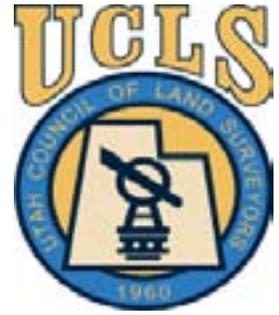


The UCLS Newsletter



Volume 5 Issue 3

June 2018

Where is it?

Most of the membership of the Utah Council of Land Surveyors know the highest point in Utah is at the top of Kings Peak at an elevation of 13,534 feet above sea level. The peak is located in the Uinta Mountains of north-central Duchesne County and named for USGS surveyor Clarence King. Furthermore, the membership would probably know the lowest point in Utah has an elevation of 2,178 feet above sea level and is located at Beaver Dam Wash in southwestern Washington County.

However, does the membership know where the center of Utah is? The first member to correctly identify this location and interpret its unique name will receive a free lunch at their next UCLS Chapter Meeting.

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 discuss land stewardship as an inclusion to the education curriculum for land surveyors and then continue with the second half of the “Reminisce of an Old Surveyor - Measuring a Distance by Taping” article.

The 19th century surveyor often became the face and persona of the United States western expansion; as noted in the true west magazine “Walking the Line” publication. This interesting article explores the challenges and accomplishments of our predecessors.

Read about the challenging survey competition of one of our local schools as they went head to head with schools across the country in the annual NSPS Student Competition. Their assigned project would be intimidating for many of our more experienced surveyors.

Arrow-wielding men were photographed, to document and perpetuate the location of witness points in England. Is this activity a surveying function?

As most surveyors know, Geoids and Datums are in constant flux. When will the next change happen? Learn more in the NGS change article.

Several state surveying societies have requested an amendment to an Unmanned Aerial System services request for sealed proposals that conflict with their state code definition of surveying. Specifically, the Virginia Association of Surveyors addressed the problem by a letter to their State Department of General Services.

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.

JUNE

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“It’s not that we need new ideas,
but we need to stop having old
ideas.”

-Edwin Land

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Teaching Land Stewardship

The focus of the professional surveying societies today seems to be on the decline of the number of surveyors out there. Some are even beginning to raise this level of concern to that of soft panic. From the outside, the surveying community is headed for a perfect storm of obsolescence. Technology has contributed to the depletion of apprenticeships; education institutions are struggling to meet enrollment targets; and every day more and more surveyors are leaving the labor force through attrition and retirement. Not a promising picture of the future, is it? Or is it?

The professional surveying societies all seem to be following the same pattern. They seem to think the answer is to go into schools and target children and show them cool toys and wow them with technology. Is that really where our value is? In toys? In technology? It might be a good way to get a message out to the public about the science behind what we do; however, that is hardly unique. Farmers use RTK now to plow their fields, and anyone can go to Walmart to buy a drone. So, toys no longer set us apart.

The greatest benefit the professional surveyor has to offer is teaching about land stewardship. It has been my experience that the average person, without hesitation, can tell me where their vehicle registration is. However, if I ask for a copy of the deed for their property I get a look of bewilderment. Why? Because people are not taught to be stewards of their property or how to be.

Stewardship used to be taught. When this country was agrarian, land tenure and stewardship were taught just as reading, writing, and arithmetic. Now that we have entered the modern age, those principles are no longer taught. Does that mean they have less value? No, it means that those who are informed have a greater value.

So, why are we pushing toys when we should be driving education toward stewardship? Why do we focus our attention on the kids who excel in Trig-Star and give them scholarships and ignore the kids in Future Farmers of America and 4-H who still receive instruction on what an acre is and how to calculate it? Every year I commit a few evenings to teach the local high school Future Farmers of America kids about the Public Lands Surveying System and how to read and plot aliquot part descriptions on a quadrangle map. These kids get it, and it has meaning to them. So, I wonder if we aren't targeting the wrong students.

As an experiment, I started asking some of the land surveyors I know where they were from and if they grew up in a big city or a small town. I was not surprised to learn that most of them grew up in a small town. My experiment was hardly scientific, but the common thread was obvious.

What if the focus changed? What if, instead of surveying education focusing heavily on technology, toys, science, and engineering, the focus were heavy on law, tenure, and history, with light application of science, engineering, and technology?

Every day, I see example plats where surveyors demonstrate their mathematical prowess and computational skill beyond reproach. Some can even demonstrate a result exactly wrong to nine decimal places. Since the surveying degree became popular and most jurisdictions adopted it, the focus of the practicing surveyor has gradually changed to the exactitude of the science of measurement instead of the art of knowing what to do with it.

At some point, even the NCEES needs to understand that boundary survey are not engineering projects where the solutions can be generated from a manual or specification book. Boundary surveys are 98% application of law and 2% application of the science of measurement. In fact, a boundary survey is one of the few places where an incorrect measurement can still yield the correct answer. (That should generate some mail.)

From an education standpoint, I realize the science is easier to quantify and qualify and therefore easier to teach. The question then becomes: Why become a surveyor? What does a surveyor have to offer? We are the caretakers of the nation's cadastre. It's about time we start to act like it. That is our value. I believe our focus should be on land stewardship and tenure.



Article published in the March 2018 edition of *xyHt* magazine, by Daniel Muth, PLS, CFedS Dan Muth is a practicing land surveyor in eastern Arizona and has been in the profession for 37 years. Among many other contributions, he's been past president of NMPS, a past chairman of APLS, and the former mayor of Springerville, AZ.

**Reminisce Of An Old Surveyor
Measuring a Distance by Taping - Part 2
(See March Newsletter for Part 1)**

by

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

Let me pause in my rendition of taping to state that when I speak of 'breaking the tape' in this instance, I am not speaking of physically breaking the tape. Rather the phrase was used to indicate the entire length of the tape was not to be employed in making the measurement required.

Long ago, some entrepreneur invented a tape clamp. The tape clamp was a handy little gadget that allowed the user to firmly secure the tape with the clamp using the two finger rings that were part of the clamp. Using the finger rings, the tape could be easily pulled without bending of the tape or permitting a slippage along the tape.

I doubt much money was made from the invention. The survey firms that had purchased this gadget were likely as not to leave it unused in the office. When brought to the field, it never seemed to be with the tape person that needed it.



Having mastered the combination of holding the tape level, keeping pressure on the tape, and keeping the plumb bob string firmly attached to a mark along the tape, the tape person could now focus their attention to the suspended plumb bob that was likely as not swinging over the ground much as a lookout does in a crow's nest over a ship in rough seas. Restraining the plumb bob from wild gyrations required the tape person to periodically tap the plumb bob into the ground until the swinging of the plumb bob settled down.

The person at the rear of the tape had a mark that the plumb bob had to be over. When he was satisfied that he had wrestled the plumb bob and by extension the appropriate part of the steel tape over this point he would repeatedly shout some agreed upon term to the forward tape person to let that person know that a measurement could now be reliably made by the forward tape person.

I have seen the patience of the rear tape person sorely tested by the inability of the lead tape person to make a timely mark or reading. The rear tape person will make repeated statements of "good" or "mark" to indicate that he is over the point and the measurement can be made. After some repetition, the rear tape person will become agitated by his own endless repetition and may be heard to stop the repetition in order to yell: "god damn it, I'm good at this end. What is taking so damn long."

If the forward tape person was not measuring to a previously established point, they would tap the plumb bob point onto the ground to make a mark in the dirt, having previously kicked away grass, leaves, and twigs to clear a space on the ground. Once the forward tape person was satisfied the mark made by the plumb bob point represented a fair measurement, they would release the tension in the tape and put a pin into the ground at the mark. This pin would become the basis for the rear tape person to advance upon and measure over.

As I previously mentioned, my employer was a kindly man but did not feel justified in purchasing equipment that was not absolutely necessary. Rather than using chaining pins, as they were commonly known, to fix the limit of the tape measurement, we would use nails or sticks with flagging tied to the end of the stick.

Having marked the length of the tape on the ground, the forward person would drag the tape in the direction of the survey to begin again the process of making the next measurement. The rear tape person would follow with the other end of the tape. Now if the rear tape person was not paying attention, they would likely as not kick the pin or nail out of the ground before they spotted it. If the rear tape person did a good job of kicking the pin loose from the ground, the taping would have to begin anew back at the starting point with numerous expletives used against the rear tape person for not paying attention to where they placed their feet. To avoid repeating the process of taping or bringing upon themselves the embarrassment of attracting the ire of the other crew members, more than one rear tape person made a best guess where the pin may have resided before they inadvertently kicked it out. If possible, the misfeasance was corrected without the forward tape person realizing what was being done.



I should mention that had the forward tape person measured into a mark or corner already fixed, his job was a little more

Reminisce Of An Old Surveyor continued....

difficult. Rather than stick a pin, nail, or stick in the ground, he had to find a way to maintain the tension, keep the tape horizontal, maintain a steady plumb bob over the point, and read the marks on the tape at the plumb bob string.

This was done by firmly clasping the plumb bob string over and on the tape using the index finger and thumb and sliding the string along the tape until the plumb bob was over the desired point. The tension was then released while still keeping a firm grasp on the string on the tape. Once all the other distractions were eliminated, the forward tape person could peak under his thumb and see what incremental hundredths of a foot mark the string was held upon.



At this point it is worth mentioning a problem that has plagued surveyors using a tape or chain for a couple of centuries - keeping track of the whole lengths that are used when measuring between two points. When a survey crew measured long distances, it is necessary to tally the number of full tape lengths used. Now it would be wise for a crew member to make a mark in a field book each time a tape length is achieved.

What is wise and what was done are two different things. If field books were not available putting notches on a stick or moving stones or across from one pocket to another was employed. Despite the best efforts, there are numerous distances where a tally was lost or added that should not have been.

I have alluded to a plumb bob suspended from the tape to the ground. The term 'suspended' is only accurate after some effort is obtained to stop the plumb bob from swinging in arcs over the ground. It is not possible to get a plumb bob to hang from the tape to the ground without some swinging. The plumb bob was determined to be contrary when let loose to hang. There were times when the plumb bob was stationary but not vertical as in the case when the plumb bob had to be dropped from chest height and there was a strong wind blowing across the open field. It seems to me that the wind was usually combined with cold temperatures. To all the other problems I have alluded to in trying to keep the plumb bob steady over a mark must be added the lost sensitivity of the fingers when using gloves and the shaking of the body from the cold temperature.

Eventually, the plumb bob was finally settled into compliance by tapping the plumb bob upon the ground until finally the tip of the plumb bob was confined to a small area meeting the tolerance of the tape person. Of course before the tapping could take place, the forward tape person usually had to expose the ground by kicking away sod, sticks, leaves, and other debris using the toe of his boot. This often accounted for the delay that caused the agitation of the rear tape person that I have previously mentioned.

I must not close this reminisce on taping before adding a few more tidbits that provide some added insight into taping practice.

Many tapes were not marked or inscribed like a more recent steel tape or the fiberglass tape still found in the surveyor's tool kit. What I mean is the tape did not contain marks to the hundredth of a foot along the entire length of the tape. The old tapes were only marked every foot except for the very end of the tape where the tenths and hundredth of a foot marks could be found. This necessitate the rear tape person find a whole foot mark to hold to and the forward tape person use the end of the tape to measure the increments of a foot. To set this up involved the forward tape person yelling back to the rear tape person to 'take a foot' or 'give a foot'.

While on the subject of marks on the tape, I must state that, dragging a tape along the ground for days, weeks, and years often succeeded in smoothing the tape and erasing the stamping of the whole feet and making the marking of whole feet difficult to read. More than once I had to look up or down the tape to find a readable mark and work my way back to the mark I was to hold at in order to know what whole foot I was holding at.

I have about exhausted my memory of taping but for three situations often encountered in taping. One situation is the delicate taping required when taping through an electrified cow fence with a steel tape. I need say no more on that topic as the reader can well imagine what often happened. I must add that in addition to the electrified wire, once the survey crew has cleared the electric fence and entered the field, the reason for the electrified wire becomes obvious. Curious cows tend to congregate about the surveyor and become a hindrance in the taping process. However, I suppose a curious cow or



Reminisce Of An Old Surveyor continued...

heifer is far better than the bulls I encountered from time to time that took offense at the red often worn by the surveyor.

The second situation not fondly remembered is taping upon a concrete or asphalt surface. Since such surfaces were often flat and without obstructions, the tape was laid flat on the surface. Tension was put on the tape ends during the measurement with knuckles touching the asphalt or concrete. In such cases, one tape person usually released their tension unexpectedly with the result that the other tape person often left some skin from their fingers on the rough surface of concrete or asphalt.

The third situation that still can incite bad dreams occurred when taping across a busy road or sidewalk. You did not have to experience this situation in order to imagine the peril of a tape suspended above the road surface when a car is observed much too late traveling down the road. Dropping the tape quickly to the road surface would often preserve the tape. Yet, there is many a time the survey crew returning to the office with a broken tape that claimed this very event to be the cause of the broken tape. Of course, there was nothing they could have done to prevent this from happening. At least that is what they claimed.

I will close this reminisce by speaking about securing the equipment used in taping. The tape was coiled with attention paid to making consistent sized loops. The tape was then thrown. I don't mean heaved to the side. I mean that the tape was



made into a figure 8 then into a compact circle loop using a twisting of the hands. Throwing the tape was an art that was often done at a surveyor's

convention to show prowess. If a person did not know how to throw a tape it turned into a wrestling match where the tape refused to cooperate and often as not ended in a jumble rivaling any fishing line tangle. If the person did know how to throw the tape, a person watching would have the unmistakable impression that a magic trick just occurred. One minute the tape is in a large loop and the next it is neatly coiled in a compact loop.

The other item of equipment deserving some effort at storage was the plumb bob. To see a plumb bob being stored with the string hanging loosely from the end of the plumb bob would reflect poorly on the owner. At some point, another inventor came up with a gammon reel that would wind the string up unless the owner resisted the urge of the gammon reel. Before the gammon reel arrived at the scene, a plumb bob string would be carefully wrapped around the head of the plumb bob and a slip put into the string to hold the string in place. A carefully tug on the string would unwrap the string from the plumb bob. A knot in the plumb bob string spoke of an untrained crew person. A knot in a plumb bob string was akin to a hang nail on the finger - it's presence always felt and always hanging up at inopportune times.

Keep this rendition of the taping process in mind young surveyor before disparaging that old surveyor that taped those long distance one small segment at a time.



6-27
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By
and
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"Daddy lit the barbecue. Now it REALLY smells like summer!"



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and
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KEANE
"My toes love wearing sandals 'cause they get to have sun and fresh air."

Salt Lake City Historic Road Development Facts

- Salt Lake City had no paved streets in 1890. The 275 miles of dirt streets were rated among the dirtiest in the West. By 1920, Salt Lake City had 73 miles of paved streets.
- Utah began building its link to the transcontinental highway in 1916. The Lincoln Highway became the first paved roadway allowing drivers to drive from New York to San Francisco in 1923.
- In 1917, Salt Lake County received an \$80.00 demand for reimbursement of 4 days of vehicle use because of the County's neglect and failure to properly maintain its roads. Additionally, the communication included a request for \$86.75 to repair the damaged automobile.
- In 1917, the Continental Oil Company submitted a claim of \$250.00 for the loss of a horse, due to bad roads.
- In 1920, a Chamber of Commerce brochure described Salt Lake City as having the "Broadest and most beautifully laid out streets in the world," and it was "Known to be one of the most scientifically arranged cities in America."
- By 1925, Salt Lake City had 62 automobile dealerships and 30,000 automobiles.
- In 1928, Salt Lake City became the first city in the world to use trolley buses with pneumatic tires and soon after became the first to adopt rear-engine motor buses.
- In 2015, the Utah Transit Authority provided over 100 bus routes in Salt Lake County.
- In 2016, the mean travel time to work was 22.2 minutes.
- In 2016, an average of 269,000 cars per day used the I-80 East SR 201 interchange.
- During 2016, UDOT employees traveled over 16 million miles in Salt Lake County.

March What Is It



Mark Gregersen was the first UCLS member who correctly responded to our March "What-is-it" competition, followed by Scott Derby, James Dahl, and Damien Blevins.

The stereoscope is an instrument with two eyepieces through which a pair of photographs of the same scene or subject, taken at slightly different angles, are viewed side by side: the two photographs are seen as a single picture apparently having depth, or three dimensions and used to process imagery and orthorectify photography. Put simply, the three dimensional effect is an optical illusion known as parallax effect and allows the viewer to observe a pair of two-dimensional photos and see a single three-dimensional image.

Walking the Line

<https://truwestmagazine.com/author/marie-bartlett/>

They were more than the sum of their parts, 19th-century surveyors, the unheralded vanguards of the Old West who established original geographical boundaries and retraced and identified existing borders in accordance with legal descriptions. Part-astronomers, part-geologists, part-engineers, these map makers were also arbitrators when land lines were in dispute. Wars have been fought and people killed over boundary disputes in which the surveyor was often the common denominator.

Yet only a handful of surveyor names remain familiar: George Washington, Thomas Jefferson, Abraham Lincoln, Meriwether Lewis, William Clark and Daniel Boone. But many more risked their lives in the line of duty to map what ultimately became the passes, railroads, towns, dams and other structures that helped form the backbone of the West.

The face and persona of our Westward Expansion, surveyors shaped Western history through their endurance, sense of adventure and knowledge of precision tools and mathematical principles.



These chainmen of the United States Geological Survey measure a baseline near Fort Wingate, New Mexico, in 1883. The chain was comprised of 100 links that totaled 66 feet in length.

-Courtesy Library of Congress-

Jacks of All Trades

“The early surveyors required the skills of a woodsman to blaze trails, and agronomist or mineralogist skills to document the soil structure or important minerals...[and] knowledge of botany to document the species of trees and determine the difference between plants that were edible and those that would kill them. “Good marksmanship was needed to obtain fresh food on site, and to defend against hostile Indians,” wrote Nebraska surveyor Jerry Penry, in *The American Surveyor*, a national trade journal for his profession.



“Perhaps no other occupation in history has required the worker to encompass so many different areas of expertise as the American surveyor,” he theorized.

The job was hard; the perils many. One of the earliest accounts of surveyors killed took place in 1838, just two years after the Battle of San Jacinto, when Texans defeated Mexican Gen. Antonio Lopez de Santa Anna. On the Guadalupe River north of San Antonio, Indians attacked a survey party and killed nine of the crew, including one surveyor who managed to carve his name, “Beatty,” on a tree before he died. At least seven more survey parties

were attacked that spring and summer, from the Rio Frio to the Red River.

Henry P. Mayo, a third-generation Texas surveyor, is a member of the Surveyors Historical Society. He helped research and compile *A Marylander and Texan: H.G. Catlett's Quest for Fortune in Early Texas*, in which noted Texas surveyor H.G. Catlett tells his story of early surveys through central Texas, as well as his exploits as a Texas Ranger. Rangers often conducted land surveys during the early years of Texas settlement.

Walking the Line continued...

“Despite attempts to prevent surveys on Indian hunting grounds, the incursions continued,” Mayo says. “In March 1838, a deputy surveyor planned surveys on the headwaters of the Navasota River. Kickapoo Indians attacked his group, killing three men.

“As a modern-day surveyor, I often relate to these pioneer surveyors. Fortunately, today, we don’t have to fight Indians, only local citizens who protest the end of their quiet country living.”

Building the Railroad

Arguably, the most important role that surveyors played in developing the West took place during the building of the 1,776-mile-long Transcontinental Railroad, completed on May 10, 1869.

Arizona surveyor Rick Bunker collects statewide survey histories, conducts interviews with old-timers and plans on writing a book about the contributions surveyors have made to Arizona history.

Denny DeMeyer, PLS, a land surveyor in Blaine, Washington, and co-chairman of North American Land Surveyors, says, “Everything ahead of society was done by surveyors. No government land was sold, no towns or cities platted, no railroads, canals, irrigation channels, roads constructed or mines developed without them.”

Garland Burnett has spent more than 40 years in land surveying and is recognized as an expert witness in ancient boundary cases for New Mexico courts. At one point, he worked for the U.S. Forest Service and became familiar with 19th-century surveyors whose work he retraced.



“It’s a complex and confusing profession to most people,” he says.

“Our work is somewhat esoteric unless you have some knowledge of math, computer science, geology, history, astronomy and real property law, to name a few. But if you don’t know what happened in the past, you can’t determine what’s needed in the present.”

Land, boundary and title consultant James R. Dorsey, PLS, spent more than half a century in surveying, specializing in wetland boundary problems in the Western states. Now retired and living in Nevada, he is an author, lecturer and instructor. Dorsey believes that without the orderly location of land by surveyors, range wars would have been even worse, with a “strongest-take-all” attitude.

“The contribution by surveyors goes all the way back to our Founding Fathers when they said that all men are created equal,” Dorsey says. “Without that mandate and the definition of private ownership land,

along with the Homestead process that was part of the land survey system by the government, there would have been no migration west - at least nothing orderly.”

UDOT RIGHT-of-WAY CHANGES

UDOT Right of Way Design is in the process of reviewing and revising many of our policies and processes and as part of our reviews we have determined that the following language that has been added to our forms in the past is no longer a clause that the department wants as a boiler plate on all documents.

Effective immediately, please do not use this language unless you have been specifically directed to do so on a particular instrument.

“After said driveways, side treatments and appurtenant parts thereof and blending slopes are constructed on the above described part of an entire tract at the expense of the Utah Department of Transportation, said Utah Department of Transportation is thereafter relieved of any further claim or demand for costs, damages or maintenance charges which may accrue against said sidewalk and appurtenant parts thereof.”

This language has been found on TCE and PE Forms however we want to ensure that on all projects presently under design or in acquisition that this language is not present on our deeds.

If you have any questions or concerns, please let me know.

Thank you for your help in this matter.

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of Lawyers and the Courts:

A woman witness when asked to give the earmarks of a rabbit replied, It has a very short tail.

A railroad train killed a farmer's cow for which the farmer offered three dollars settlement.

A lawyer in defence for a boy who had killed his father and mother, asked leniency because he was an orphan.

The old, but maybe true one, of the argument between St. Peter and the Devil, when St. Peter went looking for a Lawyer and couldn't find one.

There was the prospective juror who, when asked by the Court if he had any scruples of conscience against capital punishment, replied: "Not in this case."

The above case of Kimball is self-explaining: Whether by reason of error or otherwise by the surveyor, the Court was not "well-advised" and therefore not "competent."

The mention of land boundaries are frequently found in the Bible:

Deut. 19:14... Thou shalt not remove thy neighbors landmark, which they in old time have set.

Prov. 22:28... Remove not the ancient landmark which thy fathers have set.

Prov. 23:10... Remove not the old landmark: and enter not into the fields of the fatherless.

Job 24: 2... Some remove the landmarks: they violently take away flocks, and feed thereof.

In the summer of 1932, I established a True Meridian on the Basin at the Bank Street High School, from the angles made by observation on Polaris at eastern and western elongation bisected. This line was checked by R.W. Hooper, of Durham, in 1935, and found to be N. 0° 0' 30.7" E. or about 29/32 of an inch east, over a distance of 482.3 feet. Local Magnetic attraction was found to exist, thus causing this line useless from which to determine magnetic declination. 🌐

Benjamin Franklin said: "Love your neighbor, but pull not down thy hedge."



THE WHITE HOUSE
WASHINGTON
March 19, 2018

I send greetings to those celebrating National Surveyors Week.

Across America, professional surveyors fulfill an important role in the growth of our economy, the development of our infrastructure, and the daily functions of life. As someone who spent a career working with many highly trained and dedicated surveyors in the construction industry, I have great respect for the crucial work they do each and every day.

This week, our Nation honors the contributions and accomplishments of professional surveyors throughout American history, and we thank these hardworking men and women for their vision and dedication to the future of American greatness.

Melania joins me in sending our best wishes for a memorable week.

2018 NSPS National Student Competition

The 2018 National Society of Professional Surveyors' National Student Competition took place in conjunction with the NSPS spring meetings as part of the Western Regional Survey Conference in Las Vegas, Nevada at the Luxor Hotel and Casino. The conference, a joint affair between NALS, UCLS APLS and WFPS took place over the week of February 18 thru the 24th, with the field exercise portion of the Student Competition on Sunday February 18 being the first activity. This year's group of competitors included the Northeast Wisconsin Technical College, Idaho State University, Utah Valley University, California State University - Fresno, East Tennessee State University, Texas A&M University Corpus Christi, Northern Illinois University, University of Akron, New Mexico State University, Oregon Institute of Technology, University of Puerto Rico at Mayaguez, and Great Basin College.

The night before the field exercise, the teams met to find out the nature of the competition this year. It has been several years since this competition had a legitimate field component and it was nice to see the spirit of head-to-head competition back in the contest. The precise details of the competition, and what tools would be available to the students has been a closely guarded secret. The predetermined theme was that the competition would be similar to an 'Engineers Without Borders' mission, so the teams were prepared to travel light and work with less-than-optimal equipment. As competition coordinator Rich Vannoizzi revealed the exact nature of the competition, it turned out the teams would only be able to utilize steel tapes, and auto-levels plus accessories like rods and tripods, and a compass. They would be taken to a vacant location on BLM land just beyond the west edge of the city and assigned a site. *[Thanks to Paul Burn of GCW Engineering for finding a suitable location and securing permission from the BLM to hold the event!]* Each site was a one acre square and the center point was marked on the ground with a hub and lath and a particular predetermined orientation, hence the need for a compass. The teams must establish the boundary of their site, square it up, record the information in field notes, then lay out a grid and perform a topographic survey, including both grid points and the random points associated with the terrain features. Every site had at least one wash running through it, some had more than one. The teams were told to meet at the destination point on Sunday morning at 7 am. They would have until 5 pm to complete their survey and clean up their site. Monday would be spent processing and adjusting their data, making their explanations and defenses, and preparing their topographic and boundary plats. On Tuesday they were scheduled to make 15 minute presentations to a panel of judges and an audience.

Field Competition

Okay, the day is here. The teams all meet up in various places throughout the Luxor and then drive to a predetermined location near the event site. In a way, this is kind of a preliminary test. Can the teams navigate to the job site on their own? Yes? Good. They've all arrived at the spot, which is literally the place where the pavement ends and the desert begins, parked their cars, trucks and vans, and are milling around waiting for competition organizer Vannoizzi to give the final instructions and assign each team a site.

12 teams comprised of over 60 enthusiastic students plus advisors and a couple of journalists assemble in a big circle while Rich gives out the marching orders. The teams are going to drive down this gravel road about a half mile, park their vehicles in an orderly fashion and be led to their individual job site.

The spots for each team are chosen randomly. Some are more challenging than others. Luck of the draw is the order of the day. It's time to channel their inner MacGyvers.

8 AM

The teams have been led to their sites. There are enough roads in the area that team vehicles can be parked somewhere near their work zone. As they evaluate the challenges of their particular patch of desert, they are mostly huddling and strategizing. Some have broken out their compasses and are busy chaining out an initial baseline. The whole area is populated with various desert vegetation: Joshua Trees, big and small, (Joshua shrubs?), yucca plants, mesquite, two or three types of cactus. Everything here has stickers or stingers. The ground looks like uncounted millions of concrete trucks were rinsed out on site, but no, that is naturally occurring, concreted material.

The term 'topsoil' is patently not applicable here. Driving up the road to get here was like driving up some European stairway from a Bourne or Mission Impossible chase scene. Every tire on every vehicle took palpable abuse on the way here. One must have pity for the rental cars. Now these students have to pound nails and stakes into this same surface, which is harder than the back of my head.

9:30 AM

The sun is rising in the morning sky. Steel tapes are being stretched, orders are being yelled, and a harbinger of the day to come makes its entrance - the wind. Many cultures have words for winds like these, kamikaze, scirocco, zephyr, etc. Well this wind deserves nomenclature that I can't get away with using in this article, so let's call them a typical Nevada breeze. From now until the end of the day, the baseline wind was a steady 30+ mph with gusts of nearly double and of course, it increased as the day went on. Tapes are whipping up and down and I can only imagine the difficulties faced while trying to peg the levels. Some of the teams come from places with rolling terrain and loamy soil. We aren't there. Kneel down to stretch a tape or pound a stake and the ground will sharply poke your kneecap.



National Student Competition continued...

Tangle your chain up in a bush and you will be stabbed. Nevertheless, a look of focus and determination is visible on every face. They are taking this challenge and running with it.

11 AM

Joe Paiva of GeoLearn and his Video Director Sam Gahm are moving from team to team, capturing action video. NSPS Education Chair Steve Gould and Mr. Vannozzi are also making their rounds, keeping an eye on the activities, without interfering in the work. They are also in part ensuring that no faculty advisors are actually “advising” their teams.

If the students would have had time to look around and take in the scenery, they would have seen the beautiful dark, reddish mountains on the west side of the valley. They would have seen the rolling hills fading into the southerly distance, they would have spotted well-used paths crisscrossing the site of either some profoundly small horses, or much more likely, burros. I looked around all day in vain hoping to catch site of a burro, but it was not to be.

I think I spotted a team laying out their grids with a rag tapes. The wind makes that somewhat disadvantageous. I see another team

has drawn a site that is divided by a wash that is more like dry creek bed and the easterly side extends up the side of a hill. The difference in elevation across their site is enough that they have to break chain to their measurements. Ouch! They don't look upset about their fortune as they proceed with their work. I get the sense from every time out here that there are no problems, only opportunities.

The sun is high in the sky but it's the kind of day where if you are wearing a hoodie, (and you'd better be, or at least sporting the equivalent), you are not likely to take it off. Let's just say the wind is fairly unpleasant on bare skin. As I wander the site, I finally find a spot where I can sit in the lee of a Joshua tree while keeping in the sun and I am instantly more comfortable. It's glorious, but there is a problem, I can't see any of the teams. So I move on. It was good while it lasted.

Afternoon

It was up to the individual teams whether or not to take a lunch break. Most didn't. They ate while they worked and the sites were gradually sliced up with gridded out stake lines. Philly rods were up everywhere. Holding up more than two sections looked positively difficult. Events proceeded - some with more fanfare and urgency as the end of the day drew nearer. The sun continued to beat down. A lot of right triangles were being computed and laid out on the ground. The wind swallowed up most of the yelling, but trust me, there was yelling.

As near as I could tell, the first team to call it a day finished at about 3:30. They milled around for a good half hour after then cleaned up their site, stowed their gear and pulled away to head back to the Luxor. Around the time the first team drove away, several others wrapped up, policed their sites and departed. Pretty soon there was only one team left and they wrapped up and the day was over. Every single team is to be commended for their diligence in leaving no trace. The BLM will not second-guess their decision to allow the teams to use the public land, and that is a good thing.

Monday - Office Day

The student teams got together in a large conference room at a collection of round tables to work on their data reduction, adjustment reasoning, map-making and presentation development. It was a very busy day as each team divided up the assignments and went to work. Each round table averaged four laptops. Autocad and Carlson software packages were being deployed with grim determination. PowerPoint slides were being developed and vigorous debates and discussion were taking place at all 12 tables. A good eight hours was put in by every team and at 5:00 they turned in their maps as PDF files on flash drives to Coordinator Vannozzi, who gave them all to Paul Burn to take back to GCW and plot. By this time, the end of the second day of hard work, the teams looked to be pretty frazzled.

Tuesday - Presentation to the Judges

The teams showed up early and assembled in the room where the day before they had been busily concentrating, computing, collating and concocting. The round tables that had previously filled the room were gone, in favor of rows of seats and an upraised platform for the team of the moment. GeoLearn had cameras set up, the judges sat at a table on one side of the room facing the platform, the officials sat at a similar table on the other side of the room creating a sense of symmetry to the affair. Around the back of the room were bulletin boards holding 24"x36" map copies that each team had prepared the day before, pinned up for display and judging. All were excellent quality and detail

Each team's turn at the podium was determined randomly, as their survey sites had been on Sunday. The first team up was a little nervous, as you can imagine, or maybe you can't. Contemplate if you will: there are some fifty-plus students from eleven other teams sitting together in groups in the audience, sizing you up and planning to learn from your mistakes in presentation. Once the questions



National Student Competition continued...

from the judges and audience start, you are giving the other teams an advantage. You are going in cold and they will be able to come in hot because of you. In addition to the students, waiting to pick you apart like Hyenas spying a lone gazelle on the Serengeti, there are your advisors and all of the other teams' advisors, many surveyors and oh yeah, you are on camera and will be on YouTube soon. Some on your team are more naturally gifted as public orators than others, but the rules state that all team members must have a go at the microphone and work out their piece of the presentation. So don't sweat it.

Well, I made it sound much worse than it turned out to be because every team had two or three fantastic speakers, all the teams were comfortable with their subject matter and most fielded their questions with aplomb and often with great humor. Though the methods of survey described by each team tended to be similar, each had their own take on what was important and what was trivial, where error came from and how error was to be dealt with. It was a tremendous display of the state of advanced education across the country, and that state is very high indeed. You would be happy to hire any member of every team in this competition and I conclude that the future of Surveying is in good hands.

Wednesday - Results of the Judging



Alas, only one team can be declared the 'winner' (actually two since there was '4 year' and a '2 year' category), and a couple more can be runners up but from where I sat, every team was a winner and I feel lucky to have witnessed this particular competition. I want to personally congratulate every student from every team for taking on this tough assignment. The first place team in the two-year degree category was Northeast Wisconsin Technical College. In the bachelor degree category, the second runner-up was Utah Valley University, the first runner-up was Texas A&M Corpus Christi, and the winner of the 2018 National Student Competition was Oregon Institute of Technology. Congratulations O.I.T.!

Conclusion

No doubt about it, these student teams are the future of this profession, not to mention the future of our various state and national organizations. As full-time students, they carry a pretty good burden already. Many of them work part-time in the profession while they attend school as well. Taking the time out of their busy academic careers to prepare for and attend these competitions is a tremendous demonstration of commitment and effort for which they should be universally recognized.

If you as a state society can't make up your mind whether paying for your school team to travel to this national event each year is a worthwhile expenditure, please stop pondering it. There is every bit as much 'bang for your buck' in spending education funds on this as there is in distributing an equivalent amount of money on scholarships. We might be in Las Vegas (this year) but there is no gambling involved. Every one of these students is a proven winner.

We should all thank the Bureau of Land Management for allowing us to use the land for our competition. The BLM receives a lot of negative publicity in their attempt at even-handed management of the public lands, and that is a shame. Approached by NSPS (see below) seeking permission to hold this competition, they readily (and I hear enthusiastically) acceded.

Not enough can be said about the work that Paul Burn did running down a location for this event - one that could handle at least twelve teams with plenty of space between them, working out the details and securing permission from the BLM, arranging to have a Blue room (Porta-Potty) placed on the site, and having his firm, GCW Engineering to do some preliminary survey work to aid in planning the event, such as setting the starting point for each of the teams, and plotting all of the teams' plats. Thanks Paul!

An extra- special shout-out to the students and advisors from the University of Puerto Rico at Mayaguez! They prepared for this competition in the aftermath of Hurricane Maria, a devastation event that left most the island without electricity for months. I was told that some of the students had only regained access to the electricity (that most of us take for granted) days before trekking across the country to compete in Las Vegas. Their super-human efforts should not go unrecognized!

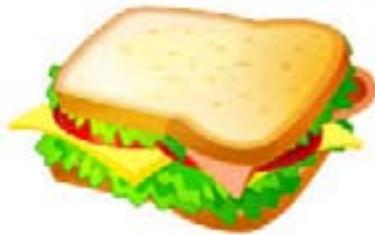
Time to start planning for the 2019 competition!

-CRC

Did You Ever Wonder Why?

- **Why is putting meat or chicken between two slices of bread called a “sandwich?”**

The word “sandwich” comes about one late night in the 1700’s when an English nobleman, John Montagu, the Fourth Earl of Sandwich, was too busy gambling to stop for a meal even though he was very hungry. The legend goes that he ordered a waiter to bring him roast beef between two slices of bread. He had the meat put between two slices of bread, figuring his hands wouldn’t get greasy, allowing him to continue playing cards. The name of the food item stuck. The town of sandwich is a small town near the southeast coast of England. Its name literally means “market town on sandy soil.” There are three towns in the US named Sandwich. Note: John Montagu was not a good person. He was an executive officer of a group of Satan worshippers, he being described “as mischievous as a monkey and as lecherous as a goat.”



- **Why when we flatten something out do we “squash” it?**

“Squash” comes from the 14th century French word, *esuasser*, meaning to crush or shatter. It entered the English language in the 16th century as “squash” and meant to squeeze, press, or crush into a flat mass or pulp; to beat to, or dash in, pieces. Interestingly, the vegetable “squash” has nothing to do with all that. Vegetable “squash” derives from a Massachusetts Indian word, *askutasquash*, meaning “a green thing eaten raw.” That leaves us with the sport of “Squash.” That comes from the game formerly called squash rackets, a reference to the “squashable” soft ball used in the game (compared with the harder ball used in its sister game rackets).

- Why do we say “roger that” to confirm receiving a message? Roger that is a phrase used in aviation and the military to confirm that a message has been received and understood. It was popularized by radio transmissions of NASA’s Apollo missions and is now sometimes used jokingly in everyday contexts. In the 1940s, the American military and British RAF used a phonetic spelling alphabet different from the current well-known Alfa, Bravo, Charlie. The phonetic alphabet used by the British and American military during the World War II was: *Able, Baker, Charlie, Dog, Easy, Fox, George, How, Item, Jig, King, Love, Mike, Nan, Oboe, Peter, Queen, Roger, Sugar, Tara, Uncle, Victor, William, X-ray, Yoke, Zebra*. The letter “R” was used as an abbreviation for “received” back in the times when messages were sent via telegraphy (in Morse code), and the practice of confirming that a transmission was received by send an “R” back was extended to spoken radio communication at the advent of two-way radio during World War II. When a soldier or a radio operator said “Roger” after receiving a transmission, he was simply saying “R” for “received”. The alphabet has changed since then, but the practice of replying to a message by saying “Roger” stuck.



10 Amazingly Helpful Tips for Surveyors

1. When setting up the instrument in precarious situations, remember to hold on to the tripod legs for stability.
2. Avoid dangerous high-speed traffic when closing a lane - have someone else place the cones.
3. Always show your expertise to fellow crew members when setting up over a property corner by placing at least one tripod leg directly on the property line.
4. Be sure to use heavy-duty iron rebar or pipe for all property corners you set, so they won’t be deterred by underground obstacles such as boulders, power lines or water pipes.
5. The hot summer sun can cause skin cancer - always make sure your instrument setups are in the shade.
6. Protect landowners from substandard work by always setting your monuments in the correct location next to those of your predecessors. This proves the previous error and your validity.
7. Keep your crew chief happy with quick setups - as long as the bubble is touching the black circle on the vial, you are golden.
8. Avoid confrontations with wildlife - equip your crew members with walkie-talkies so they can alert you of wildlife incidents. Encourage them to provide updates while you wait for clearance in the truck or at a nearby coffee shop.
9. Protect yourself and your equipment from scary rain by applying the ten-drop rule; when you see 10 drops of rain on the windshield, pack it up and go home.
10. Avoid dehydration by always carrying a chilled six-pack of beer with you to every job site.

How Arrow-Wielding Men Mapped Britain in the 1940s

Recently unearthed photos show beleaguered surveyors in suits holding pointy wooden markers.

By: Cara Giaimo

On March 11, 1947, readers of the *Manchester Evening Chronicle* were warned of a strange invasion. “Teams of men have descended on a dozen cities,” the article explained. Some of these men wielded scopes and tape measures. Others had cameras, wooden boards, and cartoonish two-foot-long arrows.

Citizens were to cooperate: if the men asked to enter your home or workplace, or point one of those arrows at your stone wall, “you shouldn’t say no,” the *Chronicle* continued. After all, silly props notwithstanding, these men were pulling off a serious feat. They were mapping all of Britain, one revision point photo at a time.

As Ordnance Survey employee Elaine Owen explains, urban surveyors based their maps off of small, unmoving features of the built landscape, called “revision points.” The photos kept track of where these anchors were located. They were vital resource in the midcentury effort to make detailed maps of Britain’s major cities, but as technology changed, they eventually fell out of use. Manchester’s languished in boxes for decades, until an archivist at the city’s Central Library showed them to Owen.

Earlier this month she scanned and uploaded about 23,000 of them to inaugurate her new website, Timepix, which used maps to place historic photos in their geographic context. “Manchester was one of the first cities to be mapped,” says Owen. Seventy years later, you can use these photos to travel back in time and walk its streets, with the survey workers pointing the way.

Nowadays, if people need precise geographical information, they generally turn to satellites. But before such technology was available, mapmaking required a tiring combination of trigonometry and hoofing it. When new maps were necessary, teams of surveyors would roam the country, choosing or building landmarks and measuring the angles and distances between them. Cartographers and draughtsmen would take the data they collected and transform it into precise charts.

Great Britain’s first major surveying project, the “Principal Triangulation,” began in 1791 and took over half a century to complete. During that time, surveyors from the Board of Ordnance established a series of “triangulation stations,” each of these station denoted by a large stone with a deep hole drilled into it. The surveyors who installed and measured from the stations wrote down variously detailed accounts of where they were, and did their best to use non-local stones for the markers, to enhance their visibility.

Though undoubtedly clever, this method had some shortcomings, which became apparent when it was time to update the maps. “The descriptions were very poor and varied in quality ... from a dimensioned plan to a statement such as ‘Mr. Brown who lives in the cottage at the foot of the hill knows the position of the station,’” a later report explained. “After a lapse of 100 years or more and the consequent demise of Mr. Brown this naturally complicated the task of finding such stations.”

In other cases, civilians accidentally destroyed the markers: the report mentions a cinema owner removing one to install a “Wonder Organ,” an archeologist excavating another, and a policeman throwing one away because he thought it was part of a zeppelin bomb.

And so in 1935, when the country underwent an update (called the “Retriangulation”), the Ordnance Survey decided to do things a bit differently. First, they installed durable concrete obelisks, known as “turg pillars” or “trig points,” on various hilltops and mountains across the country. The trig pillars doubled as stands for surveying instruments known as theodolites, and the surveyors used them to establish the initial, or primary, triangles. They then broke those down into smaller and smaller zones, their axis denoted by other markers: generally brass rods, bolts, or buried concrete blocks.



At the most fine-grained scale, though, even those were too clunky. “The cities were mapped in more detail than the countryside,” says Owen. So in urban centers like Manchester and London, surveyors decided to *find* existing fixed spots instead of making them, establishing what they called “revision points.” For these, they sought both specificity and longevity. A quintessential revision point might be a scratch on a wall, or the corner of a doorway, or an old nail sticking out of a post - something so ordinary, unchanging and small, most people wouldn’t even notice it.

This is where the props come in. These surveying teams wanted to ensure that when their own successors set out to revise the map, they wouldn’t have to spend hours searching for the right scratch, corner, or nail. So every time they deemed

something a revision point, they recorded the date and a location code onto a wooden board. They then had someone point a big arrow at the point in questions, and snapped a photo.

“They’re concentrating very hard where they’re pointing, because those points are at centimeter[-level] accuracy,” says Owen. “They need to get the arrow right on the point.”

Clicking around the Timepix map, you can get a sense of how a typical surveying team’s day might have gone. The black board - called a hymn board, after the church prop it resembled - was heavy, and difficult to haul around. The cameras must have been cumbersome as well. Despite this, the workers often dressed in collard shirts and jackets. Sometimes they even wore ties.



How Arrow-Wielding Men Mapped Britain in the 1940s continued...

“The nature of the survey is that it is ordinary places that are captured,” says Owen. “Major public buildings and places tourists might normally go are a far less interest than the humble street corners.” Some afternoons took the teams down empty streets, where they aimed their arrows at building after building. Others they spent on lonely back roads, stoically pointing up a railway bridge, and then down at the corner of a drain.

As other Mancunians went about their own days, intersecting with these roving men must have been confusing. Part of the point of that 1946 *Chronicle* article was to explain the project to the general public. (It even includes an appeal from the surveyors: “Please don’t move our tripods.”)

But even so, Owen says, “a lot of people had no idea what was going on.” In a fair number of the images, the arrow-pointers are dogged by curious onlookers - or occasionally, actual dogs. Pedestrians gawk, children photobomb, and shopkeepers come out to see what’s what.

Once the survey was finished, the photos were collected into thick books and stored in Ordnance Survey offices. Up until the 1980s, Owen says, people would still refer to them. But after satellite technology made them obsolete, they were all donated or destroyed. “They were a really valuable part of our history and we basically threw them away,” she says. (The arrows and hymn boards, unfortunately, are also nowhere to be found.)



She feels lucky to have found the Manchester revision point photos, and is excited to dig into another store, of about 300,000, that was recently unearthed in an Ordnance Survey building. There are probable other troves in local archives and record offices, too, just hanging around and waiting to be mapped.

In the meantime, this set is a good start. Now that the images are online, Owen hopes that some of these photobombing children will recognize themselves in one of them and come out of the woodwork. So far, she says, she’s in touch with one man, who has been combing through the collection: “His dad was a surveyor, and he’d go out with him on school holidays and help out, and if he was good they’d let him point the arrow.”

The owners of a pub, the Greyhound, also got in touch after spotting their building. Unlike the children, it looks almost identical to its 1940s portrait, save for the new parking lot and picnic tables out front.

Owen also hopes people enjoy the quotidian details the photos provide: the fashions, the advertisements, and other aspects of the everyday. While trying to gather ageless data for an abstract map, the surveyors happened to thoroughly capture a very particular time and place.

The Star-Spangled Banner Verse You’ve Probably Never Heard

Many Americans have no idea there are actually four official verses to the “Star-Spangled Banner” - and even fewer know about a little-known, unofficial fifth verse, written a half century later by poet Oliver Wendell Holmes. It goes like this:

When our land is illum’d with Liberty’s smile,
If a foe from within strike a blow at her glory,
Down, down, with the traitor that dares to defile
The flag of her stars and the page of her story!
By the millions unchain’d who our birthright have gained
We will keep her bright blazon forever unstained!
And the Star-Spangled Banner in triumph shall wave
While the land of the free is the home of the brave.

Holmes wrote this extra verse, long after Francis Scott Key wrote the original. The U.S. was in the grip of civil war, and unlike the familiar verse, it’s not about a foreign enemy. It’s about the foe from within.

The Story of John's Little Acre

By: L.M. Powell, Land Surveyor, Hamilton, Montana
(Reprinted from the ACSM Bulletin, August, 1975)

In the beginning, God created Heaven and Earth - and the great flood and the Ice Age passed, and there were stone and soil and mineral on John's little acre.

In 2500 B.C. by a strange mutation, surveyors were created and their work became a profession. At the time, doctors were still rattling bones and chanting to cure their patients, and lawyers were meting out justice on an "eye-for-an-eye, tooth-for-a-tooth" principle. And each spring the Nile destroyed the survey markers and they had to be remeasured so that taxes could be levied, and trees grew on John's little acre.

Years passed and, in England, the common law was established and it was good - it was horse sense. To fulfill the claim of land ownership, metes and bounds descriptions were prepared, such as: *Beginning on the bridge across Spring Creek at the west edge of town of Devonshire, England; thence north along the center of Spring Creek to the stone fence along Jones's south line; thence west along said stone fence to a lone oak tree, ...* and once each year the people of the village walked the property lines and each owner performed a ritual which laid claim to his land, and flowers grew on John's little acre.

The compass was invented, the world became round, sailors navigated, America was discovered, the Mayflower sailed, and buffalo grazed on John's little acre.

The Colonies were formed and wars were fought; Washington and Lincoln were surveyors; and birds sang on John's little acre.

In 1803, the Louisiana Purchase was made which placed a value of 4 cents on John's little acre.

The sectionalized system of land surveying had been in use for some time when the surveyor entered the Bitterroot Valley in 1872 and determined that Section 23, T. 6.N., R. 21 W., P.M.M. included John's little acre.

And stones were set and witnessed every half mile around Section 23 and the Government said "*this is good and proper, and these markers shall govern the perimeter and the aliquot parts of Section 23 regardless of errors in the original measurements*", and the SW 1/4 of Section 23 included John's little acre.

In the year 1890 a homestead was patented to a man named Bill which covered the SW 1/4 of Section 23, and Bill thought he owned exactly 160 acres bounded by lines bearing due north, south, east, and west, but he didn't; the acreage was short and the lines crooked, but it still included John's little acre.

Now John was a friend of Bill's so when he moved to the Bitterroot Valley in 1895, Bill deeded him an acre of land for his home site. The two men agreed on the boundaries, paced the distances, and drove buggy axles on the four corners. They then estimated that the SW corner was about 200 yards NE of the SW corner of Section 23, and a point of beginning was established for John's little acre.

In 1898, John decided to get married and mortgaged his acre to acquire funds to improve the house. The bank required a survey of the property, so a man with a compass and chain was hired. Due to a deposit of iron ore near the SW corner of Section 23, his bearings were erratic and since the area was brush, his distances left something to be desired, but the buggy axles were there and still marked the true boundaries of John's little acre.

By 1910, the orchard boom was on. The area had been cleared and planted to apple trees. The bearing trees had been cut and the section corner stone covered with soil. An orchard development company had purchased Bill's 160 acres and directed their surveyor to locate the exception which was John's little acre.

The surveyor, assuming that the section corner was lost, found the four buggy axles and using the erroneous data from the previous survey, set a pipe mark the SW corner of Section 23. Using a transit and steel tape, he retraced the angle and distances between the found buggy axles and prepared a new description (the third) for John's little acre.

During construction of a county road in 1920, the corner stone on the SW corner of Section 23 was found and reset beneath the road surface. In 1921 the four axles were tied to the true section corner and a new description (the fourth) prepared for John's little acre.

In 1960, a theodolite was used, and the bearings corrected slightly on John's little acre.

In 1970, an electronic measuring device was used and the distances corrected slightly on John's little acre.

And so it came to pass that by 1970, John's little acre had numerous descriptions, but it had in fact never changed. The true boundaries were still marked by the four buggy axles, the bearings and distance bore little resemblance to the original deed, the acreage was actually 1.265 acres, *but it was still John's little acre.*

And,.....



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April 23, 2018

Matthew Fritzingler
Department of General Services
Division of Purchases and Supply
1111 East Broad Street, 6th Floor
Richmond, VA 23219
matthew.fritzingler@dgs.virginia.gov

Re: Request For Sealed Proposal (RFP) # E194-79435, Unmanned Aerial System Services

Dear Mr. Fritzingler:

The Virginia Association of Surveyors (VAS) is the statewide professional society of individual professionals licensed to practice land surveying in the Commonwealth of Virginia. VAS wishes to bring to your attention its deep concern for Request for Sealed Proposal (RFP) # E194-79435, Unmanned Aerial System Services.

The Code of Virginia, § 54.1-400, provides the following definition of “the practice of land surveying”: “includes surveying of areas for a determination or correction, a description, the establishment or reestablishment of internal and external land boundaries, or the determination of topography, contours or location of physical improvements, and also includes the planning of land and subdivisions thereof. The term “planning of land and subdivisions thereof” shall include, but not be limited to, the preparation of incidental plans and profiles for roads, streets and sidewalks, grading, drainage on the surface, culverts and erosion control measures, with reference to existing state or local standards.”

RFP - E194-79435, issued by the Virginia Department of General Services (DGS) is a multi-state contract, from Virginia to California. Included in the scope of services are a variety “Land Surveying and Aerial Mapping Missions” (see pages 11-12) that fall within the definition of the practice of surveying or surveying-photogrammetry, as such terms are defined in the Code of Virginia and the Virginia Administrative Code. Moreover, such services are the “practice of land surveying” in several of the other states in which unmanned aerial system services could be performed under this contract.

Virginia and the other 49 states, as well as all U.S. territories and possessions, license land surveyors. In order to protect the public health, safety and welfare, each state requires individuals to be licensed in and by their respective jurisdictions in order to practice land surveying. Any person or persons practicing without a license may be subject to civil or criminal penalties.

Therefore, we respectfully urge an amendment to the RFP to require the contractor to have work that falls with the Virginia state law definition of the practice of land surveying to be a Virginia licensed land surveyor or surveyor-photogrammetrist, as applicable pursuant to the Code of Virginia and Virginia Administrative Code. It is our view that a similar provision be included for every other state that is a party to this contract with regard to their respective surveying licensure statutes.

Additionally, inasmuch as the RFP is for services that are the "practice of land surveying" in § 54.1-400 of the Code of Virginia, the Code (§ 2.2-4301) also considers such services to be "professional services", which "means work performed by an independent contractor within the scope of the practice of accounting, actuarial services, architecture, land surveying, landscape architecture, law, dentistry, medicine, optometry, pharmacy or professional engineering. "Professional services" shall also include the services of an economist procured by the State Corporation Commission. (emphasis added). The Code, therefore, requires contracts for professional services to be by "competitive negotiation" (§ 2.2-4302.2). RFP E194-79435 requests prices and is therefore in violation of § 2.2-4301 and § 2.2-4302.2.

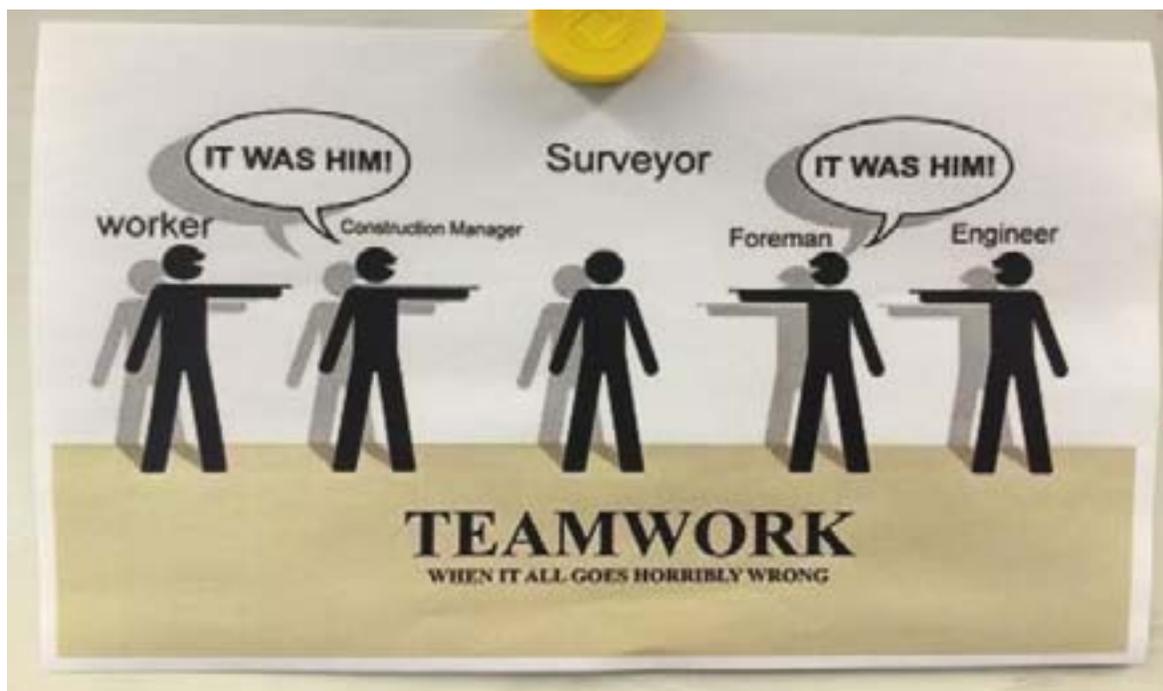
We would respectfully urge the withdrawal of RFP E194-79435 and its re-issuance with a requirement for a Virginia licensed land surveyor or surveyor-photogrammetrist, and using the qualification based competitive negotiation process for professional services, consistent with the requirements of Code of Virginia sections § 54.1-400, § 2.2-4301 and § 2.2-4302.2, as well as with respect to the requirement for performance by a licensed professional surveyor pursuant to the laws of other participating states.

On behalf of the VAS Board of Directors, thank you for your attention to this matter. If VAS can be of any assistance, please do not hesitate to contact me.

Respectfully,

Kevin D. Shreiner, LS, PS VAS President

cc: Board for Architects, Professional Engineers, Land Surveyors, Certified Interior Designers and Landscape Architects (APELSCIDLA Board), Department of Professional and Occupational Regulation (DPOR)



Why is NGS replacing NAD 83 and NAVD 88?

NAD 83 and NAVD 88, although still the official horizontal and vertical datums of the National Spatial Reference System (NSRS), have been identified as having shortcomings that are best addressed through defining new horizontal and vertical datums.

Specifically, NAD 83 is non-geocentric by about 2.2 meters. Secondly, NAVD 88 is both biased (by about one-half meter) and tilted (about 1 meter coast to coast) relative to the best global geoid models available today. Both of these issues derive from the fact that both datums were defined primarily using terrestrial surveying techniques as passive geodetic survey marks. This network of survey marks deteriorates over time (both through unchecked physical movement and simple removal), and resources are not available to maintain them.

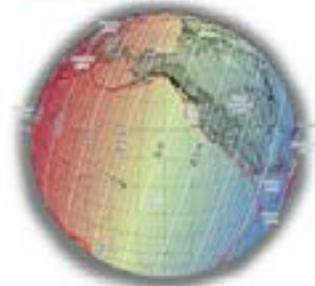
The new reference frames (geometric and geopotential) will rely primarily on Global Navigation Satellite Systems (GNSS) such as the Global Positioning System (GPS) as well as an updated and time-tracked geoid model. This paradigm will be easier and more cost-effective to maintain.

What to expect: Your coordinates will change

The magnitude of change will vary based on the datum you are using and your geographic location. View the maps below to see the approximate horizontal and height changes when the new reference frames are adopted.

You can also use online tools to calculate the approximate change in your area. Use **HTDP** to calculate approximate horizontal change and **xGEOID** models to approximate vertical change.

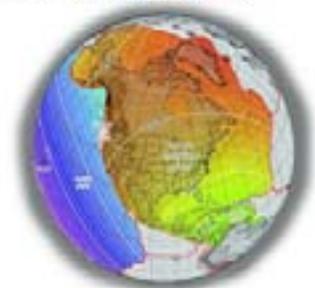
Approximate Ellipsoid Height Change



Approximate Orthometric Height Change



Approximate Horizontal Change North American Plate



Approximate Horizontal Change Pacific Plate

