The UCLS Newsletter

Volume 5 Issue 1 January 2018

What is it?

The contiguous United States is comprised of forty-eight states between the Pacific and Atlantic Oceans that lies South of Canada and North of Mexico. Furthermore, the boundary of each State is common with the boundary of at least one neighboring State. However, most States share a common boundary line with multiple States. A Tri-State corner is the location where the boundary of three States converge. How many Tri-State corners are there in the contiguous United States?

Answers may be emailed to Susan at srmerrill@ucls.org. The earliest date and time of response will determine the winner.

In this issue: We remind you of the upcoming multi-state surveying conference in Las Vegas Nevada and invite nominations for the annual UCLS surveyor of the year and lifetime achievement awards.

Reduced class enrollment has an influence on the ever-evolving state of surveying education. What do these changes mean to the practicing land surveyor and those students who are preparing to become licensed surveyors? An article by Knud E. Hermansen presents several interesting arguments.

Should a professional land surveyor be certified or licensed? An article by Allison Butler explores the current structure of state regulations and provides recommendations to address the issue. Mr. Butler is interested in your comments and has asked for feedback.

Before the establishment of the international Prime Meridian in Greenwich, the young American Republic pushed for its location to be in central Washington D.C. The history of the Jefferson Pier Marker is a fascinating story of what might have been.

How old is too old to be surveying? Read about a 100-year old Indiana surveyor who continues to work and shares his secrets to a long life.

Our thanks to Michael Nadeau for providing another Dastardly Deed. The Newsletter also contains comics, tidbits, and trivia to entertain and enlighten.

On behalf of the UCLS Publication Committee - Merry Christmas and best wishes in the coming New Year.

We invite you to share charismatic photos of yourself and/or a coworker, panoramic images of Utah's scenic wonders, or pictures of survey related tools and equipment. Additionally, we need interesting and unique descriptions or survey related stories to share with our membership. Remember, if you do not participate you have no right to complain. Please let us know your thoughts, recommendations, suggestions, or complaints.

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"Many people look forward to the New Year for a new start on old habits"
-Anonymous

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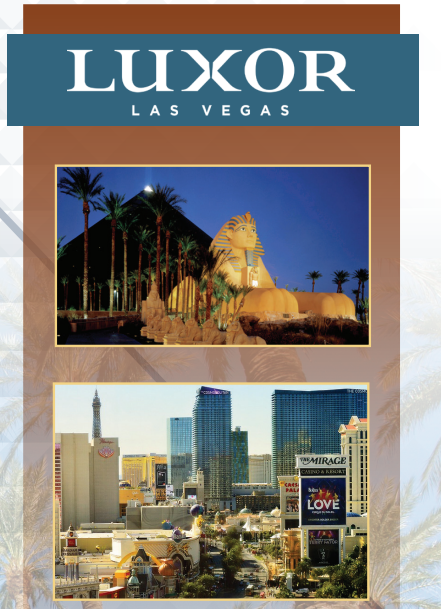
Mark Your Calendar!

APLS NALS UCLS WFPS

Western Regional Survey Conference

February 21-24, 2018

Luxor Hotel & Casino, Las Vegas, NV



- 24 Hours Continuing Education
  - Workshops
  - Technical Sessions
  - CFedS Credits Available
- Exhibits & Vendor Demos
- Silent & Live Auction

Conference Sponsored by: APLS NALS UCLS WFPS

WFPS, South E Street, Santa Rosa, CA 95404 (888) 994-3510

Conference Registration at: www.PLSeducation.org

UCLS Annual Awards

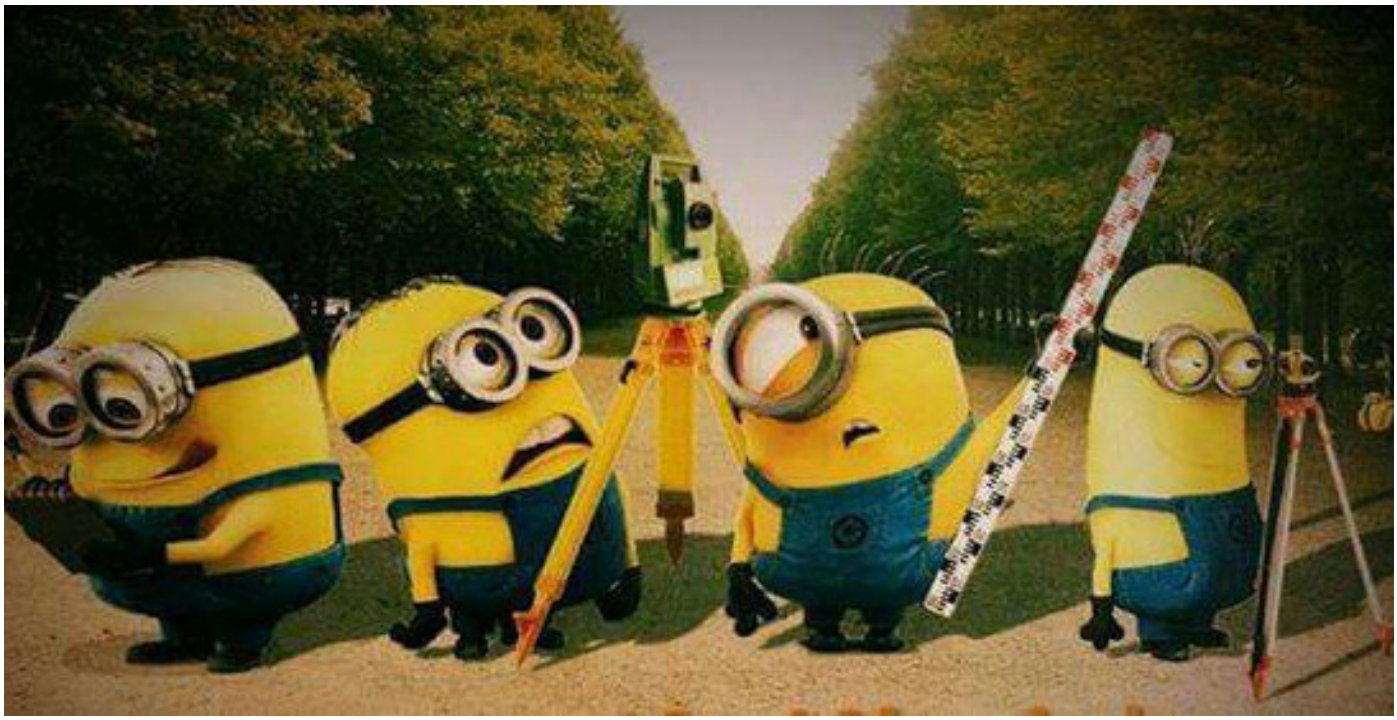
UCLS offers awards for the Surveyor of the Year and the Lifetime Achievement. These distinguished awards are outlined below. Nominations for each award are due on the last day of December.

Surveyor of the Year

Surveyor of the Year Award requirements:
Any licensed member in good standing of the UCLS in good standing is eligible. Prior recipients of the award are ineligible for 10 years following acceptance of the awards. The purpose is to recognize accomplishments over the past year. Nominations may be made by individual members of the UCLS or by a UCLS chapter. Nominations should be placed on an official UCLS Surveyor of the Year nomination form and received in the central office of the UCLS by December 31 or given to the Chapter president of your Chapter. The selection committee shall be the Executive Committee as defined in Section 3-16 in the by-laws. The selection process shall be overseen by the Chair-Elect as set forth in Section 3-20 of the by-laws. The award will not be given more than once a year. The award will be a plaque or equivalent prize as well as a free membership for one year.

Lifetime Achievement

Lifetime Achievement award requirements:
Any licensed member in good standing of the UCLS who has been active in the profession for 25 years or more. This award can only be received once. Contributions, leadership and achievements will be considered. Nominations may be made by an individual UCLS member or by a UCLS chapter. Nominations should be placed on an official UCLS Lifetime Achievement award nomination form and received in the central office of the UCLS by December 31 or given to the Chapter president of your Chapter. The selection committee shall be the Executive Committee as defined in Section 3-16 in the by-laws of the UCLS. The selection process shall be overseen by the Chair-Elect as set forth in Section 3-20 of the by-laws. The award will not be given more than once a year. The award will be a plaque or equivalent prize as well as a lifetime membership to the UCLS.



Surveying Education - A University of Maine Perspective

By
Knud E. Hermansen
P.L.S., P.E., Ph.D., Esq.

I believe it is important to keep practicing surveyors aware of the evolving state of surveying education. I cannot speak for all surveying programs. I can speak for the surveying program at the University of Maine. Let me say that there are many excellent surveying programs and surveying faculty members across the United States. Contacting the program in your state will probably reveal similar initiatives.

Surveying education at the University of Maine takes place in the Surveying Engineering Technology program. The program is one of four programs within the School of Engineering Technology. The School of Engineering Technology is part of the College of Engineering.

The Surveying Engineering Technology program is an ETAC/ABET accredited program. ABET establishes standards for engineering and surveying programs Nationwide.

Faculty within the Surveying Engineering Technology program must have at least a master's degree in surveying or related field, have at least three years of practical experience, and must be licensed as a surveyor. Currently, all faculty within the program have a Ph.D. and licensed as surveyors in at least two states. Two of the faculty are also licensed as professional engineers. One is also licensed as an attorney at law.

Graduates of the program meet the minimum education qualifications for licensure in every state. They also meet the minimum education qualifications for licensure as a professional engineer in Maine.

Students at the University of Maine can opt to obtain a dual degree in surveying and forestry without taking any extra credits. Of course, students choosing this option have no elective courses to choose from.

Students that pursue only the surveying engineering technology degree have a heavier concentration on engineering aspects, geodesy, construction, and land development.

As with many surveying programs across the Nation, student enrollment is less than optimal and is always a concern to the university administration. While there are plenty of jobs with excellent salaries for graduates, it is hard to attract students to the surveying program. Enrollment in the surveying program at the University of Maine is around 70 students. Recent trends show the enrollment is rising.

In the future, the surveying program plans to expand distance education courses allowing students to obtain many if not all surveying courses utilizing distance education. There is now a Professional Science Master's degree in Engineering and Business with a concentration in surveying that is offered entirely on line.

As an aid to distance education students, the tuition for distance education courses for non-Maine residents enrolled in the Professional Science Master's degree program is only 1.25 times the in-state tuition. Veterans receive in-state tuition rates.

In the near future, the surveying program plans to partner with community colleges, engineering, or forestry programs in those states that do not have a surveying program in order to able to offer dual degrees to provide surveying graduates for that state. For example, a student entering an engineering program in XY state university would have the option of taking surveying courses on line that are offered by the University of Maine. Judicious use of electives in their engineering program, established through cooperative arrangements between the programs, would allow the student to obtain both degrees without taking excess credits. Upon graduation, the student would receive a bachelor of science degree in engineering from XY University and a bachelor's science degree in surveying engineering technology from the University of Maine.

If the distance education surveying engineering technology program is approved the tuition rate will be 1.25 times the Maine in-state tuition. Veterans already receive in-state tuition rates.

If any state surveying society or non-surveying program would like to explore this option for their state, contact Ray Hintz at Raymond.Hintz@maine.edu You can also contact Ray if you would like more information on the master's degree with a surveying concentration.

NCEES announces price reduction for FE, FS exams in 2018

Beginning January 1, 2018, NCEES is reducing the Fundamentals of Engineering (FE) and Fundaments of Surveying (FS) exam registration fees by $50 to $175. The reduced fee will apply to registrations completed on or after this date; the new price will not be honored for registrations completed before January 1, 2018.

NCEES member boards voted to lower the price of these exams at the organization's 95th annual meeting in August 2016.

The FE exam is the first of two exams required for professional engineering licensure; it is designed to test students' knowledge of concepts learned while earning an accredited bachelor's degree in an engineering discipline. The FS exam is a similar exam designed for surveying licensure candidates. These exams are currently taken by nearly 47,000 examinees throughout the United States and 15 foreign locations annually. They are computer-based exams administered throughout the year at Pearson VUE test centers.

"NCEES and its member boards are committed to reducing barriers to licensure," NCEES Chief Executive Officer Jerry Carter explained. "Moving to year-round computer-based testing for these exams, which gives candidates greater scheduling flexibility, was an important part of those measures. The organization is taking the additional step of lowering the price of the fundamentals exams to ensure that cost is not a prohibitive factor in starting on the path to licensure."

For more information on the FE and FS exams, visit ncees.org/cbt.

ABOUT NCEES

The National Council of Examiners for Engineering and Surveying is a nonprofit organization made up of engineering and surveying licensing boards from all U.S. states, the District of Columbia, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands. Since its founding in 1920, NCEES has been committed to advancing licensure for engineers and surveyors in order to safeguard the health, safety, and welfare of the U.S. public.

NCEES helps its member licensing boards carry out their duties to regulate the professions of engineering and surveying. It develops best-practice models for state licensure laws and regulations and promotes uniformity among the states. It develops and administers the exams used for engineering and surveying licensure throughout the country. It also provides services to help licensed engineers and surveyors practice their professions in other U.S. states and territories. For more information, please visit ncees.org.

Watch for con men posing as land surveyors

By: Paul Muschick

Homeowners should use caution if someone comes to their door and identifies himself as a land surveyor, as there have been reports of "distraction thefts" association with survey impersonators.

The Pennsylvania Society of Land Surveyors issued a warning Wednesday morning advising homeowners to ask for identification from people who claim to be surveyors.

"Surveyors should always be able to identify their names and the companies they work for, and they should be able to provide valid forms of identification, license numbers, and business cards," Adam Crews, president of the society, said in the warning.

"If they are not willing to do so, then homeowners should be wary, and in all circumstances they should always keep their doors locked," he said. "When in doubt, a homeowner should call the authorities to verify an individual's identification and purpose, especially if the visit was unexpected."

You should apply that advice in other situations, too. Other scammers have posed as employees of water, electric or gas departments in attempts to gain entry to a home and commit a "distraction" scam, where one person keeps the attention of the resident while someone else sneaks in and ransacks the place.

Don't hesitate to contact police if you believe the character on your stoop is shady.

Entrepreneurial Spirited Professional Land Surveyor Wanted

Civil Engineering Technologies, LLC aka (CET), and associated sister company Land Surveying Technologies, LLC aka (LST) seek a Utah Licensed Professional Land Surveyor (PLS). CET is a professionally licensed civil engineering firm on solid ground established in 2010. LST at this point is merely articles of incorporation to reserve the name.

CET/LST seek a PLS with an entrepreneurial spirit , with the desire to build and expand a business as sustainable opportunities are presented. This is a rare opportunity for a PLS to establish a partnership business relationship with no debt. The terms of partnership are negotiable. It is anticipated the PLS, with the correct skill set, will acquire a substantial ownership percentage of LST.

CET is a debt free owner of a newly remodeled 3000 sq. ft. professional office building, with adequate room for future expansion. CET further owns debt free a Trimble 5800 GPS base and rover system, Trimble S6 Robotic Total Station, and TSC2 data collector. Additionally CET utilizes an AutoCAD Civil 3D annual subscription. All facilities will be available to LST, at no charge, to promote the startup of the Land Surveying business.

Have you dreamed of owning a land surveying business, but fear the financial risk? This is your opportunity to become a principal owner of that business debt free from the start!

If you enjoy wide open country, hunting, fishing, camping, ATV trails all minutes from your back door; CET in Roosevelt Utah is the place for you!

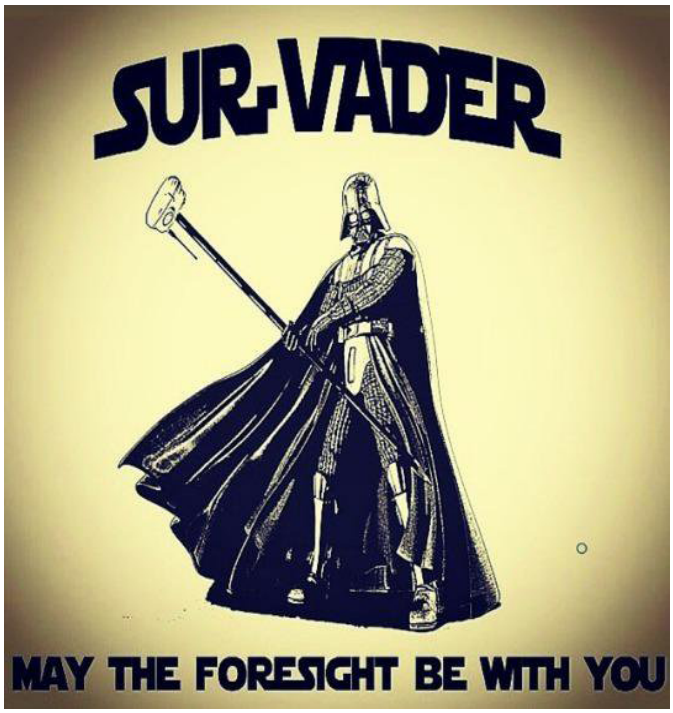
Interested Professionally Licensed Land Surveyors may contact Mr. Greg L. Buxton, P.E by phone or email for additional information.

Greg L. Buxton, P.E.
Civil Engineering Technologies, LLC
383 East Lagoon Street
Roosevelt, Utah 84066
Phone: (435)725-5678
Cell: (435)823-2468
Email: glbengineer@gmail.com

The office of the Salt Lake County Surveyor is currently recruiting for the following positions:

- Survey Tech #17-7164
- Surveyor's Field Operations Manager #17-7136

Additional information and job application may be found at http://slco.org/human-resources/job/



On the Lighter Side

Q: What do you call 50 Architects at the bottom of the ocean?
A: A start

Q: What is it that keeps a roofing team together?
A: Trussed.

Q: Why was the contractor's parcel sore?
A: Because it was a tender package.

Q: What is the similarity between an architect and a slinky?
A: Neither if them serve any discernible purpose, and it's a good laugh to watch one fall down a flight of stairs....

Q: Did you hear the one about the roof?
A: Don't worry.... it's over your head!

Q: Why was the builder so short?
A: Because he had been contracting for a long time.

Q: What do you call an electrical apprentice?
A: A shock absorber.

Q: Why is Christmas day just like a day at a construction site?
A: You end up doing all the work and some fat guy in a suit takes all the credit.

Q: Why did the nosey roofer get the sack?
A: He kept eavesdropping.

Q: How many architects does it take to shingle a roof?
A: Depends on how thin you slice 'em.

This is a Hold-up

I once had an old lady come to a complete stop while I was taking some cross sections of a road with a GPS. She rolled down her window and nervously asked me what I wanted. I said "I'm just doing some topo," and I smiled. She said she didn't have any money for me and that she needed to go.

What a Mess

When I was growing up, there were many acres of woods behind my house that had gotten sold and were going to be used for houses. I used to walk home through the woods from my bus stop, and one day I saw orange ribbons tied to branches as well as numerous stakes with the same ribbons on them.

In an effort to throw a monkey wrench into the works and keep them from knocking my woods down, I'd steal the ribbons and stakes, but they'd always re-appear in a week or two... so I started moving them. A few feet here, a few feet there...

I heard years later that the property lines were massively screwed up, with some houses built straddling lines and all sorts of other issues. Multiple rounds of lawsuits were had. Yay me?

Jefferson Pier Marker

A tiny monument to the unsuccessful attempt by Thomas Jefferson to place the prime meridian in Washington.

In the early days of the American republic, upstart patriots briefly pushed for the location of a navigational meridian passing through central Washington, D.C. This was a time before the international Prime Meridian at Greenwich was established, and many countries based their maps off prime meridians passing through their territory.

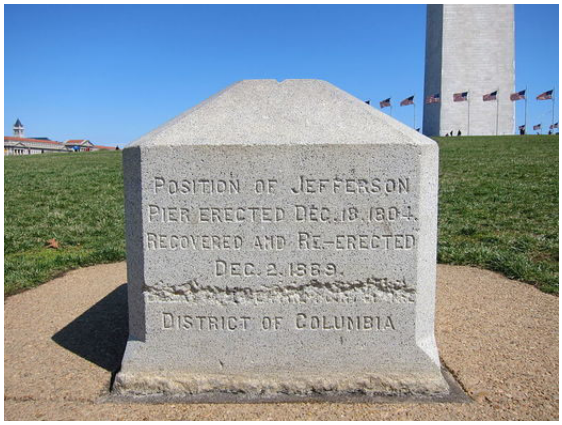
Secretary of State Thomas Jefferson, ever intrigued by surveying, was a key player in the push. To choose the exact location of the latitudinal line, he lined up the White House front door with the Capitol rotunda in 1793, an intersection he marked with a small wooden post, steps from the present-day Washington Monument.

Eleven years later, Jefferson was president, and the wooden post was replaced with a stone block capped with Aquia sandstone. The *Washington Post* archive notes grandly that this point was "to serve as a first meridian from which to reckon longitudes in the very young and patriotic republic" for years to come.

That proved overly optimistic, however, and Jefferson's stone was forgotten about within a few decades. In 1872 work was progressing on the Washington Monument, and the original stone was removed by General Babcock of the Army Corps of Engineers, who was oblivious of the history. Jefferson's meridian dreams were smashed for good in 1884 when President Arthur convened a conference at the State Department to settle on one common international line.

Debate at the Meridian Conference was heated, with the strongest opposition to the English meridian coming from French representatives, who took a "Never Greenwich!" position. (The French favored the neutral but impractical Bering Straits). Economic expediency ultimately cared the day. Greenwich's Royal Observatory already had astronomical equipment on site, so it was cheaper for all involved to convert their measurements to GMT. (The vote was 21 to 1, with France and Brazil abstaining.)

Five years later, a stone pier was re-erected at the site of the original Jefferson marker.



Last months where is it

Evan Wood was the first UCLS member who identified our October "Where is it" competition. However, Brandon Jensen, who was second, informed us that the MARS station is north of Hanksville on Cow Dung Road.

The Mars Desert Research Station (MDRS), owned and operated by the Mars Society, is a space analog facility in Utah that supports Earth-based research in pursuit of the technology, operations, and science required for human space exploration. The relative isolation of the facility allows for rigorous field studies as well as human factors research. Most crews carry out their mission under the constraints of a simulated Mars mission. Most missions are 2-3 weeks in duration, although we have supported longer missions as well. The advantage of MDRS over most facilities for simulated space missions is that the campus is surrounded by a landscape that is an actual geologic Mars analog, which offers opportunities for rigorous field studies as would be conducted during an actual space mission.

MDRS began operations in 2001 as a fully volunteer enterprise. Over 1,000 people have participated as crew and many are now involved in other analog studies at different places around the world. Thousands of other people have supported our mission in many other ways, all of them dedicated to the idea of sending humans to Mars.

Additional information may be found at http://mdrs.marssociety.org/

Certification or Licensing
What Do We Do Now?
by: J. Allison Butler, AICP, PMP

Through key cases in recent years, the current structure of state regulation and licensure of professions has been ruled unconstitutional by multiple courts in recent years, so, potentially, it might be only a matter of time before it disappears from state statutes and administrative rules. The issue today is less about whether the surveying profession will be deregulated, and more about what the profession will develop to replace state licensing laws. While we are at it, we might as well address the profession- building needs of all three core geomatics fields: surveying, photogrammetry, and mapping.

First Things First

Before we describe the problem and propose a solution, we need to agree on the scope of the surveying profession. The basic premise of this article is that surveying, photogrammetry, and mapping represent three distinct, partially overlapping fields of work, and the work of each field is sufficiently different to make separate professional skill sets. I specifically use the word 'mapping' here because I do not believe that using a geographic information system (GIS) is not a profession in the same way that being an expert in using a total station does not make one a surveyor. I believe GIS is a tool that can be used by many professions.

Not everyone agrees with the premise that the geomatics field includes three areas of work. In a lot of states, photogrammetrists agreed to define their field as part of surveying in order to get the benefits of qualification-based selection (QBS) procurements. Surveyors went along with this arrangement because it made their organizations - and political clout - larger, in addition to partially dealing with the declining number of newly licensed surveyors. Practitioners in the mapping field, however, have strongly resisted efforts to similarly expand the scope of the state-licensed profession of surveying to include all types of mapping. This resistance, which has no single point of representation, has met with marginal success, and the question of regulating mapping practices at the state level remains a subject of continued legislative pressure from the surveying and/or photogrammetry professions.

For example, the Virginia Legislature recently considered a bill (House Bill 2145) that would remove an exemption in state law that allowed some mapping work to be done by unlicensed practitioners. The exemption says a surveying license is not required to "(i) determine topography or contours, or to depict physical improvements, provided such maps or other documents shall not be used for the design, modification, or construction of improvements to real property or for flood plain determination, or (ii) graphically show existing property lines and boundaries on maps or other documents provided such depicted property lines and boundaries shall only be used for general information" [Code of Virginia 54.1-402.C]. Some people in the surveying and photogrammetry fields consider this exemption to be a loophole. The mapping profession sees it as a reasonable recognition that not all mapping work needs to be done under the direct supervision of a licensed person. An exemption like this is also an exemption in the requirement for qualifications-based selection, which means that companies competing to do so such work will have to do so on the basis of technical capabilities and price. If I could reduce the number of potential competitors (those without a Virginia surveying license) and remove price from the equation, I would be all for it, so I understand the motive here.

The problem with such legislation is that the courts have already ruled that laws expanding the scope of licensed surveying practice to photogrammetry and mapping are invalid. In fact, the U.S. Supreme Court has ruled, in a 2015 case on restraint of trade, that state licensure and regulation, as it is currently practiced, is unconstitutional and monopolistic. As a result, state licensure is not a long-term solution to preserve the surveying profession and truly protect the public, regardless of how many "professions" it seeks to include. With licensure possibly not being viable in the long term, professional certification must be part of the solution to the problems being faced by the surveying profession. Instead of trying to broaden the scope of the profession through legislation, the profession needs to embrace focused and voluntary certification as its long-term foundation.

It is also not useful to expand the scope of surveying to include all geospatial professions because the path to professional statues is unsustainable. Becoming a member of the surveying profession is strongly based in field experience acquired through apprenticeship. Unfortunately, from the perspective of developing new surveyors, the profession has mechanized the field work to the point that one-man crews are common. Even two-man crews rarely include a licensed surveyor. How do you apprentice on a one-man crew, with up to a dozen crews being supervised by a single licensed professional? Photogrammetry and mapping have also been greatly changed by technology; however, one-man "crews" were always the norm in these fields.

Technological advances in all three fields make it mechanically easier to practice the profession but have done little to alter the aspects of the work that make it truly that of a professional person. In surveying, the rules of evidence and the research they require - and the judgments that must be made - define what I fell is the core professional aspect of the field. For mapping, the core aspects are understanding the limitations of the available data and creating a product that fairly and clearly communicates what is intended. We must find ways to teach the professional aspects of all geomatics fields so that extensive apprenticeship periods are not mandated.

Surveying and, sometimes, photogrammetry are currently subject to state regulation through licensure. Mapping is, thus far, substantially unregulated, although various certification credentials are available. You can be a GIS Professional™ (GISP™) just like you can be a Project Management Professional (PMP) or an Emergency Number Professional (ENP) - I am or have been all of these - in order to demonstrate a particular level of competence in these areas, but they do not really define who you are as a professional person. A GISP may work with spatial data in many fields of application, just as a PMP may apply project management skills by managing a construction project or developing new software. A GISP is just as likely to be a professional forester as she is a biologist or planner.

What Do We Do Now? continued...

Many licensed surveyors have used the fact they are licensed by the state to justify a superior status relative to other professions that are not licensed, like mapping, or to even conclude that practitioners in these other geomatics fields are not professionals because they are not licensed. By this logic, will the deregulation of the surveying profession result in tits declassification as a profession? I respectfully submit that the claimed distinction between licensure and certification as a way to define a "true" profession is an artificial premise of a failed regulatory regime. Licensure has never well-served the surveying profession, it was merely a facade for a week framework that ultimately fails to define it. There is only one option for the future: voluntary certification following clarification of the scope of professional surveying. This model is successful in other industrialized nations (e.g., Sweden) where there are no surveying licenses but instead rigorous certification and education - without a loss of respect of stature for the profession.

In this multi-part article, I explain why state regulation of a licensed surveying profession is unconstitutional, and then offer an alternative approach to preserving and rebuilding the surveying profession through a national certification program.

Part 1.

Legal issues affecting state licensing

You may be thinking about now that you have not heard of any cases that tossed professional licensing laws and regulations out the window. Although there have been several such cases, which we will cover shortly, it is the absence of well-known successful cases *enforcing* state regulations that best demonstrates this conclusion.

Back in February 2011, I asked the Florida Board of Professional Surveyors and Mappers for a declaratory statement that would clearly define what aspects of mapping were within the scope of the regulated practice of surveying and what were not. Their answer was that no part of mapping is outside the regulated scope of professional surveying in Florida. They said that any process that measured and mapped anything fell within the regulated practice of surveying, regardless of scale, accuracy, or precision. Implicitly, they said the only level of precision , accuracy, and resolution permitted was survey-grade. By extension, the only map or imagery that can legally exist in Florida is a survey product.

So, here's my point: If the practice of professional surveying is so inclusive, why hasn't the Board sued AAA for their highway maps, or Google over their online maps, or the car companies for their navigation systems, or the many police departments using surveying equipment to document crime scenes, or the satellite companies doing aerial photography, or the utility companies tracking their facilities? I'll tell you why: because the Board wouldn't stand a chance in court and the entire charade would tumble down. Everything is legal until a judge tell you it isn't. Why give them a chance? Maybe Florida's courts haven't ruled on this question, but they have in other states.

There are two reasons such a lawsuit against these other mapping interests would fall. First, it has been established in the federal courts that all mapping is not within the scope of surveying. Ten years ago, the Washington, DC District Court recognized the existence of a separate mapping profession when Judge Ellis issued his June 2007 decision in the case of MAPPS et al. v. U.S.A., saying, "the record unambiguously reflects that the provision of 'mapping' services in the modern marketplace includes a much broader scope of work than the traditional mapping work of land surveyors" [Opinion, p.4]. The court's conclusion was that a mapping profession exists outside of surveying and that he procurement of mapping services was not subject to the federal Brooks Act and its requirement for QBS. The court also tied the surveying services subject to federal QBS procurement as only those that trace themselves to the practice of architecture and engineering. In short, the Court ruled that other people besides surveyors compile spatial data and make maps, and the rules governing surveying do not apply to their work.

Second, state regulation of mapping and photogrammetry violates two clauses in the U.S. Constitution, the Federal Trade Commission Act, and the Sherman Anti-trust Act. The first Constitutional clause that applies is the Interstate Commerce Clause, which says only the federal government has the authority to regulate business practices that cross state lines. It also blocks regulations in one state that disadvantage merchants and service providers in other states. The time when the U.S. Constitution was drafted was a period of great concern regarding the threats posed to the new country by the various self-interests of the states. Our founding fathers wanted to keep parochial state interests from blocking the free flow of goods throughout the country, so they included, as the third paragraph of Articles 1, Section 8 of the U.S. Constitution, the power for Congress to "regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes." Through what is referred to as the "dormant" element of this clause, the states are prohibited from unduly burdening interstate commerce or discriminating against out-of-state businesses.

The second Constitutional element that applies to state professional licensing laws is the Due Process Clause contained in the Fifth and Fourteenth amendments. The version in the Fourteenth Amendment specifically prohibits the states from taking any action that will "deprive any person of life, liberty, or property, without due process of law." Liberty has been defined by the U.S. Supreme Court fairly broadly, if not unambiguously, to include the right to work in the job of one's choosing. Like the Interstate Commerce clause, the Fourteenth Amendment's due process requirement has an implicit element. That"substantive due process" element has been applied by the U.S. Supreme Court as placing limits on state legislative actions related to regulating professions, among other things.

For example, in *Lochner v. New York* [198 U.S. 45 (1905)], the U.S. Supreme Court said it was a violation of the due process clause for the state to restrict the working hours of bakers. The Court found the public benefit of restricting working hours did not justify prohibiting bakers from working when they wanted. Similarly, the Court could rule that restricting the mapping profession to licensed surveyors does not meet the requirements of the due process cluase because of the lack of public benefits sufficient to outweigh the limitations such a law would impose on mappers, particularly in light of the federal court's finding in MAPPS, et al. v. U.S.A. Even in the typical unlicensed practice case that might come before a state regulatory board, due process is more than just having a hearing in accordance with some defined process. The first requirement is that the decision

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by an unbiased tribunal. There is no such state board of professional surveyors that meets this requirement in light of two federal laws and multiple court rulings.

Those two laws are the Federal Trade Commission (FTC) and Sherman Anti-trust acts, which can be reasonably treated as one legal requirement for the purposes of this discussion. Together, these federal laws are intended to prevent actions that limit competitive trade and create monopolies. The Sherman Anti-trust Act has, perhaps, the longest period of application to the question at hand in that federal and state laws to establish QBS processes for procuring surveying services, among other professional services, originated as a result of a U.S. Supreme Court ruling in 1978[1]. At the time, the National society of Professional Engineers (NSPE) prohibited their members from responding to any solicitation that included price as a selection criterion. In other words, the NSPE required its members to seek work only through the QBS process.

The Court ruled that this requirement violated the Sherman Anti-trust Act, saying, "any official opinion, policy statement, or guideline stating or implying that competitive pricing is unethical" is a violation of the Sherman Anti-trust Act (26 Stat. 209). The District Court that heard the case "was convinced that the ethical prohibition against competitive bidding was, 'on its face, a tampering with the price structure of the engineering field in violation of Article 1 of the Sherman Act'." In response, the Society argued, "its attempt to preserve the profession's traditional method of setting fees for engineering services is a reasonable method of forestalling public harm, which might be produced by unrestrained competitive bidding."

The U.S. Supreme Court rejected it all, ruling the Court of Appeals had the right idea in allowing the Society to "adopt some other ethical guideline more closely confined to the legitimate objective of preventing deceptively low bids," when striking down the code of ethics requirement for a QBS procurement process. "That engineers are often involved in large-scale projects significantly affecting the public safety does not justify any exception to the Sherman Act."

So, why is QBS still used? It is because the courts have adopted a "state action" exemption that says essentially, legislative bodies may enact laws that cause what would otherwise be violations of the Sherman Anti-trust Act to be legal. As a result, we got the Brooks Act at the federal level and the so- called "mini-Brooks Acts" at the state level to establish QBS. This means that, absent the state action exemption, QBS would be illegal.

Beyond QBS, federal anti-trust laws still have a big impact on the ability of the states to regulate geomatics professions and the spatial data that flow freely on the internet and other avenues of interstate commerce. Survey-generated data, like property boundaries, is no different once it is published. Under the dormant interstate commerce doctrine, courts will strike down any state law that expressly mandates different treatment of in-state and out-of state providers of identical products or services when the result is better treatment for in-state providers. The state must demonstrate to a high standard that the law does not have a protectionism purpose and that there is no less discriminatory way of meeting that purpose. Such laws will also be struck down if they control conduct that occurs completely in another state. The overall intent of the dormant doctrine is to prevent the disparate treatment of commercial interests in the different states.

There is clearly disparate treatment of commercial interests in the surveying, photogrammetric, and mapping fields. Florida takes, perhaps, the most extreme view whereby everything related to photogrammetry and mapping is regulated as the licensed practice of surveying. Not every state has adopted such a position. In South Carolina, for example, the law includes a class of license called a Professional GIS Surveyor who "creates, prepares, or modifies electronic or computerized data including land information systems and geographic information systems relative to the performance of the activities described in subsections (a) and (b) above" [S.C. Code Ann., 49-22-20(26)(c) (Supp.2016)]. (Subsections (a) and (b) are the activities reserved for professional land and photogrammetric surveyors, respectively.) It then goes on to list a number of exceptions from the chapter itself in 49-22-280 and from the practice of TIER A surveying, which includes the Professional GIS Surveyor, in 40-22-290. Notably, this last section exempts "the use of all civilian or commercial remotely-sensed satellite data" but not aerial photography [40-22-290(5)]. Thus, photogrammetry using aerial photography is regulated but photogrammetry using satellite imagery is not. Fortunately form e and most other GIS practitioners, South Carolina law also says "nontechnical maps...prepared by private firms or government agencies for use as guides to motorists, boaters, aviators, or pedestrians" are exempt from regulation as a surveying product [40-22-290(1)(a)]. (The term 'nontechnical map' is not defined.)

Most states also call for a licensure applicant to meet certain requirements specific to that state. Virginia, for example, required applicants to pass a "Virginia-specific photogrammetrist exam" in order to be licensed as a surveyor photogrammetrist [18VAC10-20-310.B.1]. This same requirement exists when an applicant is licensed to practice in another state and seeks licensure in Virginia through comity [18VAC10-20-360.C.]. Although it appears to treat in-state and out-of-state providers in the same manner by requiring all to pass a Virginia-specific exam, licensure itself presents a formidable obstacle to doing business in the state when the practitioner resides in a state where licensure is not required to do the work offered.

The problem is that each state has its own requirements - requirements that place a burden on interstate commerce. Technology now allows me to make a highway map of Florida for sale in that state while I work in South Carolina, where I do not need a license. Florida says the map must be created by a Florida-licensed professional surveyor and mapper. Do the laws of Florida or South Carolina apply to my work? If both apply and the company is based in South Carolina, it can make all the navigation mapping systems it likes - as long as it doesn't include Florida in its coverage. If it does, then Florida says the person producing the map has to be a Florida-licensed professional surveyor and mapper. This is disparate treatment that not only directly interferes with interstate commerce by precluding the products made in another state from being sold in Florida, it also seeks to control work done entirely in another state. Both of these results are prohibited by the dormant interstate commerce doctrine.

This scenario does not mean that South Carolina's laws are free of potential issues with the dormant interstate commerce doctrine simply because they are less-restrictive than those of Florida. My

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out-of-state mapping scenario relies on commercial data collected by others, while states like South Carolina may exempt collecting such data. So, while my mapping work may be protected, the same may not be true for the company compiling the raw data upon which I base my map. Google, for example, compiles its maps using a combination of aerial photography and GPS - derived location data collected by Street View cars. I can assure you that surveyors are not flying the airplanes or driving the cars.

But, really, every state is conflict with the dormant interstate commerce doctrine when it seeks to regulate an activity that exists in interstate commerce. And it doesn't matter if the mapping is done only in that state. This is not a new thing. As far back in time as its decision in *Gibbons v. Ogden*, 22 U.S. 1 (1824), the U.S. Supreme Court found that in-state activity could be prohibited under the Interstate Commerce Clause when it was part of a larger interstate commercial scheme. In *Swift and Company v. United States,* 196 U.S. 375 (1905), the Court found that business done even at a purely local level could become part of a continuous "current" of commerce that involved the interstate movement of goods and services. This particular case dealt with the beef production industry, but it applies equally to the spatial data production industry, especially when it puts together locally produced data and maps to create a national product.

In Justice Holmes' opinion for the majority, "when this is a typical, constantly recurring course, the current thus existing is a current of commerce among the States." He further said the purely in-state practice of beef dealers could be found to exist in interstate commerce because "its effect upon commerce among the States is not accidental, secondary, remote or merely probable." This means the production of spatial data (our "beef"), which is pervasive in interstate commerce because of the continuous "current" of commerce upon which it exists.

That continuous current is best exemplified by the Internet. The Internet is a place of commerce for spatial data. In federal district court decision of 20 years ago, the court said, "[t]he unique nature of the Internet highlights the likelihood that a single actor might be subject to haphazard, uncoordinated, and even outright inconsistent regulation by states that the actor never intended to reach and possibly was unaware were being accessed. Typically, states' jurisdictional limits are related to geography; geography, however, is virtually meaningless construct on the Internet" [*American Library Ass'n v. Pataki,* 969 F. Supp. 160, 168-69 (S.D.N.Y. 1997)]. What the court is saying, applied to our examples, is that I could post a map of Florida online from my office in South Carolina intending it to be used only by people in South Carolina, but that, upon its being accessed by people in Florida, subjects me to the regulations of that state. This puts my map in interstate commerce and precludes state regulation.

Lest you think that it is still a stretch to extend the scope of the Interstate Commerce Clause to state regulation of surveying and, potentially, all spatial data, I need only list one more example: The Civil Rights Act of 1964. Title II of this landmark legislation, which prohibits discrimination in "goods, services, facilities, privileges, advantages, and accommodations of any place of public accommodation," was founded on the Interstate Commerce Clause and has been repeatedly ruled by the courts to apply to what may be otherwise described as very local decisions. The reason is because those local decisions will impact people coming from other states. The Act defines interstate commerce as existing whenever goods and services may be provided to persons from other states, or when any of the inputs to the service moved in interstate commerce. Thus, even though each state limits its rule to its own jurisdiction, a client seeking to identify developable property in many states has to deal with a number of state-specific regulatory schemes when procuring mapping services.

This line of reasoning is not some outlandish conjecture. Federal preemption of state actions is well known. The editor of another magazine focused on the surveying field called upon the profession to "push for some federal exemption through a blanket provision giving all land surveyors certain rights of access" in a recent editorial ["Beyond the 'Yellow Pages Test' for Surveying," *Point of Beginning,* March 2017, p.6]. His motivating concern was the disparate state laws governing the right of surveyors to enter private property in order to do their work. His proposed solution can only happen through invoking the Interstate Commerce Clause, and only because local conditions impact interstate commerce.

The net effect of state regulation of photogrammetry and GIS (and probably the products of boundary surveying) is to discourage small firms from being able to operate without meeting the terms of each state's regulations. State surveying boards frequently issue cease-and desist orders to smaller firms and individuals who are preforming work the boards consider to be within the state-regulated scope of the licensed practice of surveying. These firms are too small to undertake the time and expense of a lawsuit challenging the state board and the legislation upon which it bases its actions. Meanwhile, the big companies that might successfully fight the state in court using the arguments noted above are essentially ignored in order to preserve the status quo. This approach does not always work.

For the final nail in the coffin of state regulation of the surveying profession, I offer two cases: *NC State Bd. of Dental Examiners v. FTC* in the U.S. Supreme Court (574 U.S. 13-534, 2015) and *Patel, et al v. Texas Dept. of Licensing & Regulation, et al.* in the Texas Supreme Court (No. 12-0657, Feb. 27, 2014). Both cases demonstrate that there is a limit to the state action exemption for anti-competitive actions by legislative bodies. The North Carolina case was the result of the state's Board of Dental Examiners deciding that teeth whitening, which was being performed by unlicensed persons, was within the regulated scope of dentistry. The Board subsequently sent cease-and-desist letters to scores of teeth whitening service providers and product manufacturers. Some recipients of these letters appealed to the Federal Trade Commission, which ruled that the dentistry board's action was contrary to the FTC Act, primarily because the Board was not sufficiently supervised by the state. The court said, "Because a controlling number of the Board's decision makers are active market participants in the occupation that Board regulates, the Board can invoke state-action antitrust immunity only if it was subject to active supervision by the State."

The Court specifically rejected the Board's argument that its actions were consistent with the state legislature's policy to protect the public from harm, finding "a wealth of evidence...suggesting that non-dentist provided teeth whitening is a safe cosmetic procedure" [p.4]. This sounds a lot like the case with mapping by

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the D.C. court in *MAPPS et al. v. U.S.A.*

To see how this affects state regulation, take, for instance, Florida's Board of Professional surveyors and Mappers, where seven of the nine Board members must be active licensed surveyors. This arrangement is fairly typical among the states. For this body to be able to avoid monopolistic behavior under the Sherman Anti-trust Act, it much be directly supervised by the state. According to the ruling, "The Court has identified only a few constant requirements of active supervision: The supervisor must review the substance of the anticompetitive decision...; the supervisor must have the power to veto or modify particular decisions to ensure they accord with state policy...; and the mere potential for state supervision is not an adequate substitute for a decision by the State..." [p.18]. The only way to fix the problem is for a state surveying board either to have a majority of its members from outside the profession or for the state to specifically review and decide on every action the board takes that could limit competition. Both options put non-surveyors in charge of the profession. Is that really what we want?

The Texas case is a bit more limited in its scope but equally applicable to the state regulation of the surveying profession. In this case, hair removal providers , what they call "threaders," were being required to have 750 hours of training in cosmetology from approved sources in order to be licensed by the state. The threaders argued in court that most the training required had nothing to do with the practice of their profession, nor could it be generally perceived as protecting public health. The threaders felt this onerous requirement senselessly burdened their ability to practice without doing anything to protect the public.

The Texas Court agreed, finding two conditions to be true that are directly applicable to the issue of state regulation of photogrammetry and mapping as part of the field of surveying. First, they found that the "Commission-approved beauty school's were not required to teach threading techniques" and, second, they found that "threading techniques are not required to be part of the mandated tests" [p.29]. The same situation exists with those states that regulate surveying by relying on the results of NCEES exams. The fundamentals of Surveying exam has only 4-6 questions on photogrammetry and 5-8 questions on GIS out of 110 questions. There are no questions at all on these topics in the Principles and Practices of Surveying exam. And then there is the common requirement for a four-year degree in an approved course of study and four years of apprenticeship under a licensed surveyor to qualify for the exam. How much of this course of study is in photogrammetry and general mapping?

Doubling down on state regulation is not the way to enhance or preserve the surveying profession. Not only is the profession ignoring the fact that state regulation has effectively been overturned for the reasons stated above, it is at the whim of an increasingly volatile body politic that has significant factions opposed to any state regulation. Florida and other states have already seen bills introduced and passed by one or more state legislative committees to completely de-regulate the surveying profession. All you have to do is aggravate, say, Google or Microsoft, and their big dog lobbyist will punt the surveying profession off the field. We must quickly develop the new structure for the geomatics profession.

A National Program for Surveyor Education and Certification

Earlier, we showed how the current state licensure regulations governing the surveying profession are illegal. They are in conflict with two Constitutional provisions (interstate commerce and due process) and violate anti-trust legislation. It is only a matter of an increasingly shorter time before there is no state regulation of any portion of the geomatics field. The task now is for the surveying profession and the allied professions of photogrammetry and mapping to come together to develop a new professional practice structure based on a standard set of education courses and voluntary certification. None of these professions should require licensure.

The first requirement is for all of us to agree on the scope of each field-based geomatics profession, I purpose that there are three:

- *Surveying,* which would emphasize boundary surveying at its core with additional specializations in geodetic surveying and high-precision measurements. While there may be state-specific knowledge requirements due to varying property laws, the basic methods of the profession are universal.
- *Photogrammetry,* which would involve creating imagery products, like lidar, orthophotos, and obliques. This profession is almost entirely based upon technology and physical laws.
- *Mapping,* which uses data compiled by surveyors and photogrammetrists along with less rigorously compiled at a from a variety of sources to produce graphical products and data sets intended to communicate a particular message. In addition to understanding the tools and methods of communication through maps and judging the suitability of data sources, a mapper must make interpretation judgements when performing such tasks as creating a line to show the path of a braided stream or assembling a property tax map.

Admittedly, technology is blurring the boundaries between these professions, but the ambiguity of distinguishing whether, say, doing terrestrial lidar is with the scope of surveying or photogrammetry is only an issue within the regulatory arena of state licensing. Remove that regulatory structure, where a practice must be wholly within or without a field of licensed practice, and terrestrial lidar become a tool that fits well within a certification schema; i.e., the ability to perform a terrestrial lidar project is a suitable subject for certification. GIS is also a tool for which certification has been demonstrated to be a successful regimen for identifying qualified users. Using the measurement tools of survey is similarly suitable for certification that could be equally valuable for a mapper as it is for a surveyor. Surveying, however, is a field of practice where legal judgements play a greater role than technology in defining the core skills of the profession. I have previously argued elsewhere that the field of surveying should be seen more as a branch of the law than of architecture and engineering. It will be complicated, but not impossible, to construct a certification program for the legal aspects of boundary surveying and property rights.

It is sufficient for the balance of this discussion for us to consider these three geomatics fields - surveying, photogrammetry, and mapping - as the rough outline of the practice areas to be

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addressed by education and certification programs. There would be no state regulatory systems based on licensure to tell you which profession you may practice. Whether you are a professional surveyor, photogrammetrist, or mapper will be a self-assignment is sure that could be supported by one or more certifications.

Earning a certification usually required the applicant to learn basic elements of the field, and then to pass a test to demonstrate competency in fundamental areas. There are usually education and experience prerequisites to qualify to take the test. In this way, certification is like licensing. The key difference is that certification is usually voluntary for participation in a field of work while licensing is usually mandatory. Being certified makes you more marketable because it suggest you have superior skills and will provide a better service, but it is generally not a requirement to work in the field. Being licensed is usually a requirement to becoming a member of the regulated profession. As was demonstrated in Part 1, professional regulatory structures are unsustainable, so, like it or not, certification is the best option available for the future.

While each certification represents a set of skills and knowledge, they all expect you to apply those skills and knowledge to solve problems in an area of application. In other words, it is generally not enough to have competency in the area of certification, such as GIS or photogrammetry. You must also possess knowledge and skills in another area in which you apply those technologies and methods, like planning, engineering, or biology. You are really a professional in one of these fields but possess a special ability to use a particular tool and/or technique in that profession, as recognized by a certification.

Professional planners, for example, may be certified as a general planner and subsequently get additional specialization certification in urban design or transportation. They may also get certifications in allied fields, like project management, GIS, or energy efficiency. A photogrammetrist may design the imagery system for agricultural mapping and produce the raw output of that system, but a biologist will be the one to collect ground truth data that can be used to turn the imagery into information that generates the desired final output. If the biologist is herself a certified photogrammetrist, then she may be viewed as being better qualified to do that type of work, but as a professional biologist, not a professional photogrammetrist.

Building a Surveyor Professional Certification Program

For better or worse, we have existing certification programs for photogrammetry and GIS provided through the American Society for Photogrammetry & Remote Sensing (ASPRS) and the GIS Certification Institute (GISCI). This means our immediate need is to develop a certification program for surveying, a this is the field where there are currently no offerings due to the coverage of regulatory licensing systems. The proposed outline of as revised program consists of the following actions:

1. ***Adopt a clear statement that designs the scope of the surveying profession.*** Such as a statement should differentiate between surveyors and other geomatics practitioners. Those of us who practice as professional surveyors must formally define the scope of practice in a manner that allows market space for the other geomatics fields; i.e., photogrammetry and mapping. We need a clear and simple way to refer to the surveying profession. Consider this the marketing message. This initial action will likely be the most difficult to complete, but we cannot take any subsequent actions without settling this issue. The U.S. Department of Labor has already adopted a Geospatial Industry Competency Model that can be the framed work for the additional details needed to clarify the surveying profession and its core competencies.
2. ***Base the new certification program on professional practice standards and best practices.*** Professional practice standards, recommended practices, and best practices should be developed and publicized in order to get wide acceptance of how the surveying profession should be conducted. These standards should include elements of professional judgement, not just technical skills and scientific knowledge.
3. ***Put the new professional surveyor certification program under the direct control of the professionals it seeks to recognize.*** Certified professionals should be in direct control of the organization that defines them and established the threshold for entry into the profession. There are a sufficient number of licensed persons to make them the initial leaders, but there must be a level of balance that includes room for people how use surveying services, including members of other geomatics professions. The National Society of Professional Surveyors (NSPS) is not the right host for professional certification, as it could be seen as a proxy for existing anti-competitive regulation. An independent body that is not tasked with promoting the surveying profession and lobbying the Congress and state legislatures is needed to direct the certification program.
4. ***Recognizing that it will take many years to create a full set of fundamental practice guides on which to base the professional certification program, adopt and intern solution.*** The profession should develop a transitional certification program based on the NCEES exams and model rules. Competency at the professional level may be sufficiently established as a set of basic technical skills combined with awareness of both technical and judgement issues that go beyond the ability of most practitioners. This is a "thin but broad" approach that can be filled in over time to produce a full certification regimen.
5. ***Create a formal education program to ensure the practitioners have the basic technical foundation for using the tools and methods of surveying.*** A strong education program for new entrants and practitioners who need to know the basics and long-term professionals seeking to keep up to date should be part of the certification development process, with each adopted standard and best practice being covered by at least one course or workshop. Do not adopt a standard, and then figure out how to teach people how to apply it; develop the course while creating the practice standard. The education program should also help professional surveyors fill gaps in their educational backgrounds and stay up to date on new technologies and methods. The National Geospatial Technology Center of Excellence includes cores of these education institutions and industry participants with the ability to make this happen.

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6. ***Accredit academic programs that prepare people for entry into the surveying profession or provide continuing education.*** I am talking about more than ABET accrediation of a four-year program since we need to accommodate two-year programs at community colleges and continuing education courses (some groups refer to the latter as "certification maintenance"). Graduation from an accredited educational program should be recognized by a professional credential, such as "Surveyor-in-Training."

Action 5 in the list shown above calls for creating a formal program that includes initial and continuing education elements. The pre-entry education programs that focus on college courses is substantially addressed by existing accreditation programs, but it will need to be extended to the community college level. A combination of certification-specific and continuing education courses will need a form of accreditation that does not currently exist. Developing courses for both levels of education is a major part of the solution, but field training experience will remain an issue that traditional classroom offerings cannot provide.

A four-year apprenticeship is not a sustainable method for gaining field experience prior to certification. Viable alternatives include a much shorter work experience period prerequisite for certification, potentially including internships, which can occur while the future-surveyor is still in school, in addition to levels of certification. I believe that community colleges are the key to providing the surveyor education components needed to provide the productive capacity required to replenish the ranks of the surveying profession. This is an area where there is a national organization in place to coordinate the work. The name doesn't really convey what the National Geospatial Technology Center of Excellence does, but it is nevertheless the organization to which the surveying profession needs to turn for educational programming at all levels of higher education.

I am certainly not the first to recommend moving away from regulation as the basis for the surveying profession. For example, the International Federation of Surveyors (FIG) created a task force on mutual recognition of qualifications that sought to define the universal aspects of the surveying profession so that members of that profession might have some mobility in practice. The task force concluded that any universal definition of competence "should not be introduced with the force of government." It distinguished competence to perform a task from professional competence, the latter being "a more complex range of skills and which includes potential to deal appropriately with new problems in a professional manner."

FIG attempted to address the mobility of professional surveyors from country to country, which it saw as a potential market entry barrier. In the process, it compiled a catalog of methods by which practitioners in various countries became recognized as surveying professionals. All of the examples cited except two (Australia and USA) used certification by an independent body as the threshold. Australia switched to certification after the report was published, leaving only the USA with government-issued licensure. More notable, perhaps, is the lack of any sub-national professional recognition method anywhere except in the USA, where state regulation exists (for now).

However, the USA actually has state-specific legal requirements for survey products, primarily due to differences in real property ownership laws. Some state-level elements need to be included in a comprehensive solution. National certification is likely not a solution to this part of practice of the surveying profession. What then?

As noted earlier, there is a way for state regulation to continue for boundary surveying practice and that is to put mostly the customers of surveying services and products on the regulatory board. Such a board could consist of primary clients or users of surveying, such as attorneys, mortgage bankers, property appraisers, and mapper - people who are well qualified to say what products they want to receive and how they will be used. These boards would not determine who could practice surveying, but would instead serve as a quality control mechanism for the output of surveyors. Regulation of the boundary surveying practice area, for example, could consist of product compliance reviews by the state regulatory boards, while the various professional associations and certification bodies would develop the continuously evolving means and methods for creating the products. No one would say who could practice surveying, but the market would recognize the superior capabilities of a certified professional. This solution satisfies constitutional and other legal requirements described in Part 1 related to anti-trust and interstate commerce issues by removing the state regulatory process from control by members of the surveying profession while continuing to involve them. Combined with a unified education framework and the voluntary certification program conducted by surveyors for themselves, this three-part solution checks off all the boxes.

This multi-part article has shown that surveying, like other professions, has been significantly affected by various federal legislative acts and court rulings. The result is that state regulation of the profession, as it exists today, is unconstitutional and anti-competitive. The surveying profession needs to construct a new foundation based upon practice standards, education, and certification. State regulatory boards may continue to exist only if they are composed on non-surveyors and focus on the products of surveying. The solution proposed here is but an example, one intended to serve not as the model but as a call to action. The surveying profession needs to act quickly if it is to have a professional structure in place before the ineffective and illegal state regulatory system is removed.

Reprinted with permission of the author, J. Allison Butlerand the approval of xyHt publication J. Allison Butler has been involved in the geospatial field for 40 years. You can reach him at abutler@mpzero.com

When Age Is a Headline:
Surveyor stays on job as century mark looms
by: Bill McCleery

Amid other historic milestones for the Hoosier State of recent note, here's one that's not gotten quite as much coverage as, say, Indiana State Parks' centennial.

DNR surveyor Robert Vollmer turns 100 years old on May 20, 2017.

"I didn't aim to stay on this long," said Vollmer, who joined DNR in 1962, and is, of course, that state's record holder as its oldest full-time employee. "But it kind of stays in your blood, you know?"

On a routine basis, Vollmer drives to DNR properties in every corner of Indiana and tromps into woods and weeds, many times alone, to perform topographic, site and property-line surveys. He collects technical field data for the DNR's Division of Engineering and provides boundary lines and other site information for the DNR landholding divisions - State Parks, Fish & Wildlife, Forestry, Nature Preserves, Outdoor Recreation and Land Acquisition.

Asked when he might retire, Vollmer says he intends to hang it up when he feels too old to drive or too weary of enduring bites from ticks and mosquitoes during a day's work.

"Some days I feel I'm getting very close to retirement," he said.

But he loves his job too much to walk away. Duty has taken him to 90 of Indiana's 92 counties - all but Dearborn and Switzerland. "I don't care where I go," he said. "It's not the area, it's the people you work with who make the difference in whether you enjoy it or not. And I've worked with a lot of good people.

SECRETS TO A LONG LIFE

Vollmer partly attributes his longevity to genes. His mother lived to 108. But he also credits staying active and making sensible choices.

"Your body is similar to an automobile engine," he said. "You must read it accordingly. Keep it running to circulate your blood and keep the vital parts well-oiled by staying in motion.

"I've always managed to breathe plenty of fresh air along with some of the filthy stuff. I never have smoked or used tobacco. I always thought it as stupid to intentionally inhale something that you knew was harmful."

Keeping one's mind active is as important as physical exercise, he added. Vollmer enjoys staying up with the latest technology, working from his laptop in the field and employing high-tech surveying tools. He described a robotic instrument called the Trimble S6 total station that swivels on its tripod from a stationary location to follow him wherever he ventures with a handheld GPS device.

"That handheld GPS enables us to get our position on Earth," he added. "It communicates with satellites in space, both U.S. and Russian. They let us use theirs, and we let them use ours. I used to have to work out geolocation using trigonometry. It might take me hours whereas now I just take my finger and, pow, instantly I've got it right in front of me."

Vollmer's supervisor marvels at the man's energy.

"He never wants to be idle," said DNR Engineering director Dale Gick. "He's always on the go, always moving. He works all the time, nights and weekends, everything. His institutional knowledge is incredible."

Sometimes his boss worries the surveyor will overdo it.

"I try to get him to be cautious when it's too cold or too hot out," Gick said. "And I try to get him to take someone with him, such as a property manager, at whatever site he's working. But he always says they were busy and he didn't want to bother anybody."

Vollmer is a valuable mentor to younger employees, Gick added.

"It's amazing how someone at 99 years old can be so excited and get up to speed quickly on new technology," he said. "We actually haven't had training yet for that new GPS unit, but Bob's already out using it."

Gick is less than half his employee's age.

"I'm 46," he said. "I can't imagine what it would be like to work another 50 years."

According to Ashley Hungate, communications director for the State Personnel Department, the record for seniority accumulated by a state employee belongs to Louis Douglas, who retired on Oct. 19, 2012, after 65 continuous years with the Department of Health. Douglas, however, was 89 at the time.

Vollmer was already 45 when he joined DNR in 1962- and he had already worked for more than a quarter-century in other roles, including (like Douglas) serving in World War II.

EARLY YEARS

Growing up in Washington, in Davis County, the future DNR staffer worked his first job as a gas station attendant while still in high school. It was in this role, he says, where he regularly encountered Matthew Welsh, who would become governor by the time Vollmer became a state employee. He chuckled at his first recollections the state's future leader.

"He was just a snow-nosed kid going to law school and as dating a girl who went to my high school," he said. "He drove his dad's big Cadillac and always had to get just enough gasoline to get his dad's car home. One time he held his hand out with a dime and asked for a dime's worth. When he became governor, I told him about that."

Like many in his generation, Vollmer enlisted in the armed services in 1941 upon hearing about Pearl Harbor. But he did so for three branches - the Army, Navy and Marines. He served with the Navy, the first one to swear him in.

"I was all over the Pacific," he said. "My first tour of duty was on the last island in the Aleutian chain, about 700 miles from Japan. I was a machine gunner.

During his wartime service, he survived a avalanche on the island of Attu that took the lives of several others. He did so by carving out an open space while buried under the snow and then dropping handfuls of it on his face and seeing in which direction it fell. By determining which way gravity carried the snow, he knew to dig in the other direction to reach open air.

Perhaps his most difficult wartime stint occurred in the Philippines.

When Age Is a Headline...

"We had to get used to mosquitoes in the jungle. They were so bad," he said. "We had mosquito patrols when we were fighting around those swampy areas and jungles. We had guys who would spray Johnson's Baby Oil where ever water was standing to kill all the larvae."

To this day, Vollmer takes medication prescribed for malaria. He might be fine without it at this point, he says, but a doctor told him it would help keep the disease at bay, so he continues with the regimen.

Another memento he keeps from his wartime service is his prized 1942 Willys military jeep that, like him, also saw action in the Philippines with U.S. forces. He acquired the combat-damaged vehicle shortly after war's end and refurbished it. He still drives it as often as possible, sometimes leading parades and participating in other military and veterans' events.

"I've had it 70 years, and it runs like a sewing machine," he said, adding that he once rebuilt the engine. "I told my wife that if I pass away first, make the grave big enough for myself AND the jeep, and put me behind the steering wheel."

BACK TO INDIANA

Upon his return from military service, Vollmer lived in California for several years. While there, he married his hometown sweetheart, Helen Roberta Burress, and, at her encouragement, studied surveying and related subjects at the University of California at Berkeley.

He and his wife moved back to Indiana, and he transferred to Purdue. With the couple's first child on the way, they purchased property in the Happy Hollow area of West Lafayette, near the Wabash River, and began building the couple's first house.

"I worked all summer building that house. That was a rough semester, going to school and trying to build a house," he said.

The months passed faster than he had anticipated, and the Vollmers were forced to move into the house before he had even added the roof.

"Here I was, my wife was pregnant and the snow was about to fly," he said. "So I went across the river in Lafayette to a bar and hired me a couple drunks who said they were carpenters. I asked them if they could read a carpenter's square, and they said they could."

He says he believes in giving people a chance to prove themselves.

After he graduated from Purdue in 1952, he moved his family to a farm near Loogootee, in Martin County.

His oldest daughter remembers growing up with a father who loved telling stories, playing pranks and sharing his love of nature with his four children, activities he continues to enjoy.

"My siblings and I think he is the best dad," said Theresa Spurgeon, 66. "He's amazing the way he still enjoys his work. I just retired from teaching last year at age 65 so I feel like the slacker in the family." Vollmer provided his children memorable experience , Spurgeon said.

"Our farm was right there near Hindostan Falls on the East Fork of the White River," she said. "Our dad used to take us down there in his Jeep. When the water level was low, he would put a picnic table out in the middle of the river, and we would eat lunch with the water running between our feet."

Her father has the heart of a teacher, she says, adding that he helped inspire her career choice.

"He could tell you any tree that's in the forest. I remember he helped me with a leaf collection when I was a freshman at Loogootee High School where you had to identify them with their regular names and Latin names. Daddy took me to special parts of the county so we would have a ginkgo leaf or something no one else would have."

Helen died in 1967. In 1984, Vollmer married Katrina Jo Schuler of Nashville, in Brown County, and in an area to which the couple soon moved.

'I NEVER GROW UP'

He has plenty of stories from his 54 years with the DNR.

There's the time he confronted a man who installed a fence that encroached upon Bass Lake Beach, which was a state property at the time. Only after aggressively pressing his point did he learn the person to whom he was talking had been a top lieutenant of gangster Al Capone.

"This guy was very polite, and I got along with him really well," Vollmer said. "But I had no idea who he was at the time."

He still recalls one detail of the fencing the man used: small aluminum tags woven into the chain-link labeling it "Property of the City of Chicago."

Another incident still troubles Vollmer many years later. Working in a remote area, he and a colleague stumbled upon a toddler, alone, wearing a soiled diaper and covered by red ants. They cleaned up the girl as best they could and called emergency responders. Rescue personnel and child protective services took over from there. He still wonders what happened to her.

Over the course of his career, Vollmer became known for a "trademark" customization of state-owned vehicles. After often forgetting or misplacing pencil sharpeners, he began removing hood ornaments from state vehicles assigned to him and, in their place, bolting crank pencil sharpeners.

"I never had to look from them after that," he said. "I knew right where they were."

Vollmer eventually discontinued his practice as technology reduced the need for pencils and changes in vehicle design made it less practical to mount pencil sharpeners on their hoods. Chuckling, he suggested he might resume his tradition before he retires.

Coworkers may be impressed by his longevity at his job, but Vollmer says his neighbors probably just know him as the guy who hosts huge Independence Day celebrations.

"I get the loudest fireworks I can get," he said. "I like it. I never grow up, I guess. I'm 99, but I still like to shoot firecrackers." For the most recent display, his children and four grandchildren gathered at his home. Before the fireworks, the group pledged allegiance to the flag as Vollmer's 35-year-old granddaughter, Erin Spurgeon, dressed as the Statue of Liberty, held a torch above her head. She and the three other grandchildren caught lightening bugs in jars, which represented lanterns. Keeping and annual tradition, Vollmer recited "Paul Revere's Ride," the poem by Henry Wadsworth Longfellow that includes the lantern imagery of "one if by land, two if by sea."

Before heading back to their home that week, Vollmer's children and grandchildren began making plans for another big celebration - a looming 100th birthday party.

Bill McCleery is the deputy director of communications for the state's Office of Technology, email WMcCleery@iot.IN.gov.

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WARRANTY DEED

NOEL C. JENSEN and ELAINE JENSEN
Grantor
of , *County of* UTAH ,
State of Utah, hereby CONVEY and WARRANT to
KEENELAND PARK, L.L.C.
Grantee
of LINDON UT *for the sum of*
TEN DOLLARS ($10.00) AND OTHER GOOD AND VALUABLE CONSIDERATION

the following described tract(s) of land in UTAH *County, State of Utah:*

Beginning at the intersection of the North line of 400 North Street and the Easterly line of State Street, Lindon, Utah, which point is South 1241.74 feet and East 551.17 feet (Based on the Utah State Coordinate System, Central Zone and Data published by the Utah County Surveyor as to December 1976) from the North quarter corner of Section 33, Township 5 South, Range 2 East, Salt Lake Base and Meridian; thence North 41 deg. 51' 33" West along the Easterly line of said State Street 373.93 feet; thence South 89 deg. 59' 49' East 633.91 feet to a fence line; thence South 17 deg. 39' 20" West along said fence line and remnant thereof 302.05 feet to the North line of said 400 North Street; thence North 88 deg. 10' 12" West along said Street line 292.92 feet to the point of beginning.

THIS SUBJECT PROPERTY IS RESTRICTED AGAINST USE AS A PIZZA PALOR OR A FORMAL RESTAURANT SPECIALIZING IN ITALIAN FOOD BUT IS NOT RESTRICTED AS TO USE AS A GENERAL TYPE RESTAURANT WHICH SERVES ITALIAN ENTREES.

SUBJECT TO Easements, Restrictions, Encumbrances, and Rights of Way of record and to general property taxes for the year 1994 and thereafter.

WITNESS, the hand of said grantor this 7TH *day of* SEPTEMBER, 1994

Signed in the Presence of

NOEL C. JENSEN

ELAINE JENSEN

STATE OF UTAH,)
ss.
County of UTAH)

On the 7th *day of* September 1994
personally appeared before me NOEL C. JENSEN and ELAINE JENSEN
the signer of the within instrument, who duly acknowledged to me that he executed the same.

NOTARY PUBLIC
C. BRYANT SAFFORD
313 EAST 1200 SOUTH #200
OREM, UT 84058
My Commission Expires June 3 1997
State of Utah

Notary Public

My commission expires _____ *Residing in* _____

Did You Ever Wonder Why?
By: Michael Whitling, PSM

Why do we call an opening to let air in a "window?"

Early Scandinavian homes were simply designed and often included a stable area for livestock under the same roofs the humans. In the winter, because the tightly shut doors trapped stale air and smoke from the indoor fires, they built holes high on the walls and in the roof for ventilation. They called these opening vindr auga, which means 'the wind's eye.' The old English word for air openings was eye-thirl, a compound eye and 'thyrel,' meaning hole. Sometime between the 1400's and the 1600's, 'wind's eye' became "window" and replaced eye-thirl as the common word for a visual opening in a home. Note: 'Thirl' is still used in English dialect as a noun for 'hole' and as a verb for 'make a hole,' but it survives in standard Modern English only in the word 'nostril,' the descendant of Old English 'nosthyrel,' nose-hole.'

Why is a traveler from town to town sometimes called a "hobo?"

A "hobo" is someone who travels or wanders in search of work or odd jobs. (The traditional explanation of the difference between a "hobo" and a "tramp" is that the former travels to find work, the latter to avoid it.) The classic "hobo" who travels by hopping rides on freight trains first appeared in the U.S. after the Civil War, and the "hobo" population exploded during the Great Depression of the 1930s. There are various theories as to the origin of "hobo." One is that a hobo traditionally has been a migrant worker, not simply a vagrant; it comes from "hoe boy," a migratory farm worker. Another thought is it comes from "ho, boy," which was what railroad mail handlers in the northwestern U.S. yelled when they heaved mailbags off the trains. There's also a suggestion that "hobo" is short for 'hopping boxcars,' and some maintain that "hobo" is short for Hoboken, NJ, where many rail lines converged in the 19th century, making the city a natural gathering point for vagabonds. Note: We know where "tramp" comes from. It is derived from the Low German trampen, to trample. The first definition of the English verb "tramp" is "to walk with heavy steps." That's probably how you would walk if you spent your days marching from town to town, hungry for your next meal.

Why are traffic lights; red, yellow and green?

The color scheme derives from a system used by the railroad industry since the 1830s. At this time, railroad companies developed a lighted means to let train engineers know when to stop or go, with different lighted colors representing different actions. They chose red as the color for stop because red for centuries had been used to indicate danger. For the other colors, they chose white as the color for go and green as the color for caution. The choice of a white light for go turned out to cause a lot of problems. For instance, in an incident in 1914 a red lens fell out of its holder leaving the white light behind it exposed. This ended with a train running a "stop" signal and crashing into another train. Thus, the railroad decided to change it so the green light meant go and a caution "yellow" was chosen, primarily because the color is so distinct from the other two colors used. In 1920, in Detroit Michigan, a policeman named William L. Potts invented the four-way, three- color traffic signal using all three of the colors now used in the railroad system. Thus, Detroit became the first to use the red, green, and yellow lights to control road traffic and soon after the rest of the country followed their lead.

Quick Facts:

Emily Dickinson (1830-1886), America's most famous female poet, published only seven poems in her lifetime; all were published anonymously and against her will. It wasn't until after her death, at 56, that her nearly 2000 poems were discovered.

The kid on the Cracker Jack box is named Robert.

The seven Gummi Bears are named Gruffi, Cubbi, Tummi, Zummi, Sunni, Gusto, and Grammi.

The double Popsicle stick was introduced during the Depression. It was designed so two people could share it.

Five Jell-O flavors that flopped: celery, coffee, cola, apple, and chocolate.

Twinkie inventor Jimmy Dewar ate 40,177 Twinkies in his lifetime.

Bellysinkers, doorknobs, and burl cakes are all nicknames for doughnuts.

For the infamous "A Christmas Story" scene in which Flick's tongue sticks to the flagpole, a hidden suction tube was used to safely create the illusion that his tongue had frozen to the metal.

More than 50 percent of the people who are bitten by venomous snakes in the United States and who go untreated still survive.

In 1999, Furbies were banned from the National Security Agency's Maryland headquarters because it was feared the toys might repeat national security secrets.

Kool-Aid was originally marketed as "Fruit Smack."

To clean tarnished copper bottoms of pots and pans, spread a little ketchup onto the bottom. Let it sit for a couple minutes. Wipe it clean and rinse.

Sonny Bono is the only member of U.S. Congress to have scored a number one single on the Billboard Hot 100 ("I Got You Babe" in 1965).

According to superstition, spilling salt can cause bad luck - an idea that may have originated with Leonardo da Vinci's painting "The Last Supper," which shows Judas knocking over a slat container.

The lyrics to Bill Haley's recording of "Shake, Rattle And Roll" that said I'm like one-eyed cat, peepin' in a seafood store, were ironic because Haley himself was blind in one eye since the age of four.

Wille Nelson's first gig: playing guitar in a polka band.