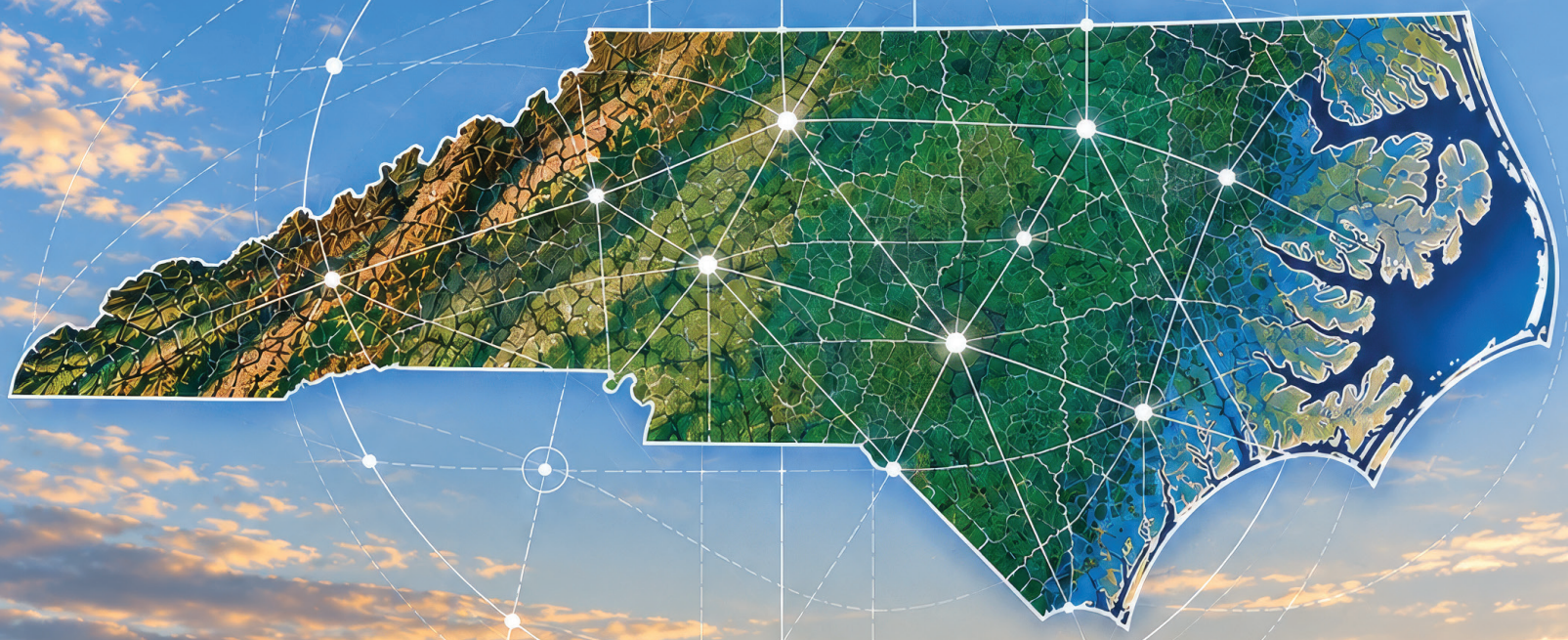
The Tarheel SURVEYOR

FALL 2026 No. 26.2



2022 HAS FINALLY ARRIVED

The Modernized NSRS Enters Beta Testing

What North Carolina Surveyors Need to Know

INVESTING IN OUR TECHNICIANS
P. 12

IN-HOUSE OR OUTSOURCE?
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THE WOMEN'S SURVEYOR SUMMIT
P. 22

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The Tarheel SURVEYOR

FALL 2026

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ABOUT NCSS:

- Founded January 31, 1939
- Second oldest professional surveying organization in the United States
- Only professional surveying organization in NC
- Affiliated with the National Society of Professional Surveyors and, therefore, all Professional Members are also accounted as members of NSPS as of July 1, 2013

OUR MISSION:

"A society of professional surveyors and their associates dedicated to enhancing professionalism, improving legislative awareness and promoting the profession of surveying."

Who We Are

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turner@res.us

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Jacob Laughter

YADKIN VALLEY CHAPTER PRESIDENT
Rusty Douglas

visit https://www.ncsurveyors.com/about for contact information

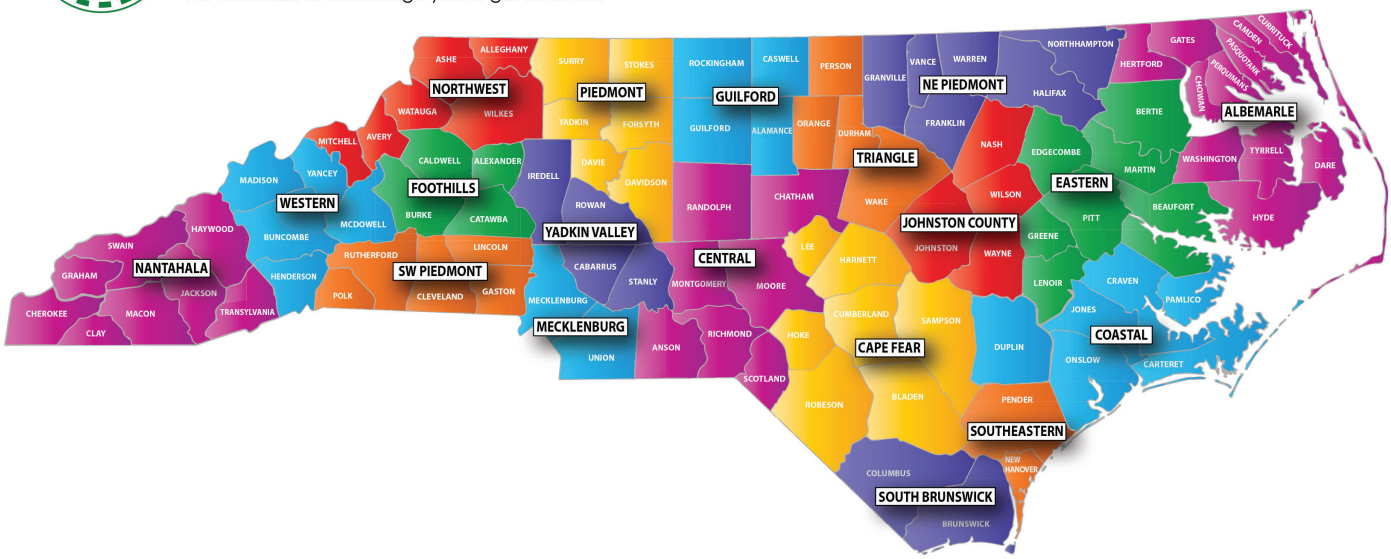
CHAPTER MEETINGS

CHAPTER	DATE & TIME	LOCATION
Albemarle	4th Tuesday | 6:30 pm	Various Locations, NE Counties
Cape Fear	Last Thursday | 6:00 pm	Various Locations, Fayetteville
Central	Last Tuesday | 6:00 pm	Blake's B-Que, Candor
Coastal	Last Monday | 6:30 pm	Various Loc., Carteret & Craven Counties
Eastern	2nd Monday | 6:30 pm	Parker's BBQ, Greenville
Foothills	2nd Tuesday, 7:00 pm	Timberwoods, Morganton
Guilford	3rd Thursday, 6:00pm	Various Locations, Greensboro
Johnston County	2nd Thursday | 6:00 pm *no meeting Jun-Aug	Various Locations, Smithfield
Mecklenburg	1st Tuesday | 6:00 pm *no meeting Jul-Aug	Dilworth Grille, Charlotte
Nantahala	3rd Tuesday | 6:30 pm *no meeting Jun-Aug	Various Locations, Sylva
NE Piedmont	3rd Tuesday | 7:00 pm	Johnny Bulls, Louisburg
Northwest	3rd Tuesday | 6:00 pm *no meeting Dec.	Various Locations, Boone & Wilkesboro
Piedmont	4th Tuesday | 6:00 pm	66 Grill & Taphouse, Winston-Salem
Southeastern	Last Wed., 6:00pm	Various Locations, Wilmington
South Brunswick	Last Friday | 12:00pm	Starz, Grille, Shallotte
SW Piedmont	2nd Thursday | 6:00 pm	Fisherman's Feast, Shelby
Triangle	3rd Tuesday | 6:30 pm	Mason Jar Tavern, Fuquay Varina
Western	2nd Tuesday | 6:00 pm	AB-Tech, Asheville
Yadkin Valley	2nd Wednesday | 6:30 pm	Pancho Villa's, Salisbury

Please contact chapter president to confirm meeting details before attending.

NCSS CHAPTER AREAS

There are 19 local chapters of NCSS located throughout the state of North Carolina that meet regularly. These meetings are a great way to stay up to date on the latest issues affecting surveyors in the state. If you are not currently attending your local chapter meeting, we would like to encourage you to get involved.



NCSS STAFF

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MEMBERSHIP DIRECTOR
Anna L. Culiat
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NCSS OFFICE MANAGER
Alison Olwell
aolwell@ncsurveyors.com



Director's Notes



Your Professional Point of Reference

If you have ever tried to walk in a perfectly straight line without being able to see where you are going, chances are you did not end up where you expected.

There is an interesting experiment that demonstrates this. People are asked to walk straight across an open area while blindfolded. They think they are maintaining a straight course, but before long, they begin to turn. Some eventually walk in circles. Without an outside point of reference, they simply cannot recognize that they have begun to drift.

Surveyors probably understand the importance of a reliable point of reference better than most. But this experiment made me think about the idea differently. What are the points of reference for the surveying profession?

Surveying does not stand still. Laws and regulations change. Technology advances. New ways of collecting and using data emerge. Sometimes issues that began completely outside the realm of surveying end up affecting the profession. No one can keep up with it all on their own. That is one of the roles I see NCSS playing: helping surveyors stay informed, connected, represented, and prepared.

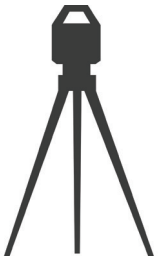
We get calls and emails in the NCSS office every week from surveyors looking for information. That is one reason we continue adding resources to the NCSS website. You can find laws and rules, links to NCBELS and the NC Geodetic Survey, research resources, continuing education information, and practical tools. NCSS is not the final authority on many of these things, but we can help get you to the right source. And if there is something you think would be useful that we do not have, let us know. Some of our best resources have started with someone asking a question.

A lot of what NCSS does also happens behind the scenes. While you are focused on clients, projects, employees, and deadlines, bills are being introduced; rules are being considered; and other issues are developing that could eventually affect surveying. Someone needs to be paying attention.

That does not mean NCSS takes a position on every issue. Sometimes we simply need to monitor an issue. When something does require action, our lobbyists, committees, chapter leaders, members, and Board all have a part in the process. Their input matters because what looks simple on paper can look very different when you consider how it will actually affect surveyors in practice.

The connections within the profession are just as important. Chances are, if you are dealing with an issue, another surveyor has dealt with something similar. Those relationships develop through chapters, conferences, seminars, committees, Young Surveyors Network activities, and sometimes just through a conversation over lunch.

We see it in the NCSS office too. Sometimes someone calls with a question and the best answer



Schedule at a GLANCE

NOV. 6, 2026
Johnston County Chapter Seminar
Four Oaks, NC
8:00am-5:00pm
8 PDHs

NOV. 6, 2026
YSN Treasure Hunt
Shelby, NC
1:00am-5:00pm

NOV. 7, 2026
Fall Board of Directors Meeting
8:00am
Youngsville, NC

NOV. 13, 2026
NE Piedmont Chapter Seminar
8:00am-4:30pm
7.5 PDHs
Youngsville, NC

NOV. 20, 2026
Western Chapter Seminar
8:00am-4:30pm
Mills River, NC

DEC. 4, 2026
Piedmont Chapter Seminar
8:00am-5:00pm
Mills River, NC

DEC. 10, 2026
NCSS Final 2026 Seminar
8:00am-4:30pm
Rocky Mount, NC



we can give is not a statute, rule, or website. It is the name of another surveyor who has already dealt with the same thing. There is a lot of value in knowing who to call.

We also have to keep looking ahead. The new datum, advancing technology, changing standards, and artificial intelligence are just a few examples of how quickly the profession continues to change. Experience is incredibly valuable, and continuing education gives surveyors an opportunity to build on that experience and keep it current. We have to think about who comes next.

Our Workforce Development Committee, Education Foundation, Young Surveyors Network, and FS and PS Reviews are all pieces of the same puzzle. How do we help people discover surveying? How do we get them into the profession? How do we help them stay? And how do we support those who want to become licensed? The future of surveying is not somebody else's project. It belongs to us.

The people in that walking experiment did not drift because they forgot how to walk. They simply lacked a point of reference to help them recognize when their direction had changed. Surveyors understand the importance of having good points of reference. I think the same is true for the profession itself.

None of us has to know everything or have every answer. Sometimes it is enough to know where to look, who to ask, and how to stay connected. I hope NCSS continues to be one of those points of reference for you.

Sincerely,

Sherri L. Barron

Sherri L. Barron
Executive Director

LETTER FROM THE PRESIDENT



What Does It Mean to Be a Professional?

When we hear the word "professional," most of us probably think about having a license, wearing the right clothes, showing up on time, and doing our job well. Those things are certainly part of it. But I believe being a professional means much more than simply having "P.L.S." behind your name. Being a professional is about how you carry yourself, how you treat people, and how seriously you take the responsibility that comes with being a surveyor.

Surveying is a profession built on trust. Our clients trust us with their property. Attorneys trust our work when preparing legal documents. Engineers and other professionals rely on our information to design and build. Courts may rely on our maps and testimony. Most importantly, the public relies on us to accurately define and protect property rights. That responsibility should change the way we approach our work.

Professionalism Starts With You

Being professional starts long before you step onto a job site. It starts with how you prepare, how you communicate, and how you approach each project.

A professional surveyor doesn't have to know everything. In fact, one of the most professional things we can do is recognize what we don't know. Surveying continues to change. Technology changes. Laws and standards change. The way we perform our work changes. The professional understands that learning doesn't stop when you get your license.

This is one of the reasons organizations like the North Carolina Society of Surveyors are so important to our profession. NCSS provides an opportunity for surveyors across the state to share knowledge, discuss challenges, learn from one another, and stay connected to what is happening in our profession.

Continuing education is important, but professionalism goes beyond getting the required hours. It means staying curious. It means asking questions. It means learning from other surveyors and being willing to admit when someone else has a better answer. That mindset makes us better surveyors.

How Professionalism Elevates Us

Professionalism elevates us because it changes how others see the value of what we do. There is a difference between being someone who "does surveys" and being a professional surveyor. Anyone can operate equipment, collect data, or draw a map. Our profession requires much more than that. It requires judgment, experience, ethics, knowledge, and accountability.

When we conduct ourselves professionally, we demonstrate that surveying is not simply a technical service. We are providing professional opinions that can affect property ownership, construction projects, land development, and

people's lives. That distinction matters.

It also matters how we communicate that value. Sometimes we are our own worst enemy. We can be quick to talk about how much technology has made our jobs easier or how fast we can complete a survey. But our value isn't simply in how quickly we can collect points. Our value is in knowing **which points matter, why they matter, how they should be interpreted, and what the evidence means.**

Technology is a tool. Professional judgment is what makes the tool useful.

It Shows in the Little Things
Professionalism isn't always demonstrated through major decisions. Most of the time, it shows up in the little things.

- It's returning a phone call.
- It's answering an email instead of letting it sit for three days.
- It's telling a client when something will cost more than originally expected.
- It's admitting when you made a mistake and taking responsibility for it.
- It's treating the person holding the shovel with the same respect you give the person signing the contract.
- It's showing up prepared.
- It's doing what you said you were going to do.

Those things may seem simple, but the little things add up & build a reputation over time. In My opinion, reputation matters in surveying. Most of us work in relatively small professional circles. The way we handle one project can affect the next five opportunities that come our way. People remember the surveyor who was dependable, honest, knowledgeable, and easy to work with.

We Are Representing More Than Ourselves
As surveyors, we also represent our profession. Every interaction we have with a client, property owner, contractor, attorney, engineer, or member of the public is an opportunity to either strengthen or weaken the public's perception of surveying. That's a responsibility we should **NEVER** take lightly.

It is also why our involvement with NCSS matters. When we participate in our professional society, attend meetings, go to conferences, serve on committees, mentor younger surveyors, or simply have conversations with other professionals, we are investing in more than our own careers. We are helping strengthen surveying in North Carolina.

The younger people entering our profession are watching us. They are learning not only from what we teach them, but from how we conduct ourselves. If we want them to value professionalism, ethics, education, and service, we must demonstrate those things ourselves. Professionalism is contagious. Unfortunately, so is the lack of it.

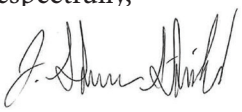
Raising the Standard
Being professional doesn't mean acting like we're better than anyone else. It means understanding the responsibility that comes with what we do and conducting ourselves accordingly. I believe the future of surveying in North Carolina depends on us raising that standard.

NCSS gives us a place to do that together. Whether you're a young surveyor just getting started, a seasoned professional, a survey technician, or somewhere in between, we all have something to contribute to the profession. We should expect professionalism from ourselves, encourage it in the people coming into the profession, and recognize it in our peers. At the end of the day, being a professional surveyor isn't just about having a license. It's about earning the trust that comes with it.

Our equipment will change. Our software will change. Board rules & policies will change. The way we perform fieldwork will continue to change as it has every year for decades. But the fundamentals of professionalism shouldn't.

Be honest. Be dependable. Keep learning. Do good work. Treat people with respect. Get involved. Stand behind your work. If we do those things, we don't just elevate ourselves as surveyors; we elevate the profession as a whole and ultimately, that's what being a professional should mean.

Respectfully,



J. Shane Strickland, PLS, CFS
NCSS President 2026

NSPS

NSPS Memorandum of Understanding

In 2012, NCSS agreed to partner with the National Society of Professional Surveyors (NSPS) to foster membership on both the state and national levels.
As a result, your membership with NCSS now includes dual membership with NSPS. Read the MOU on our website at: www.ncsurveyors.com/wp-content/uploads/2026/10/2019-MOU.pdf





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Education Foundation

by John Odom, PLS
Education Foundation President

This has been a crazy busy summer for the Education Foundation. Our members were able to attend the annual FFA Conference, the CTE Conference, the Home Schoolers (Thrive) Conference, and the Public Charter Schools Conference. We welcome any opportunity to display and discuss our materials to further the profession and to help younger generations realize just how rewarding it can be. We have also attended or will be attending several career trade days at local community colleges. These are great opportunities for you to get involved and expose college students to surveying.

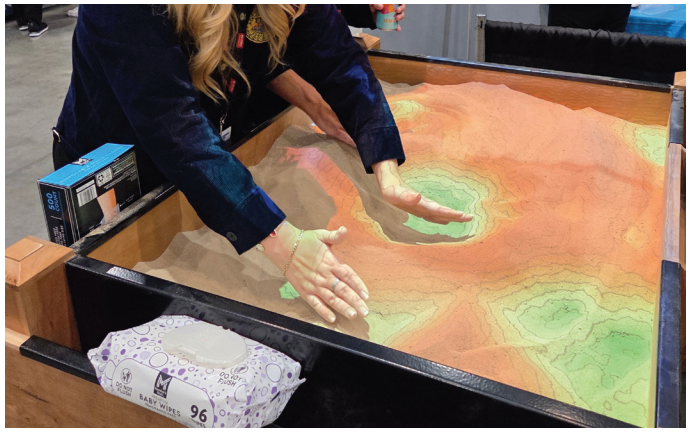
We awarded eight scholarships valued at $20,000 this year to eight out of thirty-two applicants. Four went to 4-year students and four to 2-year students. Thank you for your support of the cash and gun raffles each year. Speaking of raffles, it is almost that time of year again. See Mike Adams for cash raffle tickets; do it early because we have been selling out early the past few years. And see me for gun raffle tickets. We have a Browning Citori Hunter over-under 20-gauge shotgun this year. Tickets will be out at the November Board Meeting and will be available until the drawing at the convention in February. Thank you again for all your support in our fundraising efforts.

We will not be purchasing the state Trig-Star packet this year, but if your chapter is interested, we will purchase the package for you and help with prizes for the winners. Please contact the NCSS office if you are in need of materials.

We are still promoting our license plates and encouraging every one of our members, even non-members, to purchase one. We have a brochure that we will be handing out at the local chapter seminars that will explain the process. The process is very simple. Contact me or the Society office if you need guidance.

1.Order using the form found at http://www.ncsseduationfoundation.com/images/LicensePlate/ApplicationMVR-27PPA.pdf
2. Order when renewing online: https://www.ncdot.gov/dmv/title-registration/license-plates/pages/specialty-plates.aspx

$15 of each plate goes back to the Education Foundation and helps support our scholarships to geomatics students across the state. Our next goal is to completely fund a full scholarship for an up-and-coming future surveyor for a full year. We know we can achieve it based on the support of our fellow members.



We have had a great reception for our sand table display this year at the exhibits. We have decided to loan it out for exhibits only if an Education Foundation member is present. It is a complicated process to set up and operate, so we feel like it is in our best interest to be there when it is on display. We have enjoyed the trailer that was donated to us, and we had it wrapped to make it look even more fantastic. Make sure to check it out next time you are at the Society office. I am sure we will try to have it at the convention this year as well.

If you ever have any questions, would like to donate, or know of a future surveying student that we can reach out to, please don't hesitate to contact any one of us.

Our committee members:
Mike Adams, Jeff Allen, David Lee, Robin Lee, John Odom, Jared Ownbey, Clay Pate, Gary Thompson
Jamie Watkins

Thanks for your time and support!!
John Odom

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by Julie McDonald, PE, PLS

Every firm in North Carolina runs into the same obstacles sooner or later. Technology keeps changing how we work, the need for skilled field and office technicians keeps growing, and the supply of qualified people never quite catches up. What often gets overlooked is an existing resource to help with this predicament: the Certified Survey Technician (CST) Program. Sponsored by the National Society of Professional Surveyors (NSPS), this program offers a way to gauge technical and general knowledge and gives employers a consistent way to evaluate and develop their workforce.

What Is the CST Program?

The CST Program is a national certification for survey technicians. It was first initiated in 1986 (testing at Level I began in 1988) and serves two important purposes at once: a credential for the technician and an evaluation tool for the employer. The program is built around four levels of certification and two tracks, Field and Office, so technicians can follow the path that better suits their work. Certification comes through a mix of standardized examination and documented experience, with each level building on the one before it.

The program is also recognized by the U.S. Department of Labor within its National Apprenticeship Program. It does not license anyone to practice surveying, since that authority rests with individual state boards, but it does provide meaningful recognition of technical competence.

The Benefits

For technicians, certification is a genuine mark of achievement and carries more weight on a resume than any self-description. It lays out a clear career ladder, which matters greatly for people building their skills over several years. For employers, it offers an objective read on an applicant's ability, a basis for job assignments and promotions, and a way to give clients confidence in the crew performing their work.

How to Get Started

The program's process can be explained in a few steps:

1. Choose your level and track. Certification is offered in the two tracks of Field and Office at four levels. Level I is entry level, Level II expects one-and-a-half years of experience, Level III necessitates three-and-a-half years, and Level IV requires five-and-a-half years plus an active Level III certification. Applicants decide on their track based on their experience and the work they perform, and they may start at any level from I through III based on their qualifications. Each exam is built from defined work elements, covering areas such as survey types and history, field equipment and operations, survey control, survey computations, office operations, plan reading, first aid, and safety. Exams at the higher levels include testing on the principles of the profession and supervisory skills. The CST Program Book at www.cstnsps.com lays out the position descriptions and work elements for each level in complete detail.

2. Submit your application. Applications should be submitted at least two weeks before your exam date,

with full payment included. Current fees are $120 for students, active military, and veterans; and $180 for standard examinees. Group rates are available for testing done at the same site, same time, and with the same proctor.

3. Coordinate a proctor and site. There is no fixed testing schedule or location. Applicants work with the NSPS office or their state CST Coordinator (where one exists) to arrange an approved proctor (such as a licensed surveyor or educator) and a place to test.

4. Take the exam. Exams for levels I-III run four hours, are multiple choice and open-book, and are offered in both online and paper formats. Both formats are proctored.

Accessing Online Resources

The program's home base is www.cstnsps.com, which has the CST Program Book, brochures, applicant guidance, FAQs, and coordinator contacts. To set up an exam, you can reach the NSPS office at 240-439-4615, ext. 112. General program questions can go to cstinformation@nsps.us.com.

Technicians can contact the NSPS office directly or check the CST website for exam locations and the procedure to line up a proctor. NCSS is available to help point members in the right direction.

Whether you're a technician looking to formalize your skills or a firm owner investing in your employees, the CST Program is an affordable, credible step toward a stronger profession. It is worth encouraging your technicians to pursue it. The return elevates and delivers value to the individual, the firm, and the future of surveying in North Carolina.



Julie McDonald is a professional engineer and land surveyor and the owner of Tidemark Land Services, Inc., in Charlotte, NC. She has more than 35 years of experience in surveying and right of way services and is an active leader with the International Right of Way Association. She also serves on the NSPS Certified Survey Technician (CST) Board.

WELCOME NEW LICENSEES

Mazen A. Alowdi
Chandler D. Barnard
Abdellatif Boho
Timothy L. Davis
Samuel Davis
Dylan W. Fish
John Paul Foust
Lucas G. Garber
Joseph Gareau
Adam Garrison
David B. Godbold
Brian Green
Keller Guisewhite
Thomas M. Healy
Brian Jimison
Christian Kohnle
Robert Brayden Lewis
Jeffrey T. Lewis
Tiana Marbuery
Sebastian J. Matysuk
Coulton S. Messick
Colton T. Morgan
Thomas James Murphy
Christopher Myers
Harrison M. Nagele
Brandon M. Nelson
Jacqueline Nelson
Richard C. Odom
Gabriela De Oliveira
James M. Ray
Michael A. Rhodes
Ngaty Seck
Brandon R. Simpson
Jessica Sloan
Timothy D. Speelman
Neil E. Svedberg
Brennan E. Teddy
Dakota R. Troublefield
Kyle J. Turner
Caleb Ronald Watkins
Cullen Wooten



by John Willis, PLS

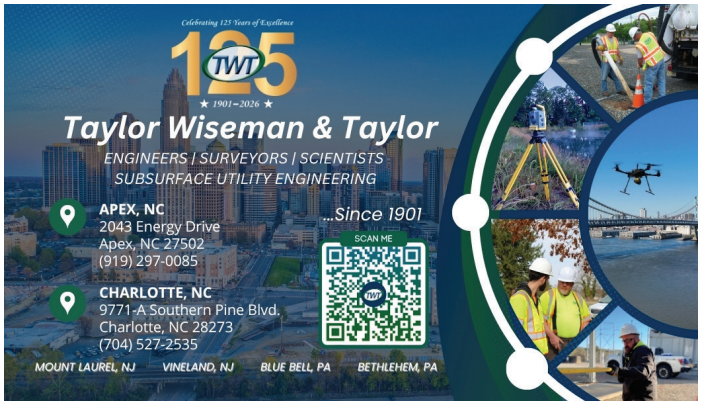
Contrary to popular belief, sometimes it isn't efficient to tackle every project that walks through the door. For many firms, there are long-term clients that have built in us an innate desire to keep them happy. Has your desire to keep a client coming back ever caused you to take on a project that you probably shouldn't have? Did the thought of hiring someone else to perform all or part of the project cross your mind? When does it make sense to outsource to someone else instead of doing it yourself?

Outsourcing part or all of a project allows you to maintain control of the workflow while leveraging other's skills and labor, overseeing quality, and keeping yourself as the point of contact for your client. This allows you to build a team of professionals that possess skills and expertise to tackle projects beyond your current capabilities. This also opens the door for today's subconsultant to be a future client or a networking source for future projects. However, managing subconsultants does take extra effort, so it is reasonable that you would charge a 10% - 15% "handling fee" in addition to the subconsultant's fees for your time administering and managing the subcontracts. With that in mind, let's look at some reasons to outsource.

You may simply not have enough in-house capacity. You may need to outsource when you have a short-term need, especially if this sudden uptick in workload is caused by one potential project. Additionally, as we have experienced in recent years, there is questionable availability of talent in the workforce to provide adequate staffing for the added projects.

The project may require specialized equipment. We continue to hear and see the impact of LiDAR all around us. Whether it's utilized on aerial platforms or terrestrial-based platforms, it looks like LiDAR scanning is here to stay. LiDAR is an excellent tool to have in your toolbox, but it comes with a higher price tag, and if it is not used frequently, it may be cost-prohibitive for some. Bathymetric equipment may also be cost-prohibitive for short-term use. In addition to the sonar units, bathymetric equipment will require some type of vessel, either boats or marine drones, to deploy the units. The final example is underground utility locating equipment, from electromagnetic detectors and ground-penetrating radar to vacuum excavation machines. When the project scope requires more detailed utility information than provided by an 811 call, you may need to hire someone who owns this equipment to do a short-term or one-time project for you.

You may be wondering why you can't just rent this equipment and use it for your special project. This specialized equipment also needs specialized knowledge.



To commercially operate an unmanned aerial vehicle (drone), one would need an FAA Part 107 pilot's license. To perform the bathymetric survey from a boat, one would need the nautical skills to safely and competently operate the craft, along with the knowledge to competently process the data obtained during these missions. If you don't readily possess those skills, what is the cost in time and money to obtain that knowledge? As a novice obtaining knowledge and experience, how likely is the risk of making mistakes, and what is the cost of those mistakes? Could you competently complete the project?

I had an example of this recently when I was tasked with an 1,100-acre boundary and topo. Although I had access to an in-house aerial LiDAR system, the number of individual flights and the prospect of blending together all that data was going to prove time-consuming and costly for the client. We decided to contract an aerial mapping firm to fly the site with a fixed-wing plane and process the data. It would have taken us weeks to collect and process all the data that the aerial firm was able to gather in just a few hours.

So what are some of the deciding factors in whether to hire a subconsultant or to do it in-house?

- Do you currently have the capacity and personnel to carry out the project in a timely manner?
- Do you have the necessary equipment to perform the task or have it readily available to lease?
- Do you currently have the expertise to competently complete the project?
- Does performing this service expose any liability issues for the firm?
- Will performing this service impact the health, safety or welfare of the public?
- Is this a service you plan to offer in the future?

If any of these questions give you pause, maybe this is the ideal project to test the waters of partnering with a trusted subconsultant.



John Willis is the Assistant Geomatics Director and Principal at Davis-Martin-Powell, acquired by McKim & Creed in June 2026. He has more than 30 years of surveying experience, including nine years operating his own surveying business. His expertise includes project management, boundary and topographic surveys, development and property acquisition surveys, and construction staking.

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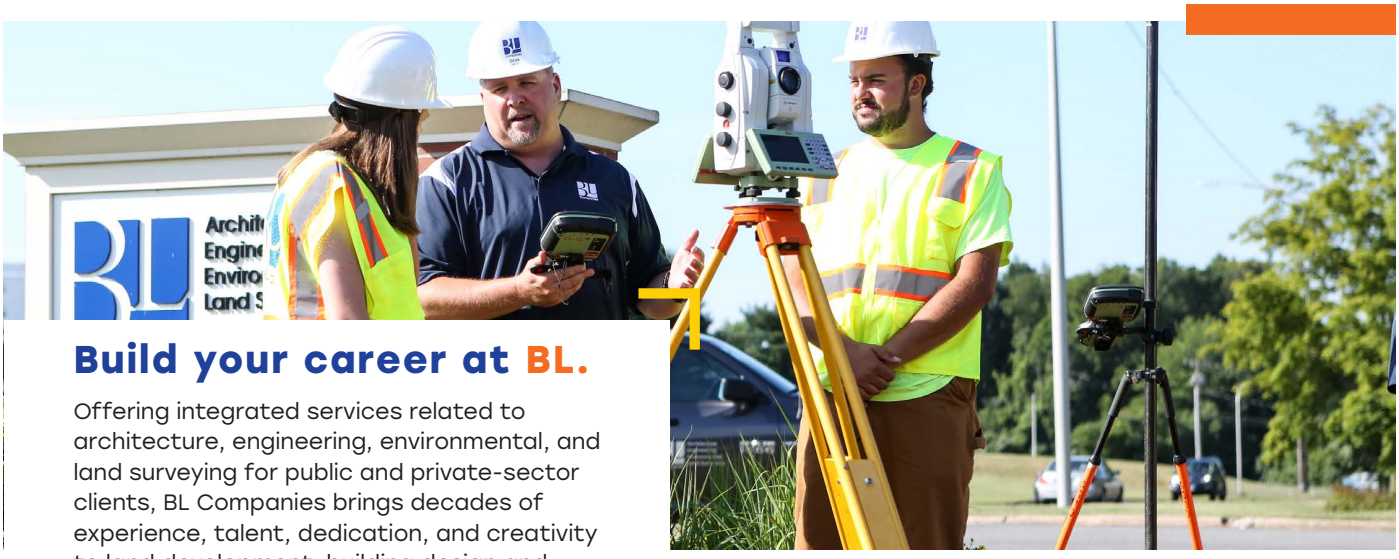

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Positioning North Carolina Today and for the F

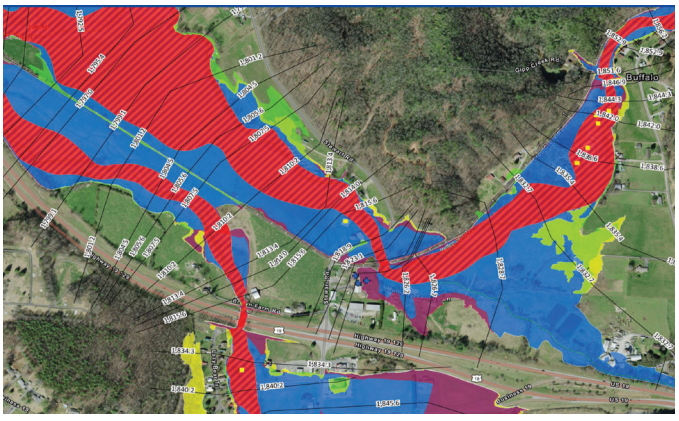
Four essential resources connecting today's surveying

by Gary W. Thompson, PLS

Every day, surveying work across North Carolina relies on an extensive network of data, technology, and resources. Much of the work required to maintain and improve those resources happens behind the scenes.

From flood mapping and real-time positioning to Online Positioning User Service (OPUS), statewide Light Detection and Ranging (LiDAR) and imagery, the North Carolina Geodetic Survey helps provide the framework that supports surveying and geospatial work across the state. As North Carolina prepares for significant changes to the nation's reference system, many of these familiar resources are also evolving to support what comes next.

The transition will not happen everywhere at once. Some systems will move to the new datums and units sooner than others, creating a period when you may encounter data and deliverables referenced to different datums and units. Understanding the resources available to you, how they are evolving, and which reference systems they use will become increasingly important as North Carolina moves through that transition.



01 FLOOD MAPS/FRIS

A Familiar Resource in a Changing Reference Environment

The North Carolina Flood Risk Information System (FRIS) provides access to flood hazard information through an interactive mapping system. In addition to viewing regulatory flood information, FRIS provides tools that make it easier to examine how flood mapping affects a particular property or area.

One particularly useful feature allows you to compare changes from the previous Flood Insurance Rate Map (FIRM). The mapping identifies areas where the flood hazard has decreased in green and increased in red, making changes between map updates much easier to see.

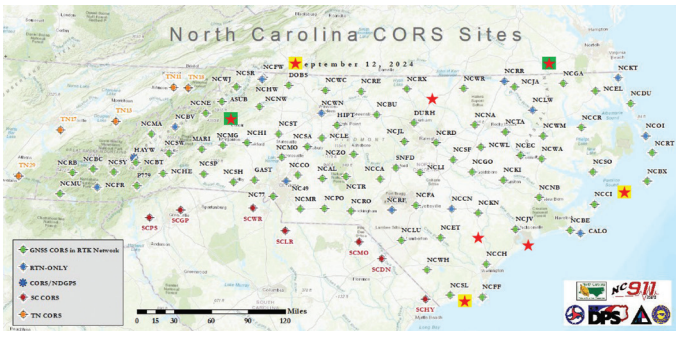


Another important detail as North Carolina prepares for the new reference frames: FRIS is staying on the current reference system for now and will remain referenced to NAD83(2011), NAVD88, and the U.S. Survey Foot.

That distinction will become increasingly important as other geospatial resources move to NATRF2022, NAPGD2022, GEOID2022, and the international foot. If you are using FRIS information alongside GNSS positions, LiDAR, imagery, or other geospatial data, check the datum and units for each source before combining or comparing the information. FRIS will not necessarily be on the same reference system as the other data you are using.

WHAT YOU NEED TO KNOW

FRIS will remain on NAD83(2011), NAVD88, and the U.S. Survey Foot for now. When using FRIS with other data, check the datum and units of each source.



02 CORS/RTN NETWORK

Preparing North Carolina's Positioning Network for the New Datums

North Carolina's Continuously Operating Reference Station (CORS) network provides positioning infrastructure that supports real-time Global Navigation Satellite System (GNSS) work statewide. The network continues to expand, with stations already installed, additional stations in progress, and future CORS locations planned across North Carolina.

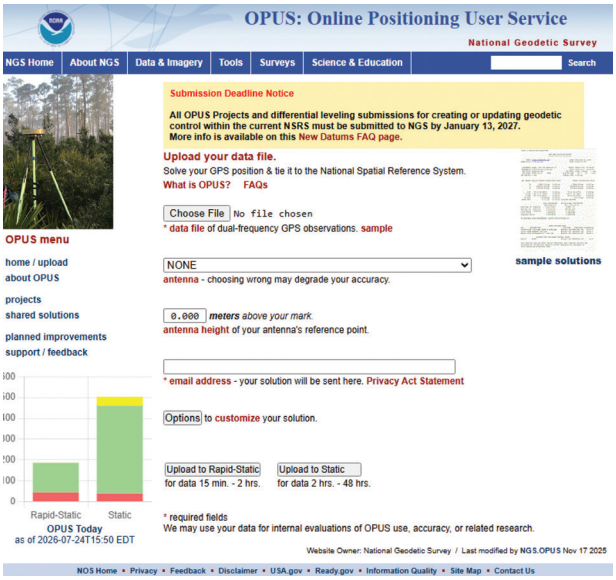
At the same time, the Real Time Network (RTN) is being prepared for the transition to the new reference frames. A third RTN server is being brought online and will provide corrections for the new datums when they become available in 2027.

As North Carolina moves toward NATRF2022 and NAPGD2022, along with the North Carolina Coordinate System of 2022, GEOID2022, and the international foot, the positioning infrastructure you depend on is being prepared to support those changes. *(see page 28 for more details)*

If you routinely use the RTN, the third server is an important part of that effort. As corrections for the new datums become available, knowing which reference frame you are working in will be critical when you collect data or combine new observations with existing project information. You should also verify that your equipment will support the 2022 datums and units.

WHAT YOU NEED TO KNOW

A third RTN server will provide corrections for the new datums. Know which reference frame you are working in and verify that your equipment supports the new datums and units.



03 OPUS

Bridging Today's Reference System and What Comes Next

OPUS provides a way to process GNSS observations through the National Geodetic Survey and obtain positions tied to the National Spatial Reference System (NSRS). With the transition to the new reference frames, the information you receive through OPUS will change as well.

OPUS output will include NATRF2022, NAPGD2022, the North Carolina Coordinate System of 2022, the international foot, and GEOID2022.

You may still have projects, records, control, and other data that rely on NAD83(2011) and NAVD88. Those needs will not disappear simply because OPUS begins providing results in the new reference frames. When you use an OPUS result with existing project information, identify each reference frame before using the values together.

To help bridge that gap, a post-processing application has been added to the NC Real Time Network system to provide NAD83(2011) and NAVD88 heights for OPUS users.

This North Carolina web application gives OPUS users access to NAD83(2011) and NAVD88 heights when a project requires them.

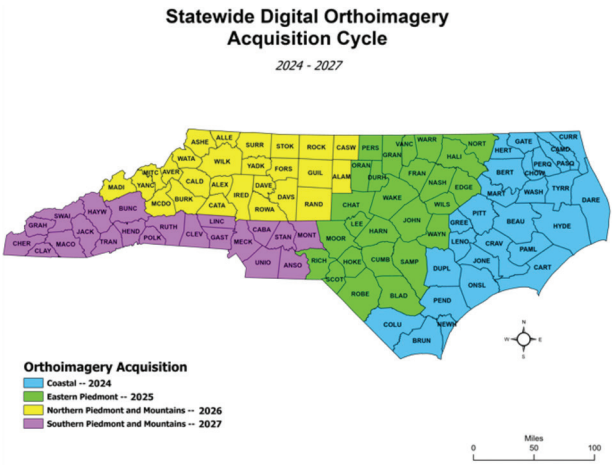
WHAT YOU NEED TO KNOW

OPUS output will include the new reference frames. When using OPUS results with existing project information, confirm the reference frame before using the values together.

04 STATEWIDE LiDAR & IMAGERY

Mapping North Carolina From Above

North Carolina's statewide LiDAR program provides detailed elevation data across the state, with new collections



updating and improving upon earlier datasets. Recent phases have included Quality Level 1 (QL1) data collected in 2024 and 2025, referenced to NAD83(2011), NAVD88, and the U.S. Survey Foot.

That work continues in 2026. The current LiDAR collection will also remain referenced to NAD83(2011), NAVD88, and the U.S. Survey Foot.

The next significant change comes with the fourth statewide phase of LiDAR collection in 2027. Planned collection areas extend from 2027 through 2030, and this new phase will use the new datums and the international foot.

That means the collection year and phase will matter when you use LiDAR data. Data from the next statewide phase will not be referenced to the same datums and units. Before bringing LiDAR into a project, check the metadata to confirm the collection year, horizontal datum, vertical datum, geoid model, and units.

Preparation for the next phase also includes how the data itself will be organized. The NC 2022 Reference Frame Working Group is developing a new 2022 datum tile layout for statewide imagery and LiDAR projects.

You can also see the value of repeated statewide collections by comparing 2017 and 2025 LiDAR along the North Carolina and Tennessee boundary at I-40. The comparison provides a clear visual example of how successive collections can document changes in the landscape.

WHAT YOU NEED TO KNOW

The next statewide phase (starting in 2027) will use different reference systems. Check the collection year, datum, and units before using LiDAR data.

PREPARING FOR WHAT COMES NEXT

The transition to the new reference frames will not happen all at once. Flood mapping, positioning services, OPUS, LiDAR, and imagery will move forward on different schedules. For a period of time, current and new reference systems will exist side by side.

That makes knowing your data source and checking its horizontal datum, vertical datum, and units more important than ever. As you prepare, review your existing geospatial data and metadata, confirm your software can perform the necessary transformations, verify your equipment supports the 2022 datums and units, and make sure your deliverables clearly identify the horizontal datum, vertical datum, and units used.

North Carolina is already preparing its systems and resources for the transition. Know the reference system of the data coming into a project, know the reference system you are working in, and clearly identify the reference system and units of what you deliver.

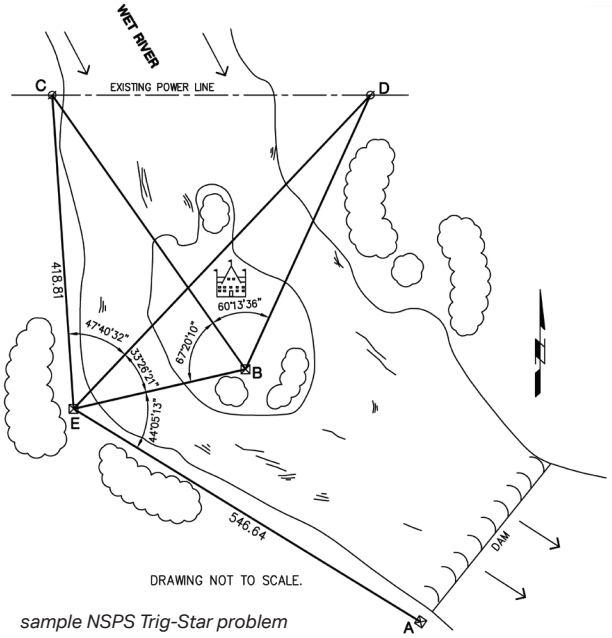


Gary W. Thompson is the Deputy Hazard Mitigation Chief, North Carolina Emergency Management/Hazard Mitigation, and Chief of the North Carolina Geodetic Survey/Hazard Mitigation/NC Emergency Management. He has held a professional license as a Professional Land Surveyor (PLS) in North Carolina since 1980. He has served as president of both the NCSS and NSPS. He is also an emeritus member of NCBEES.



PROBLEM CORNER

A group of investors has plans to build a resort on an island in the Wet River. The electric company will supply power to a transformer station (Point "B") at the resort by constructing a generating plant (Point "A") at the dam downstream of the resort. The transformer station will need to be connected to an existing power line which crosses the river just north of the island. Using the information in the diagram that was obtained by a survey crew, find the following dimensions:



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Distance BD = _____

Required Answer Format
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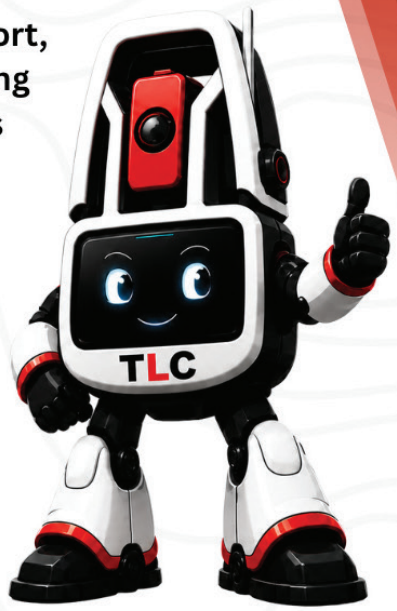



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by Alicia Tabachnick, PLS

The Women Surveyors Summit is a national continuing education and networking event held in a different state each year. Because women represent less than six percent of surveyors nationwide (even less within some states), the Summit intentionally rotates across the country to improve accessibility for attendees from all regions. Its mission is simple but powerful: create opportunities for education, mentoring, networking, and support among women working in land surveying while helping strengthen the profession as a whole.

The Summit was founded by Anna Rios from Texas. While representing the Texas Young Surveyors Network at a FIG Young Surveyors meeting in Minnesota, she noticed something different about the atmosphere. The women in attendance were exceptionally welcoming and inclusive. Reflecting on previous conferences she had attended, she began asking herself why that sense of belonging seemed so rare and what could be done to change it. From that experience, the idea for the Women Surveyors Summit was born.

In 2019, the first Summit was held in Austin, Texas, and registration sold out within just three days of opening. The conference was held virtually due to the COVID-19 pandemic and boasted approximately one hundred attendees. Since then, the Summit has continued to grow in both attendance and influence. The event has since been held in Colonial Williamsburg, Virginia; Stillwater, Minnesota; Pittsburgh, Pennsylvania; and Las Vegas, Nevada. The 2026 Summit was held in San Diego, California, hosted 220 attendees, and even had to turn people away due to registration limits. The 2027 Women Surveyors Summit will be a tri-state event hosted by Indiana, Illinois, and Kentucky. It will be held October 21st- 24th and is expected to attract nearly three hundred attendees.

This growth has largely occurred through word of mouth and social media. The Summit draws attendees from across the United States and its territories, with participants traveling from places as far away as Alaska and Puerto Rico. Attendees range from students and entry-level field personnel to licensed surveyors, business owners, educators, and retirees. This diversity of experience creates a unique environment where those just entering the profession can learn directly from those who have spent decades helping shape it.

What makes the Summit unique is not simply that it is a conference for women. Rather, it creates a rare environment where women in an overwhelmingly male profession can walk into a room and immediately see others who share similar experiences and challenges. It also increases visibility for women in surveying and provides those entering the profession with inspiration, support, and a clearer understanding of the opportunities available to them.

During a live Geoholics Podcast interview at the 2025 Summit, Rita Lumos, Nevada's first licensed female land surveyor and the second female president of NSPS, admitted she was initially skeptical about the need for

a woman-focused event. After attending, however, she spoke about the tremendous value she saw in the support, mentorship, and encouragement that attendees provide one another.

Hosted by the Future Surveyors Foundation, a 501c3 non-profit organization, the Women Surveyors Summit is supported by many of the profession's leading companies, including SAM, Trimble, LJA Surveying, Westwood, Diamondback Land Surveying, and numerous others that return year after year. Local planning committees, working alongside Future Surveyors Foundation board members, volunteer countless hours to ensure each Summit is successful.

The Future Surveyors Foundation believes in supporting efforts already in place, whether that is state professional organizations or certifications that are offered for surveyors. Each year, during the welcome session of the Summit, attendees are encouraged to get involved in their local chapter, state, national, and international survey organizations. In pursuit of this, the Summit has hosted a Certified Survey Technician (CST) Exam every year. This is open to all individuals, not just women, not just the attendees. The Summit plans to continue hosting the CST Exam on the first day of the Summit every year as a way to support surveyors local to the event.

Many attendees would argue that networking is the most valuable part of the Summit. Attendees form connections with others that they can reach out to for support or sometimes even project or business development opportunities across the country. There is palpable energy throughout the event and raw honesty in the conversations that develop naturally among attendees. Discussions can include preparing for exams, pursuing professional licensure, owning a company, serving in professional organizations, balancing family responsibilities with field work, or simply finding the best sunscreen for a long day outside. The conversations are genuine, practical, and supportive.

Many attendees arrive knowing no one and leave with a nationwide network of colleagues, mentors, and friends. Those connections often extend far beyond the event itself. Personally, I have built friendships that have lasted years, created cross-country professional relationships, and developed contacts that continue to provide insight, advice, and opportunities. Some have even contributed to business development efforts and office expansion opportunities within my own company.







I experienced this opportunity for connection firsthand at my first Summit in Colonial Williamsburg, Virginia in 2022. Like many first-time attendees, I was uncertain about what to expect. As I sat waiting for the opening session to begin, I noticed another woman arrive alone and motioned for her to join me. That simple gesture led to a conversation with Natalie Martinez of the U.S. Army Corps of Engineers. As we talked, I learned about her work training military personnel across the country to use surveying equipment and combining surveying and GIS technologies for projects like the Normandy American Cemetery. I had never even considered some of the career paths she described. It was one of many moments that expanded my curiosity for what a surveying career could be.

Most importantly, the Summit helps participants envision a future for themselves within the profession. Retaining, supporting, and encouraging the next generation to keep going are all a large part of the Summit's efforts. Creating visibility for women in the profession and showcasing available opportunities is a highlight of the event.

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Reaching an underrepresented segment of the workforce is one way to increase available specialists in a profession that often talks about the number of those retiring or aging out and the small number of those entering the profession to fill the workforce needs. At the Summit in 2026, over forty percent were between the ages of 25-35. Many are currently in the process of obtaining their CST certifications, are surveyors-in-training, or are becoming licensed surveyors. The Summit also attracts women from surveying programs across the country, including strong participation from the University of Puerto Rico. For many students, attending the Summit is their first opportunity to meet women from every corner of the profession and see the wide variety of career paths available to them.

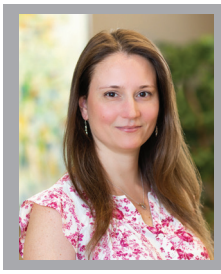
I have had many conversations over the last four years with women telling me they were thinking of leaving the profession but changed their minds after attending the Summit. Those moments are difficult to measure, but they matter tremendously and happen often.

At a time when the surveying profession faces a significant workforce shortage, we cannot afford to overlook any segment of the population. We must focus on expanding the talent pool, strengthening the workforce, and ensuring the long-term future of the profession. Women represent more than half of the population, yet they remain significantly underrepresented in surveying. Creating visibility, mentorship, and support helps attract talented individuals who may never have otherwise considered surveying as a career. Encouraging more women to enter and remain in surveying is not simply about diversity. It is about strengthening the profession, expanding our workforce, and ensuring the long-term future of land surveying.

The Women Surveyors Summit is not about excluding men. In fact, its continued success depends heavily on the support of male allies, employers, professional societies, and sponsors. Their support helps keep attendance costs manageable and allows more women to participate. Strong professions are built by people who invest in the next generation.

If you are a woman in surveying and have never attended the Women Surveyors Summit, my advice is simple. Go once. You'll understand and be at the next one. If you are an employer, professional society leader, or a sponsor considering whether this event is worthy of your support, the answer is equally simple. Absolutely it is. By supporting the Women Surveyors Summit, you are investing not only in the surveyors who attend but also in the future of the surveying profession itself.





Alicia Tabachnick, is a professional land surveyor licensed in North Carolina and New York with more than 24 years of experience in the surveying profession. She specializes in ALTA/NSPS Land Title Surveys, boundary surveying, and topographic surveying. Alicia serves as Secretary of the Future Surveyors Foundation.

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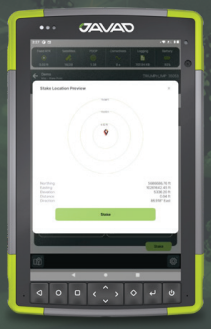

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YSN
YOUNG SURVEYORS NETWORK
NORTH CAROLINA SOCIETY OF SURVEYORS

The North Carolina Young Surveyors Network (YSN) continues to create opportunities for education, networking, and professional growth. In August, the YSN hosted its third Tech Day in Wilmington, bringing participants together for hands-on learning and exposure to industry technology. Special thanks to Duncan-Parnell for once again sponsoring this valuable event. The network also continues to offer Ask Me Anything (AMA) sessions, connecting young surveyors with experienced professionals on a variety of topics. Looking ahead, the YSN is partnering with Adam Plumbly of AP Surveying and the Southwest Piedmont Chapter to host a Treasure Hunt on November 6th in Shelby. Your team could win $1,000!

For more information about the YSN and upcoming activities, visit the YSN page on the NCSS website. https://www.ncsurveyors.com/young-surveyors-network







YSN MEMBER SPOTLIGHT



Mark Thomas

Mark began his surveying career primarily in the field, working on a variety of survey projects before moving into the office to learn CAD. He found that he learned the most on projects he was able to see from start to finish, an experience that helped shape his appreciation for a field-to-finish approach. His focus on efficiency and crew safety eventually led him to reality capture technology, including LiDAR, and he now specializes in LiDAR and point cloud data extraction. One lesson he learned along the way was the importance of understanding the scope and purpose of a survey rather than always chasing the highest possible level of accuracy.

Mark credits strong mentors with helping guide him toward licensure. He compares mentorship to bumper lanes in bowling: "They aren't throwing the ball for you, but they keep you in the lane." Becoming involved with NCSS early in his career also helped him build a network of like-minded professionals he could turn to for advice.

He encourages young surveyors to invest in their own development, remain willing to learn, manage their time well, and communicate their progress without having to be asked. He also sees setbacks as opportunities to learn, particularly when pursuing licensure: "It's only a failure if you didn't learn anything from it." Mark also encourages young professionals to attend local chapter meetings, seek out mentors, and become involved with YSN as a way to connect with other young professionals in surveying.

For those working toward licensure, Mark offers a simple perspective on setbacks: "It's only a failure if you didn't learn anything from it." He encourages young surveyors to invest in themselves, communicate without waiting to be asked, and get involved in the profession. Local chapter meetings and YSN can provide opportunities to meet mentors, build relationships, and learn from others. Above all, Mark believes young professionals should remain willing to learn, be consistent, know their worth, and never stop looking for ways to improve.

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Impacts and Considerations to be Aware of in the New NSRS

by David B. Zilkoski



Source: Zurich-American Insurance Group

In earlier Tarheel articles, I've followed the National Geodetic Survey's (NGS) work to modernize the National Spatial Reference System (NSRS). In September 2026, NGS released core Beta products and tools for user testing and feedback, including the Data Delivery System (DDS), the NGS Coordinate Conversion and Transformation Tool (NCAT), and OPUS Static. After roughly six months of testing, these Beta tools are expected to move into production, at which point NGS will officially publish the modernized NSRS.

As noted previously, this modernization marks a major shift in how geospatial data—and, by extension, engineering and construction projects—are defined in the United States. Surveyors, engineers, and construction firms should be prepared for key changes:

- Shift in datums
- Time-dependency
- Transition and compatibility
- Preparation requirements

1. Shift in Datums

The most significant change will be the replacement of the current horizontal (NAD 83) and vertical (NAVD 88) datums with new, time-dependent reference frames. In my Spring 2025 and Fall 2025 Tarheel articles, I illustrated how horizontal and vertical values in North Carolina differ between the legacy and new frames (see figures below for change magnitudes).

- Horizontal: NAD 83 will be replaced by four plate-fixed terrestrial reference frames, such as the North American Terrestrial Reference Frame of 2022 (NATRF2022).
- Vertical: NAVD 88 will be replaced by NAPGD2022—the North American-Pacific Geopotential Datum of 2022—a geopotential datum realized from a gravimetric geoid model.
- Impact: Coordinates and heights will shift substantially—often by several feet. Designs, plans, and GIS layers tied to legacy datums will not align with modern datasets unless properly converted (see the figure below showing how mismatched datums can cause conflicts on the same project).

2. Time-Dependency

Unlike earlier systems built around static survey monuments, the modernized NSRS is inherently time dependent. [See my Fall 2022 Tarheel article for examples of coordinate changes driven by tectonic plate motion.]

- Dynamic coordinates: Because the North American plate is always moving, coordinates evolve over time. Engineers must use tools that account for the survey or design epoch. NGS routines will automate this by providing Reference Epoch Coordinates (REC) at epoch 2020.0 (for example, NATRF2022, epoch 2020.0). [See my Fall 2021 Tarheel article for the coordinate types NGS will distribute in the modernized NSRS.]
- Workflow integration: Software, GNSS receivers, and project workflows must be updated to work with dynamic, time-dependent reference frames rather

than assuming fixed positions. NGS routines will again handle time dependence by providing both REC at 2020.0 and Survey Epoch Coordinates (SEC) at the epoch of the survey.

3. Transition and Compatibility

- Data conversion: Surveyors will need to transform existing project datasets and establish a plan to manage legacy records and convert critical historical information accurately to the new system to prevent design mistakes or site conflicts.
- Project continuity: We will have to manage projects that span the transition with extra care. Mixing datums on the same site can cause severe construction, surveying, and layout errors (see the figure below showing how mismatched datums can cause conflicts on the same project).
- Hardware/software updates: We will need to verify that all GNSS receivers, surveying software, and CAD/GIS platforms support the new reference frames and have the required transformation tools installed.

4. Preparation Recommendations

- Training and education: Equip teams with focused instruction on the shift from static to dynamic datums and its practical impact on workflows.
- Standards and contracts: Audit current specifications and agreements. Specify the reference frame for active projects and document transition procedures for multi year infrastructure work.
- Collaboration with surveyors: Partner closely with licensed professional surveyors to manage transformations and maintain compliant site control under the new reference frames.
- NGS guidance: Leverage National Geodetic Survey materials, including guidance documents, tools, and tutorials, to prepare your organization for the transition.

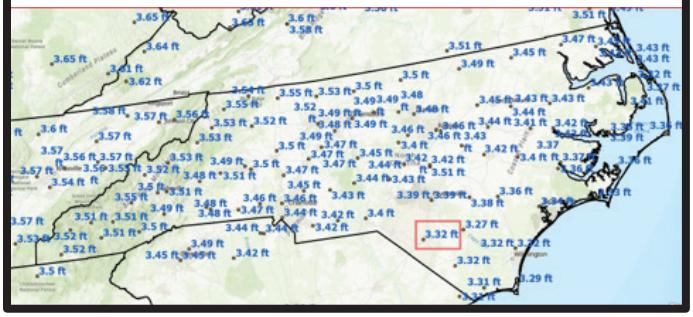
Call for Action by Geospatial Users of the NSRS

Recognize that NSRS modernization is not a software upgrade; it's a fundamental shift in how positions are computed. Treat it as a foundational change and prioritize adoption to safeguard accuracy and safety across engineering and construction. Modernization is a redefinition of positioning, not just new tools, and it must be viewed as a core change in spatial computation to protect accuracy and safety in engineering and construction workflows. NSRS modernization fundamentally changes how spatial positions are calculated. We must prioritize it as such.

Magnitudes of the shifts in datums in North Carolina

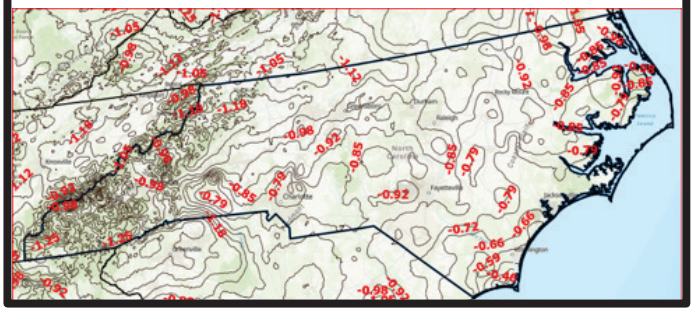
Horizontal: The North American Datum of 1983 (NAD 83) will be replaced by four plate-fixed terrestrial reference frames; e.g., North American Terrestrial Reference Frame of 2022 (NATRF2022).

NAD83 (2011), Epoch 2010 to NATRF2022, Epoch 2020 Horizontal Changes in NC (Units ift)



Vertical: NAVD 88 will be replaced by NAPGD2022—the North American-Pacific Geopotential Datum of 2022—a geopotential datum realized from a gravimetric geoid model.

Difference Between NAPGD2022 and NAVD 88 (Units ift) in NC



Impact: Coordinates and heights will shift significantly (often by several feet). This means that project designs, blueprints, and GIS data based on old datums will not align with modern datasets without conversion.



David B. Zilkoski served as Director, National Geodetic Survey, from 2005 - 2009 and was the Project Manager of the New Adjustment of the North American Vertical Datum of 1988. He currently works as a geodetic consultant on NGS' modernization of the National Spatial Reference System. He is Chair of North Carolina Geodetic Survey Advisory Committee and a member of the North Carolina 2022 Reference Frame Working Group.

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MEMBER PROFILE

Gus Kean, PLS



Gus Keane came to North Carolina to attend college and went on to build his career here as a land surveyor. He spent his childhood in northern Virginia and Maine and manned a paper route for the Washington Post in his Virginia neighborhood. He attended UNC-Chapel Hill in the 90s and graduated in 1996 with a degree in geography. After graduation, he spent a few years in Denver, Colorado, where he held his first industry-related job digitizing maps and creating surface models from contours at LandInfo.

Since his time in Colorado, Gus has worked for three other firms in the surveying and mapping industry. After leaving LandInfo, he began working at Titan Atlantic Group in Raleigh, North Carolina, and he worked his way through the survey department, starting as a drafter and ending up as a project manager. Gus met some of the most influential mentors and peers of his career during these early years. Jesse Price from Titan Atlantic Group taught him foundational skills, introduced him to subsurface utility mapping, and encouraged him to consider licensure, which Gus earned in 2003. Kevin Madeiros worked alongside Gus for years, and they supported one another as they grew and learned the industry.

In 2004, the year after he earned his license, Gus started work for ESP. The variety of opportunities with that group educated him on the many facets of surveying and helped him learn what he liked to do and what he should avoid (not every job is for everyone). He served as a project manager and then as department manager in ESP's Cary office. Seventeen years later, Gus joined NV5 in 2021, where he continues to work today. His role at NV5 focuses on technical and operational challenges and solutions. He is directly involved with SUE, Survey, UAS, GIS, and other services. He also assists in incorporating new technology into workflows and improving existing processes and procedures across the Geomatics group.

In his role at NV5 Gus has been encouraged to keep learning new skills. He enjoys the challenge of adapting to new surveying technology and methods, such as LiDAR scanning, which has revolutionized his career. A new application seems to be developed every day, and he believes surveyors are still learning how powerful and versatile it is as a data collection method. Similarly, his favorite part of his job as a surveyor is the variety of tasks, job sites, and clients. Each project is unique and brings a new set of challenges. He loves a complete site survey job the most, since you get to touch all aspects of the project, from boundary to topography to infrastructure, and see how the various systems complement each other.

As fun as these new surveying challenges are, the most meaningful thing Gus has done as a surveyor is help others come into the industry and develop themselves. He has served the Triangle Chapter of NCSS in all leadership roles and assisted with NCBELS and NCEES in exam formulation and creation processes. He is currently on the Advisory Board for the Geomatics/ Civil Engineering Technology department at Wake Tech Community College. He also volunteers with Future Cities and MathCounts and has just started serving as a mentor in the NSPS YPS program. No matter the topic, Gus believes that supporting programs that academically engage young people matters deeply.

Those young people have the great opportunity to fill future openings in the surveying profession. Gus sees an increased need for positional data and believes that surveyors could be well-placed to manage and produce that data. Acknowledging and embracing the wide variety of applications beyond "traditional" surveying will open doors for the next generation of surveyors. To these up-and-comers, Gus says, "Dive in and learn the basics, the nuts and bolts. Get exposure to as many different types of surveying as you can, then pursue an area of interest that you enjoy." Then you never know! You could grow up to love a big plate of North Carolina BBQ, get curious about natural science, and volunteer for youth programs when you're not surveying too! You could be the next Gus Keane.

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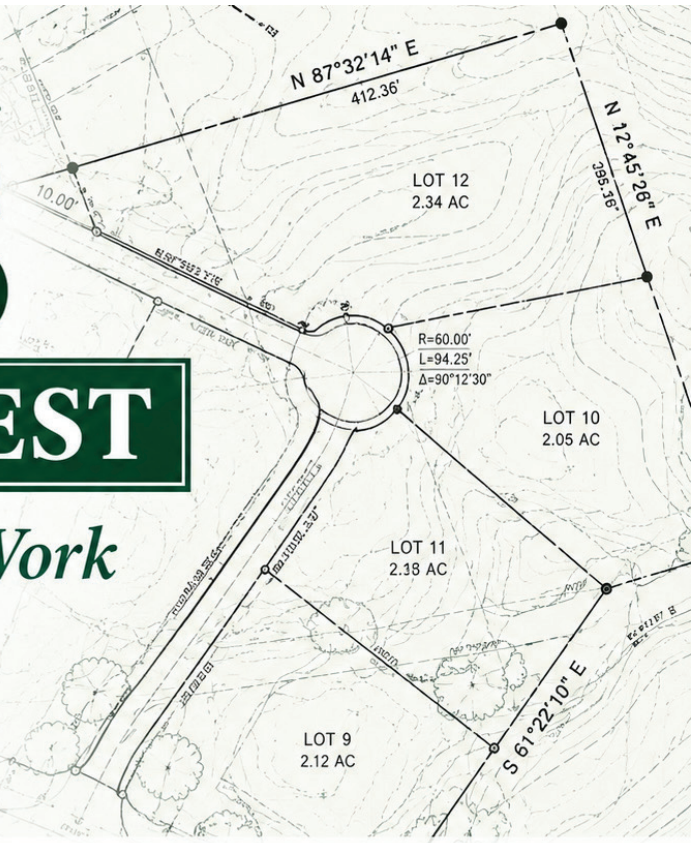

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