 and obtained his Professional Registration in 2000. He is the second of two sons in the surveying profession of Price S. Thomas, PLS 847. He first "surveyed" working for his father at the ripe old age of 10. That first experience convinced him that this is what he wanted to do for a career. He is also a second-generation County Surveyor following in his father's footsteps as a former Cole County Surveyor. He has worked for the City of Columbia, Brush & Associates, Miller Associates, Crockett Engineering Consultants, A Civil Group and The State Land Survey Program. He has also volunteered his professional services traveling to Africa with Engineering Ministries International on three separate occasions, visiting 8 different countries including Sierra Leone, Tanzania, Zambia, Zimbabwe, and South Africa. He has been a member of the Missouri Society of Professional Surveyors for over 20 years and currently chairs the History and Archives Committee. He is also a Past President of the Missouri Association of Professional County Surveyors.

Matt lives in Chamois, Missouri with his better-half, Carrie Hammond. He is also an active Mason and spends most of his time away from work, trying to improve his property or helping around his community.

In his spare time, which he admits is limited, Matt enjoys hunting, fishing, camping, floating, photography, geocaching, genealogy research, and spending time with his family.

Secretary-Treasurer – Scott Faenger

Scott Faenger is the Missouri State Land Surveyor and the Director of the Department of Agriculture's Land Survey Program located in Rolla, Missouri. He was introduced to the profession in the early 1990's when he answered a laborer want ad in Houston, Texas and spent that summer locating pipeline for a surveying /engineering firm. He went on to become a party chief with that company. He has also worked for land surveying firms in Arkansas and Missouri and has been with the Land Survey Program of Missouri for the past 20 years. Scott started with the Land Survey Program in 2003, as an instrument man with the Missouri's State Parks survey crew. In 2005, he transferred into the Land Survey Program's Cadastral Section and has been a part of numerous township wide, county line, and state line projects that involve restoring or reestablishing corners of the United States Public Land Survey System. In February 2022, Scott became Missouri's 5th State Land Surveyor and the Director of the Land Survey Program. The Land Survey Program is responsible for preserving and protecting the United States Public Land Survey corners and state and county boundary markers, providing the framework for all geodetic positioning activities in the state; collecting, preserving, and providing copies of land survey records; and disseminating regulations designed to assist in uniform and professional surveying methods and standards for the State of Missouri. Scott is currently a member of the Missouri Society of Professional Surveyor's Board of Directors and serves on the history committee and the public relations/sales committee. He resides in Rolla with his wife, Patty.

Nominees for 2024-2025 Board of Directors

Brian D. Viele

Brian Viele graduated from Southwest Missouri State University in 1983 with a BS in Geology and began his surveying career in 1984 at Moore & Wolfinbarger in Springfield, Missouri. He earned a Missouri PLS license in 1992 and served as Vice-President and Survey Manager at the Howard Moore Group, owned and operated Landmark Surveying and Consulting, LLC in Springfield from 1996 to 2010, then joined Great River Engineering as its Director of Surveying where he is currently employed. In addition to his production work at Great River Engineering (GRE), Brian coordinates surveying activities for GRE offices in Springfield, Kansas City, St. Louis, Branson, and Jefferson City. Brian has been active in MSPS over the years, twice serving as President of the Ozark Chapter, and was an instructor at Missouri State University where he taught surveying courses for 12 years. He is also an Arkansas Professional Surveyor and a Missouri Registered Geologist. When time allows, Brian enjoys music, gardening, mountain hiking, rock collecting, and entertaining his five grandchildren. He resides in eastern Greene County with his wife of 42 years.

Brian A Atnip

Brian Atnip is co-owner and Professional Surveyor at MJSurveying LLC, Joplin MO.

Under his ten-year leadership, MJSurveying LLC has grown by 500%.

Having 30 years of experience in the surveying profession, Brian started his survey career at MoDOT in 1994 where he worked 19 years, serving in various capacities and multiple areas and districts in the state.

While working in the Kansas City District office he pursued his professional license and took classes at Longview Community College in Lee's Summit, and attained his Missouri Professional Surveyor license in 2008.

Brian has served the last 10 years as the Dade County Surveyor.

He serves currently as a Board Director for the Southwest Chapter of the Missouri Society of Professional Land Surveyors.

Brian prides himself in his work ethic, customer service, and ability to provide the best quality surveys for every client. He believes it is all about relationships, being an effective communicator, and treating everyone fairly.

Brian enjoys spending time with his wife Debbie, and is very proud of their 4 grown kids.

He is an avid Kansas City Chiefs, and St. Louis Cardinals fan. Brian has enjoyed being a high school football referee for 26 years and loves participating in his church, golfing, and giving back to his community.

Norman D. Ellerbrock

Norman is founder and President of Four Points Land Surveying & Engineering, Inc. in Hannibal, MO. Norm started his surveying career in 1989 in Dayton, Ohio. He received his Missouri P.L.S. license in 2001, his Illinois license in 1995 and Iowa license in 2018.

Norm is Past President of the Illinois Professional Land Surveyors Association and Past President of the Sangamon Valley Chapter. He has been on the NSPS CST Board since July, 2018 and is currently the CST Board Chair. Norm is also the CST Committee chair for MSPS. Norm is the current President of the Quincy After Dark Rotary Club.

Norm enjoys running the business and being involved in the day to day surveying activities. He does miss being able to get out and work in the field. Researching the historical documents related to surveying is one of the highlights of the job he especially likes. Norm's surveying career has been mainly focusing on boundary surveys.

Norm lives in Palmyra, Missouri with his wife Suzanne. They have 3 grown children and 5 grandchildren. Norm enjoys reading, working in the yard, teaching the grandchildren how to operate the tractors and traveling.

Tom Barnard

Tom is a Professional Land Surveyor based out of South-Central Missouri. From an early age, Tom had a great interest in surveying and drafting. He received a degree in Engineering Technology from Missouri State University in 2003 and worked for Perennial Energy as a draftsman for gas handing systems. In 2005, he began his surveying career at the Missouri Department of Transportation in Willow Springs, as a design technician, and later as a survey technician. During his tenure at MoDOT, he received his surveying education from the University of Wyoming and Missouri State University. He entered the Land Surveying in Training Program in 2010 and was licensed in 2016. In 2017, Tom left the Highway Department to pursue his own practice and has since, operated Southern Missouri Surveying, LLC, in West Plains, Missouri. Tom is a member of the Missouri Society of Professional Surveyors (MSPS). Tom and his wife of 19 years reside in Howell County, Missouri, along with his two daughters, and spends much of his free time outdoors- traveling, hunting, fishing, and playing golf.

Membership: Current MSPS member and have been for several years.

A Grateful Farewell: Reflecting on 33 1/2 Years of Service

by Judy Kempker, Executive Director (ret.), APEPLSPLA Board

As I sit back and reflect on an illustrious career spanning over three decades, I find myself standing at the threshold of a new chapter, bidding farewell to a role that has been both my passion and my purpose. For 33 1/2 years, I have had the honor and privilege of working for and serving as the Executive Director of the Missouri Board for Architects, Professional Engineers, Professional Land Surveyors and Professional Landscape Architects—a journey that has been nothing short of extraordinary.

When I first embarked on this journey over three decades ago, I could have never imagined the profound impact it would have on my life and the lives of countless others. From the very beginning, I approached my role with a deep sense of responsibility, integrity, and a commitment to upholding the highest standards of professionalism and excellence.

Over the years, I have had the privilege of working alongside some of the most talented and dedicated professionals in the field. Together, we have tackled challenges, navigated changes, and strived to ensure that our regulatory practices evolve with the ever-changing landscape of the industry. From drafting regulations to adjudicating complaints, every decision made was guided by a steadfast dedication to serving the best interests of the public and upholding the integrity of our professions.

But beyond the regulatory aspect of my role, what has truly made these 33 1/2 years meaningful are the relationships forged and the lives touched along the way. From architects and engineers to land surveyors and landscape architects, I have had the pleasure of collaborating with individuals who are not just experts in their fields but also compassionate, driven, and deeply committed to making a positive impact on the world around them.

Together, we have celebrated milestones, weathered storms, and worked tirelessly to advance our professions to ensure the health, safety, and welfare of the public. Each day brought new challenges and opportunities for growth, and I am immensely proud of the progress we have made along the way; especially, in keeping our licensing fees the lowest in the nation while continuing to provide excellent customer service. And I'm confident that progress will continue under the new leadership of my successor, Ms. Rhonda Bullock, who has served as my Executive Assistant for the past two years. I have witnessed firsthand Rhonda's dedication, her intellect, and her unwavering commitment to the Board's mission and values; therefore, I am convinced she will carry on the tradition of strategic planning and the drive for positive change while leading with humility, empathy, and a genuine desire to serve the best interests of the Board as well as its licensees and stakeholders.

(continued on page 26)

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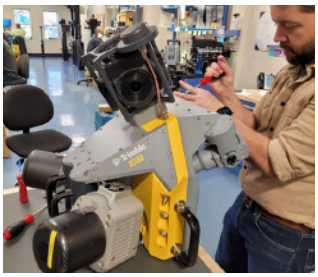


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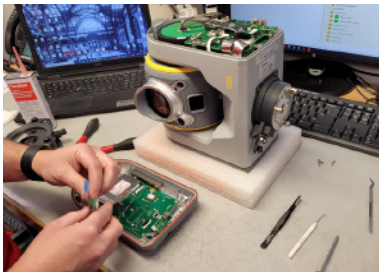


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NOAA's New Geodetic Datum

Replacing NAD 83 and NAVD 88 have been in the works for a long time; now the change is getting near.

by Juan Plaza, xyHt, April 8, 2024

The surveying and geospatial communities in the United States have been using geodetic datums that were designed and implemented at a time when the Global Positioning System (GPS) was in its infancy. Yes, we are referring to NAD 83 and NAVD 88, the horizontal and vertical geodetic datums that have been in use for decades. Well, changes are coming to the nation's positioning infrastructure and all our geospatial data.

The National Geodetic Survey (NGS), which sits within the National Oceanic and Atmospheric Administration (NOAA), is responsible for defining, maintaining, and providing access to this positioning infrastructure, called the National Spatial Reference System (NSRS). Since 2007, NGS has been working to overhaul the NSRS as part of a herculean modernization program. Horizontal positions are currently defined by the North American Datum of 1983 (NAD 83). This will be replaced by four tectonic plate-fixed terrestrial reference frames, which will provide latitude, longitude, and ellipsoid height information referenced to specific epochs in time. Vertical positions or elevations are currently defined by the North American Vertical Datum of 1988 (NAVD 88) in the contiguous United States (CONUS). Other states and territories have their own vertical datums. These will be replaced with the new geopotential datum, partly including a geoid model that spans the entire northwestern quadrant of Earth.

The new datum and reference frames will be accessible nearly anywhere, removing the need to rely solely on aging physical infrastructure like survey marks, which currently help define NAD 83 and NAVD 88. The new terrestrial reference frames that will replace NAD 83 will be accessed via reference stations that continuously receive Global Navigation Satellite Systems (GNSS) data like GPS. These reference stations are known as CORSs, or Continuously Operating Reference Stations, some of which are maintained by the NGS as part of the NOAA CORS Network (NCN). This continuous GPS data allows NGS to estimate errors introduced into GPS measurements, such as those from changing conditions in the atmosphere, particularly water vapor and precipitation. This information is then used by NGS's Online Positioning Users Service (OPUS) to process user submitted data and improve the accuracy of the resulting coordinates.

Users can use OPUS to help accurately determine any geometric position, which includes latitude, longitude, and ellipsoid heights, computed using an ellipsoid model of the earth. An ellipsoid is used as a rough approximation of the shape of the earth; however, we know that the earth is not a perfect ellipsoid. As a result, we need other models to fill in the picture.

The first type are digital elevation models that reflect the varied topography of the earth, including features such as mountains, valleys, rivers, and shorelines. The second type are models of gravity, such as the geoid models, that relate to the varying strength of gravity according to the mass of the underlying land, with highs in mountainous regions and lows in less dense areas. Combining ellipsoid heights from GNSS with a new NGS geoid model will define orthometric heights (colloquially called "heights above sea level") in the modernized system.

GNSS Receiver measuring a precise static location in Cook Inlet, Alaska.

GNSS Receiver measuring ground subsidence in Newport, Rhode Island.

Galen Scott, NGS constituent resources manager at NGS, said the changes are not only exciting, but hugely relevant for our industry.

"The current vertical datum for CONUS and Alaska, NAVD 88, was developed by adjusting together 2.2 million kilometers (1.36 million miles) of geodetic leveling data collected by surveyors walking across the country making precise observations between nearly 800,000 benchmarks over the course of nearly a century," Galen said. "It was a huge effort that resulted in a very accurate model using the best science of the time. But things have changed, and the reality today is that satellite data is critical to most of the geospatial data workflows now used across the industry.

GNSS receiver measuring ground subsidence in Newport, Rhode Island.

"The new geopotential datum and terrestrial reference frames will take advantage of many technological advances and will provide a foundation for geospatial data that is not only more accurate and more accessible, but nationally consistent, aligned to international standards, and aligned to our current understanding of the center mass of the earth, around which all our positioning satellites orbit. All of these updates together will enable us all to get more out of our geospatial data sets than ever before."

The centerpiece and one of the most impressive accomplishments of the NSRS modernization program was GRAV-D, or Gravity for the Redefinition of the American Vertical Datum project.

"The new reference frames will rely primarily on GNSS, such as GPS, as well as on a gravimetric geoid model resulting from the GRAV-D Project," Galen emphasized.

According to NGS, these new reference frames will be easier to access and to maintain than the current NSRS, which relies on physical survey marks that deteriorate over time.

(continued on next page)

NOAA's New Geodetic Datum *(continued)*

"Some issues that were not well accounted for in the current NSRS are continental drift and land deformation. But this time we have designed the modernized system to better account for these important types of changes on our dynamic planet," says Galen. "Historically, we lumped together the North American and Caribbean tectonic plates for NAD 83. Now we understand and can measure how those plates rotate individually, so this time we have defined four Terrestrial Reference Frames (TRFs) for the four tectonic plates within our areas of responsibility. These include NATREF2022, PATREF2022, MATREF2022, and CATREF2022 named for the North American, Pacific, Marianas, and Caribbean plates, respectively. We've also introduced reference epochs for coordinates, that are like timestamps for survey data to help us make sense of changes in the landscape over time."

Another big issue that was addressed during the preparations for the release of the new NSRS was the exact definition of the center of mass of the earth.

GNSS receiver measuring a precise static location in American Samoa.

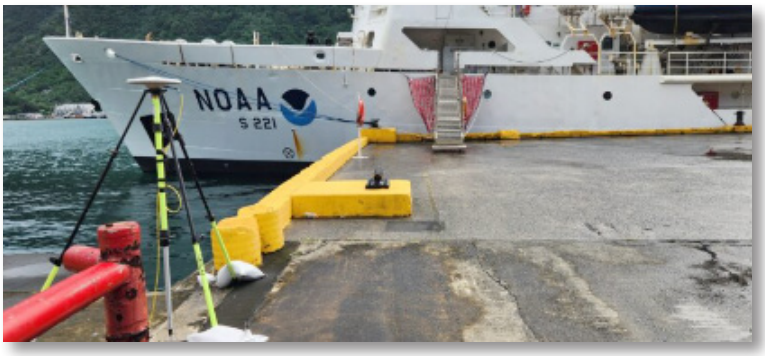
"I know that it sounds strange, but NAD 83 was not geocentric." Galen said. "Over the decades, scientists have perfected our understanding of the exact location of the center of mass of the earth. This is essentially the point around which the earth rotates and satellites orbit. NAD 83 is non-geocentric by about 2.2 meters (7.2 feet) which complicates the matter when using GNSS satellite data.

In CONUS, NAVD 88 is both biased (by about one-half meter) and tilted (about one meter coast to coast) relative to the best global geoid models available today. In addition to this bias and tilt, NAVD 88 suffers from the fact that it was made from old leveling data on marks that may have moved since they were surveyed, and the update process used did not effectively account for vertical land motion over time. All these issues are being addressed in the modernized system.

The new terrestrial reference frames will be completely geocentric and will rely on GNSS data that does not deteriorate over time and is much harder to remove by external forces.

"Another historical fact that might sound superfluous, but it plays a key role in the accuracy of the new model is that in the past the crews working on horizontal measurements and vertical measurements were different," Galen said. "Now the geometric and geopotential (or horizontal and vertical) systems are defined together and that will bring an extra layer of consistency to the new system."

So, when will the new system be available?



GNSS Receiver in front of a NOAA research vessel in American Samoa.

"Well, it's not a binary answer or a day and night deployment," Galen said. "This is an enormous undertaking, and it will not all come out at once. In fact, we just had a webinar called Progress Toward a Modernized NSRS on February 8, 2024, that explained the remaining steps and timelines. In a nutshell we will be rolling out modernized NSRS components onto NGS's BETA website beginning in mid-2024 and are aiming for all the data and a limited set of tools to be available by mid-2025.

As each component is rolled out, it can be tested and the process of being incorporated into geospatial data workflows can begin. Once all components are available, another full six months of testing will continue, culminating in the actual replacement of the current NSRS with modernized NSRS sometime in 2026.

However, the time to prepare is now. While tools will be available to facilitate the transformation of specific position information, it can take years to change products, services, or databases. Surveyors and geospatial professionals may want to begin examining the metadata of current databases and records that may be impacted and plan for the effort required to transition them to the new system based on the accuracy requirements of the data and related products. For more information, check out the Transitioning to the Modernized NSRS section within the NGS Blueprint 3 document.

Another issue that might be important to examine as an industry is that many state and other governmental entities passed laws requiring that public works or maps reference NAD 83 or NAVD 88 and many private contracts have similar references. Those laws or contracts will need to be changed to refer to the current version of the NSRS, and examples are available on the NGS "Get Prepared" page. Starting to plan now will help you be well positioned for the change.

"The benefits of the new system are not quantified just in terms of accuracy, but there's also a huge economic impact that will take place over 10 years." Galen said.

An economic study by NOAA was commissioned to look at the financial benefits of updating horizontal and vertical datums to more accurately reflect the satellite-based nature of our profession today and in the years to come. The study mentions that the overall number of persons employed in surveying and mapping is estimated between 170,000 and 200,000.

The study concludes that a conjectural estimate of the net benefit of GRAV-D is in the vicinity of $240 million per year. The present discounted value of benefits of $240 million per year over 15 years is $2.2 billion. Combining the benefits of the $2.6 billion estimate of the benefits of GRAV-D in avoided costs of expensive long distance geodetic leveling with the $2.2 billion from improved floodplain management yields a combined estimate of the present value of benefits of GRAV-D over 15 years of $4.8 billion.

"We are confident that the transition to a modernized NSRS will contribute greatly to the accuracy of the mapping in the country, and it will allow surveyors and geospatial professionals to adapt their methodologies and workflows to the new system in a way that would benefit all involved," concluded Galen.

For further information about the specific changes and to keep track of the specific release dates, go to www.geodesy.noaa.gov and subscribe to the different newsletters that are updated continuously.

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https://www.xyht.com/gnsslocation-tech/noaas-new-geodetic-datum/

Article by Juan B. Plaza
Juan B. Plaza is a drone and general aviation consultant based in Boca Raton, Florida. He specializes in modern uses for manned and unmanned aviation in the areas of mapping, lidar, and precision GNSS. He is also a commercial pilot and frequently flies photogrammetry missions in Cessna Citation jets and Piper Aztec light twin.

A Grateful Farewell *(continued)*

Knowing that I am leaving the Board in very capable hands, I bid farewell to this chapter of my life; but, as I do so, I am filled with a profound sense of gratitude—for the support of my Board Members and staff, the trust of our licensees and the public, and the countless memories that will forever be etched in my heart. While my time as the Executive Director comes to an end on June 30th, I am excited for the journey that lies ahead. Retirement beckons with promises of leisure, exploration, and the freedom to pursue new passions. But as I embark on this new adventure, I carry with me the lessons learned, the friendships forged, and the knowledge that the work we have done together has made a lasting difference in the lives of many.

To my Board Members and staff (both former and current and all of whom I will consider forever friends), professional partners, and licensees—**THANK YOU** for 33 1/2 years of shared experiences, collaboration, and camaraderie. It has been one of the greatest honors of my life and a sincere privilege to serve alongside you, and I look forward to the next chapter spending more time with my family, traveling, relaxing, and whatever else it may hold.

Until we meet again, farewell.

A Warm Welcome

Ms. Rhonda Bullock is the new Executive Director of the Missouri Board for Architects, Professional Engineers, Professional Land Surveyors and Professional Landscape Architects. Ms. Bullock has assumed all responsibilities of her new role since the retirement of Ms. Judy Kempker.

Ms. Bullock has served as Ms. Kempker's Executive Assistant for the last two years and brings a wealth of experience and expertise to her new role and is poised to continue the legacy left by Ms. Kempker, who dedicated 33 1/2 years to the organization. Ms. Bullock is well-equipped to guide the Board forward, ensuring the highest standards of professionalism and integrity.

Under Ms. Bullock's guidance, we are confident that the Board will continue to thrive and serve the public interest with distinction so please join us in welcoming Ms. Bullock to this pivotal role, as we look forward to a future of continued excellence and achievement.

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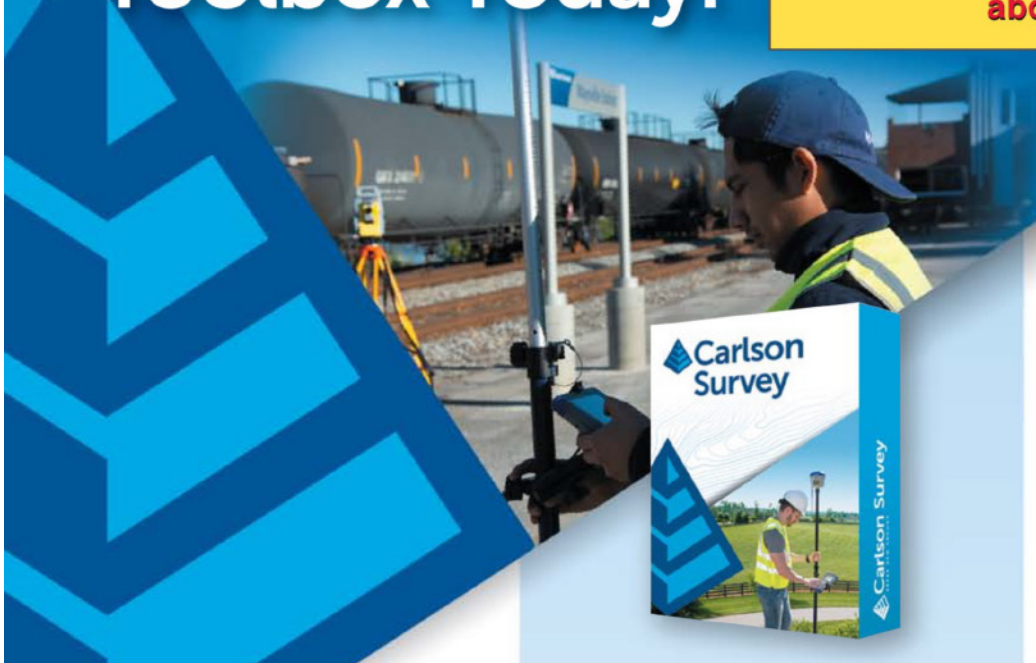

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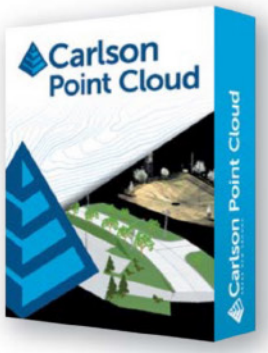

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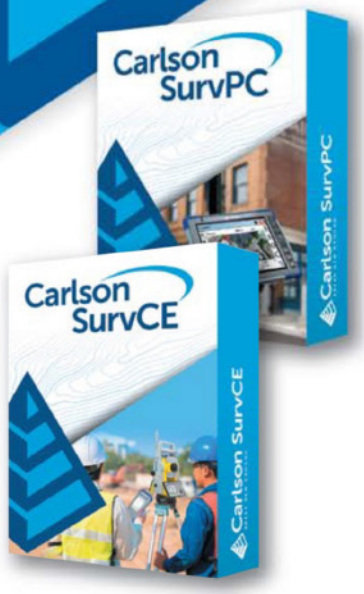

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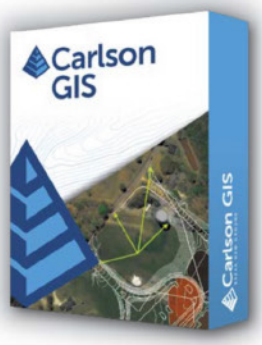

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Industry Report

Mapping the Mood of the Geospatial Community from GIM International

by Don Martin

Editor's Note: GIM International has published a report on their annual reviewing the issues and challenges facing related fields in the realm of surveying and mapping. Readers of *Missouri Surveyor* are invited to read the full report for themselves at:

https://www.gim-international.com/content/article/mapping-the-mood-of-the-geospatial-community

"The *GIM International* annual industry survey is about 'taking the temperature' of the geospatial industry once a year and exploring the prevailing attitudes among land surveyors around the world. Notable findings this year include renewed interest in drones, remote sensing technologies being embraced by smaller survey companies, concerns about the growth of new geoprofessionals, and uncertainty about the economic and geopolitical situation. Needless to say, we gauged our readers' opinions on AI: what do they expect from artificial intelligence, and how can it evolve from a buzzword to practical applications? Read on for your peers' insights into these and many other topics!" - *by Wim van Wegen, March 19, 2024, GIM International*

In *Mapping the Mood of the Geospatial Community*, Wim van Wegen summarizes the findings of an annual review of surveying related fields akin to the manner of a business SWOT analysis. This offers an informative macro view of technological, political, societal and economic matters impacting those engaged in the practice of geospatial professions. Some of what they have identified includes:

Business challenges resulting from:

- *Difficulty in finding skilled personnel*
- *Keeping up with technology*
- *Impact of geopolitics*

Emerging opportunities from:

- *Capital improvements and infrastructure projects*
- *Supporting sustainability efforts*

Visit the GIM International website for this report and more. They offer insightful content, critical news and tracking of new developments in the world of geomatics.

https://www.gim-international.com

Introduction to the Civil GPS Service Interface Committee

Civil GPS Service Interface Committee

The Civil GPS Service Interface Committee (CGSIC) is the worldwide forum for effective interaction between all civil GPS users and the U.S. GPS authorities. The U.S. Coast Guard Navigation Center (NAVCEN) coordinates and manages CGSIC in cooperation with the Department of Transportation.

Purpose

The Department of Transportation established CGSIC to exchange information about GPS with the civil user community, respond to the needs of civil GPS users, and integrate GPS into civil sector applications. Information from CGSIC members and meetings is provided to United States GPS authorities for consideration in GPS policy development and GPS service operation.

Public Participation

CGSIC meets annually and is open to anyone interested in civil GPS issues. Membership is free, and there is no fee to attend any CGSIC meeting. CGSIC includes members from U.S. and international private, government, and industry user groups.

Air Force presentation in front of a CGSIC audience.

Those wishing to become a contributing participant and agree to be contacted for input on matters pertaining to your organization or expertise, should complete the CGSIC registration form on the NAVCEN website:

https://www.navcen.uscg.gov/contact/cgsic-registration-form

Surveying, Mapping, and Geo-Sciences (SM&G) Subcommittee

The SM&G Subcommittee provides an open forum for civil user information exchange concerning the use of GPS by surveying, mapping and geo-science organizations, recommending appropriate action on those issues which concern their user needs. The subcommittee works to identify the common needs of the geo-science community for GPS information,

(continued on next page)

Introduction to the Civil GPS Service Interface Committee *(continued)*

respond to such requests and concerns submitted by this user community, and forward issues to the full CGSIC. The subcommittee is chaired by John Galetzka of NOAA's National Geodetic Survey (john.galetzka@noaa.gov).

Surveying & Mapping

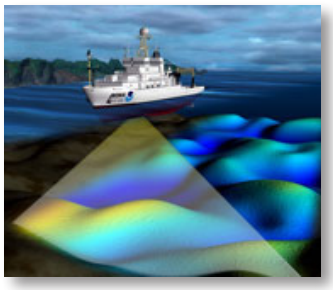
The surveying and mapping community was one of the first to take advantage of GPS because it dramatically increased productivity and resulted in more accurate and reliable data. Today, GPS is a vital part of surveying and mapping activities around the world.

When used by skilled professionals, GPS provides surveying and mapping data of the highest accuracy. GPS-based data collection is much faster than conventional surveying and mapping techniques, reducing the amount of equipment and labor required. A single surveyor can now accomplish in one day what once took an entire team weeks to do.

GPS supports the accurate mapping and modeling of the physical world — from mountains and rivers to streets and buildings to utility lines and other resources. Features measured with GPS can be displayed on maps and in geographic information systems (GIS) that store, manipulate, and display geographically referenced data.

Governments, scientific organizations, and commercial operations throughout the world use GPS and GIS technology to facilitate timely decisions and wise use of resources. Any organization or agency that requires accurate location information about its assets can benefit from the efficiency and productivity provided by GPS positioning.

Unlike conventional techniques, GPS surveying is not bound by constraints such as line-of-sight visibility between survey stations. The stations can be deployed at greater distances from each other and can operate anywhere with a good view of the sky, rather than being confined to remote hilltops as previously required.



GPS is especially useful in surveying coasts and waterways, where there are few land-based reference points. Survey vessels combine GPS positions with sonar depth soundings to make the nautical charts that alert mariners to changing water depths and underwater hazards. Bridge builders and offshore oil rigs also depend on GPS for accurate hydrographic surveys.

Land surveyors and mappers can carry GPS systems in backpacks or mount them on vehicles to allow rapid, accurate data collection. Some of these systems communicate wirelessly with reference receivers to deliver continuous, real-time, centimeter-level accuracy and unprecedented productivity gains.

To achieve the highest level of accuracy, most survey-grade receivers use two GPS radio frequencies: L1 and L2. Currently, there is no fully functional civilian signal at L2, so these receivers leverage a military L2 signal using "codeless" techniques.

The ongoing GPS modernization program is adding a dedicated civil signal at L2 that supports high-accuracy positioning without the use of military signals. The GPS program is also adding a third civil signal at the L5 frequency that will enhance performance even further. After 2020, the government will no longer support codeless access to military GPS signals.

Civil Global Positioning System (GPS)
Service Interface Committee Charter

1. Introduction
The Civil Global Positioning System (GPS) Service Interface Committee (CGSIC) is established by the U.S. Department of Transportation as a function of the Assistant Secretary for Transportation Policy's (OST/P) outreach program to the civil GPS user community.

2. Objectives
- Provide a forum to exchange technical information and collect information on the civil GPS user community's GPS needs.
- Identify information requirements and methods to distribute this information to the civil GPS user community.
- Conduct GPS information studies on civil user needs as requested by DOT or identified by the Committee.
- Identify any GPS issues that may need resolution and submit them to appropriate authorities for consideration.

3. Committee Composition
The CGSIC is comprised of representatives from relevant private, government, and industry user groups, both U.S. and international. The Committee structure consists of a chair, two deputy chairs, an Executive Secretariat, and an Executive Panel. The Committee is chaired by the Director, Radionavigation and Positioning in OST/P. The first Deputy Chair is Commanding Officer, the U.S. Coast Guard Navigation Center (NAVCEN). The Commanding Officer of NAVCEN is supported by an Executive Secretariat and manages the Committee, maintains membership roles, coordinates Committee meetings, represents the Committee Chair at GPS related meetings, and coordinates responses to submitted issues. The second Deputy Chair is the Deputy Chair for International Affairs and is a non-U.S. representative appointed by the Chair with the approval of the Executive Panel. The Executive Panel consists of the Chair, Deputy Chairs, Subcommittee chairs, a representative from the GIAC, and representatives from three modal areas:

- Aviation - a representative designated by the Federal Aviation Administration to address aviation issues,
- Land - a representative designated by the Federal Highway Administration to focus on land, reference station, and timing issues, and
- Marine - a representative designated by the U.S. Coast Guard to address maritime issues.

4. Subcommittees
The CGSIC may create standing subcommittees, ad hoc subcommittees, or special working groups to work specific areas of civil GPS user needs and facilitate technical information exchange. Standing subcommittees have been established for the:

- International Information
- Timing
- U.S. States and Local Government
- Survey, Mapping, and Geo-Sciences

Standing committee chairs will be elected by the subcommittee members for a two-year term. Elections will be held in conjunction with a general meeting.

5. Administrative Guidelines
The administrative guidelines for the CGSIC are:

- The committee will meet as often as needed, but not less than annually. The date, time, and location will be announced at least two months before each meeting.
- A Summary Record of each meeting should be mailed to members as soon as possible after the meeting on the U.S. Coast Guard's Navigation Center's web site.
- Attendance is open to anyone with a need to exchange information or provide input regarding civil GPS requirements, both domestic and international.
- The Chair or Deputy Chair will make every effort to attend all subcommittee meetings. If unable to attend, the Chair or Deputy Chair will answer questions submitted in writing.
- The Commanding Officer of NAVCEN will coordinate meeting arrangements, agendas, produce Summary Reports, and maintain membership lists.

(continued on next page)

Introduction to the Civil GPS Service Interface Committee *(continued)*

Surveying, Mapping, and Geo-Sciences Subcommittee Charter

1. Introduction
The Civil Global Positioning System (GPS) Service Interface Committee (CGSIC) is established to identify civil GPS user needs in support of the Department of Transportation's (DOT) Civil GPS Service (CGS) program and as a function of the Assistant Secretary for Transportation Policy's (OST/P) outreach program to the civil GPS user community. The CGSIC charters several subcommittees that focus on various disciplines within the GPS user community. The Surveying, Mapping, and Geo-Sciences Subcommittee of CGSIC is chartered for the following purposes:

2. Objectives
- To provide an open forum for civil user information exchange concerning the use of GPS by surveying, mapping and geo-science organizations, recommending appropriate action on those issues which concern their user needs.
- To identify the common needs of the geo-science community for GPS information, respond to such requests and concerns submitted by this user community, and forward issues to the full CGSIC.
- Identify information requirements and methods to distribute this information to surveying, mapping, and geo-science users of GPS.
- To maintain a list of active points of contact in the surveying, mapping and geo-science community which support CGSIC activities.
- To conduct GPS information studies on civil user needs among the surveying, mapping and geo-science community.
- To effectively support the CGSIC's role under the National Space-Based Positioning, Navigation, and Timing (PNT) Executive Committee.

3. Definitions
"Surveying, Mapping and Geo-Sciences" refers to the community of civilian government agencies, businesses and academic organizations of all 50 states, the District of Columbia, Puerto Rico, U.S. possessions and territories that utilize GPS signals as part of their infrastructure.

"Common needs" refer only to those of civilian governmental, institutional, educational and private agencies, and exclude all requirements arising from defense considerations.

"GPS Information" consists of all forms of information about GPS, including but not limited to:
- Operational GPS status information, as provided by the US Department of Defense;
- GPS systems information;
- GPS applications information.

4. Sub-Committee Structure
The Sub-Committee is formed by the US Department of Transportation Civil GPS Service Interface Committee (CGSIC).

The Sub-Committee is entitled the "Surveying, Mapping and Geo-sciences"

The Sub-Committee will have a Chair, Deputy Chair, and Secretary, and may appoint additional officials or working groups at its own discretion.

Attendance at Sub-Committee meetings is encouraged by any individual or representative of any surveying, mapping and /or geo-science organization.

5. Sub-Committee Guidelines
The work of this Sub-Committee is to be coordinated with that of other Sub-Committees.

Meeting reports are to be distributed via the US Coast Guard Navigation Center (NAVCEN), which acts as the CGSIC secretariat, according to address lists maintained by the Sub-Committee.

The Sub-Committee is to maintain a list of points of contact within the surveying, mapping and geo-sciences community.

The Sub-Committee may arrange its own separate meetings at any time and place as announced. Delegates attend meetings at their own expense.

The Sub-Committee will address other related matters concerning GPS applications as deemed appropriate by the Sub-Committee.

National Geodetic Survey

Positioning America for the Future

NOAA offices update VDatum grid for Gulf of Mexico

July 29, 2024

CO-OPS, NGS, and OCS released a new version of the Vertical Datum Transformation, **VDatum 4.7**, which includes a revised grid for the western Gulf of Mexico. A revolutionary software system, VDatum translates geospatial data among 36 different vertical reference systems and removes the most serious impediments to data sharing. Geospatial data can be seamlessly integrated to improve floodplain mapping, coastal and emergency management, and natural disaster preparedness, which benefits the U.S. public. Similar enhancements are underway for VDatum grids in the remainder of the Gulf of Mexico, Alaska, Atlantic, and certain Pacific regions.

Beta release of modernized reference system

June 28, 2024

NGS will begin using its **Beta Product Release Site** to promote public testing of modernized National Spatial Reference System products and services. A new web design and up-to-date content makes the beta site easier to find and promote. This design change also allows for better cross-promotion of items found in recent NGS News Bulletins, such as new online tools for land surveyors and short outreach videos in Spanish.

https://beta.ngs.noaa.gov/

(continued on next page)

NGS conducts outreach at surveying and geomatics conference

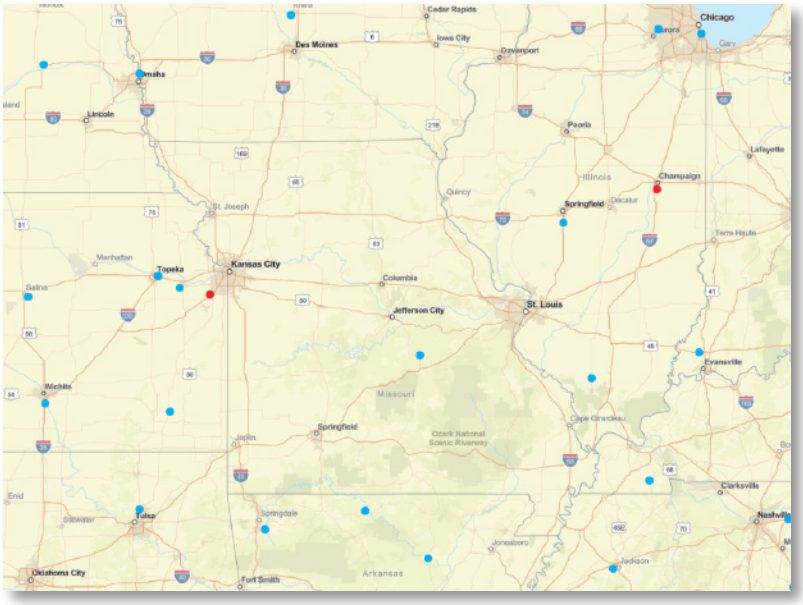
June 21, 2024

Acting NGS Director Brad Kearse, the NGS senior advisor for geodesy, and multiple NGS staff presented sessions and served as panelists on topics concerning the 2025 **modernization of the National Spatial Reference System**, or NSRS, at the biennial Utility Engineering and Surveying Institute, or UESI, conference in Corvallis, Oregon. Attendees provided feedback concerning the modernized NSRS that will help state, regional, private sector, and academic groups adopt and transition to the new system. NGS staff also led workshops on the **Vertical Datum Transformation** software to convert elevation data from different sources into a common reference system and on the **State Plane Coordinate System** of 2022. The American Society of Civil Engineers' UESI hosts the biennial conference for surveyors, engineers, and academics in partnership with the Oregon State University, the Surveying and Geomatics Educators Society, and the American Association for Geodetic Surveying.

NGS Introduces Four New Online Tools

May 24, 2024

NGS released four new online tools to the public on the **geodesy.noaa.gov** website after the tools were extensively tested on the NGS Beta site. The release enhances access to NGS products, including **DSWorld Web**, which enables users to submit updated information on survey marks available on NGS datasheets; the **Leveling Projects Page** that simplifies searches for mark and observation information for an entire leveling project; the **Calibration Base Line, or CBL, Web Map** that provides quick and easy access to the latest CBL information; and the **Passive Mark Page** that offers user-friendly datasheet access — including photos, graphics, maps, and project information.



NGS Calibration Base Line (CBL) Map, zoomed in on Missouri and surrounding areas. The blue dots represents the current status of a CBL as 'good.'

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P.O. Box 234 • Loose Creek, MO 65054
kliethermesresearch@gmail.com
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Office: 573 634•3455
Fax: 573 634•8898
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Nolte Wins Primary Election!

Land Surveyor and MSPS past President Mark Nolte of Higginsville has won the Republican primary election for Missouri's House of Representative 51st District. Nolte has spent much of his surveying practice within the boundaries of District 51 in Lafayette and Saline counties. He grew up on a farm in Lafayette County.

Mark is a University of Missouri graduate. He became a licensed surveyor in 1992. He was elected as Lafayette County Surveyor, serving in that capacity for 24 years. He was also a member of the and six years on the Lafayette County C-1 (Higginsville) School Board for six years. He was appointed by Governor Parsons to the Missouri Registration Board for Architects, Professional Engineers, Professional Land Surveyors, and Professional Landscape Architects, where he currently serves as the Board Chair for Professional Land Surveyors. He also serves on the Higginsville Planning Commission.

Nolte has been honored by the Missouri Society for Professional Land Surveyors having received their "Legislative Appreciation Award" and as "Surveyor of the Year". He is a private pilot with an instrument rating and has a passion for fishing. He lives in Higginsville with his wife, Elizabeth.

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