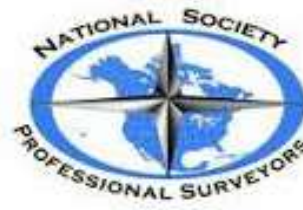


# The UCLS Newsletter



May 2022

## What is it?



There are a total of 29 counties in the great state of Utah. Among them, Salt Lake County is the oldest (established in 1849) while Daggett County is the youngest (established in 1919). The most populated county is Salt Lake County, the largest county in area is San Juan County and the smallest in size is Davis County.

Each County is governed by elected officials, having different types of authority and leadership; including the office of the County Surveyor. The office and/or function of the County Surveyor varies in each County. Some counties have an elected County Surveyor, others have appointed their County Surveyors, some utilize contracts while others have combined offices.

The first UCLS member to correctly identify those counties that have an elected

County Surveyor becomes eligible for a free lunch at your next UCLS chapter meeting.

Answers may be emailed to Susan at [srmerrill@ucls.org](mailto:srmerrill@ucls.org). The earliest date and time of response will determine the winner.

### **In this issue:**

We introduce you to the recently installed 2022 UCLS officers and the new Executive Director of NSPS. Unfortunately, we also say goodbye to two lifelong UCLS members who recently passed away.

Review the history of land surveying through two outstanding articles; "Land Surveying from the Doomsday book to Drones", and "What's a Rope stretcher?" Additionally, the patent for the new and improved Gammon reel is shared.

On the business side of surveying, we examine the benefits of having licensed educators, ascertain business ethics, and appraise the NGS GPS Benchmark project status.

Surveyors establish and re-establish boundaries. Read about a boundary dispute between two European countries, how the conflict was created and how it was resolved.

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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**"No matter what people tell you,**  
**words and ideas can change the**  
**world."**  
**- Robin Williams**

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## Land Surveying Evolution from the Domesday Book to Drones

by: Kyle Hagerty

All real estate traces its roots back to land surveying, it's the very foundation the property industry is built on. Centuries of deal-making form a chain of ownership all the way back to the very first surveys. Technology is changing land surveying, evolving the way we understand land and ownership at the center of every transaction.

The Domesday Book, or Domesday Book in Middle English, formed the basis of property ownership across England and much of Wales for centuries. It may be the most important historical document you've never heard of. After defeating the Anglo-Saxons in 1066 during his invasion of England, Norman king William The Conqueror demanded his new fiefdom be surveyed to determine who still alive owned what land, what type of people they were and what they now owed their new king. After such a monumental upheaval, William needed to reassert his claim to the land granted to him by his new crown. It wasn't till nearly two decades later that work began under William II. Exact numbers and time frames are hard to know, but men were sent all over the countryside, holding public inquiries attended by every lord and representative of every township.

The survey went far beyond recording the names of landholders and the size of their holdings. The Domesday Book created a national valuation list, estimating the value of all landholdings across the country at the time of Edward the Confessor's death, when the new owners received it, at the time of the survey and its potential value. Four different value assessments for every tract of ownership. The survey, written in Latin unreadable to most native English, was a full account of kingdom's financial resources via land holdings, the most important source of national wealth at the time. The total value of the land recorded in the Domesday Book was roughly \$73,000, a King's ransom considering a wealthy household earned just \$10 a year. So thorough was the survey it was as if God himself had surveyed his domain, making lasting, unalterable decisions, like those of Judgment Day, giving the books its name. The Domesday Book was born, immediately becoming an invaluable resource, stored at the national treasury, referred to simply as 'the book'. It would remain that way for centuries until another complete survey of England happened in 1873.

The Domesday Book was a marvel of record keeping but relied on the same basic techniques employed by the Romans, Greeks, Chinese, Mesopotamians, and Egyptians. Basic distances and boundaries were measured with rope or string,

sometimes a crude compass, to establish boundaries recorded in exacting detail. It wasn't until the 18th century that mapping became a critical part of surveying, using theodolites, precise instruments using a tripod and compass, to illustrate each plot.

The Industrial Revolution of the 1800s created more demand for land surveying than ever before as cities across the globe experienced explosive growth. Surveying became a profession, hired by cities, transportation departments, railways, and frontier speculators. As the value of national economies and land grew exponentially, so too did the importance of accurate land plot measurements and exact boundary descriptions. Surveyors set out across America to explore possible routes for a transcontinental railroad, using theodolites modified with scopes and tools for triangulation.

Surveying in the 21st century is technically advanced endeavor. Theodolites have given way to total stations, using electronics and advanced optical instruments, onboard computers to perform triangulation calculations and even robotics to perform basic surveying. Satellite positioning systems measure features and land boundaries with speed, accuracy, and scale only capable from space. Laser scanners using Light Detection And Ranging (LIDAR) technology trace the shape of land and buildings with near-infrared lasers. LIDAR surveying devices can be attached to planes, helicopters, and cars to survey at speed. Software then collects and analyzes all the surveying data to create rich maps with extreme detail compiled through multiple surveys.

Once limited to the ground except at great cost, surveying has gone aerial with the use of drones, able to conduct photogrammetry, 3D mapping, and land surveying at a fraction of the cost of other forms of aerial surveying. Drones are being used by developers and construction professionals to make crucial site planning decisions, carrying LIDAR surveyors and other advanced optics. Surveying was one of the first commercial applications for drones and has been widely adopted.

When it comes to record keeping, everything is now online. Far from relying on one book, land catalogs, surveys and tracts are kept on city, state, and federal databases, accessible to practically anyone with just a few clicks. The block chain is useful in establishing verifiable title records and transfers as a digital distributed ledger. Land ownership is

---

*Land Surveying Evolution from the Domesday Book to Drones Continued...*

public knowledge, leading to developers having to rely on crafty techniques like holding companies that obfuscate their deals. In the United States, the Bureau of Land Management (BLM) and General Land Office (GLO) provide live access to more than five million Federal land title records issued between 1788 and the present.

No matter how advanced the technology or record keeping of surveying becomes, they will always be tied to older iterations like the Domesday Book. Claims established by the original Domesday Book were involved in a property dispute as recently as 2019.

The BLM bases its online databases on 1,582 original General Land Office tract books. That's because land surveying, even with the most advanced technology, is an inherently historical endeavor, built on centuries of established titles, boundaries, and transfers. Throughout history, some of the most brutal wars, costly deals, and hottest legal issues have centered around land surveying establishing who has a claim to what. As technology and record keeping advance, settling such disputes has gotten easier, easing tensions among neighbors and nations.

Building new surveying and record keeping tools must account for the centuries of work done by governments, academics, and surveyors. Real estate's storied place in the global economy is backed by decades of meticulous record keeping, creating rich historical documents that the very foundations of bureaucracy and private property holdings are based on. Just as the Magna Carta established the idea of consultative government that led to liberty and democracy, the Domesday Book and other historical surveys established the first record of private property ownership that forms the basis of our capitalist economic system.

### January Where-Is-It



The photo for the January 2022 Where-is-it competition was provided by Meridian Engineering using drone methods. The picture is near Echo Reservoir at the I-80 and I-84 interchange.

Bruce Williams of the Salt Lake County Surveyor's Office was the first to correctly identify the location of the picture. Karl Jensen of Aero-graphics and Bahy Rahimzadegan of the Weber County Surveyor's Office followed with the second and third correct guess.

## The Business Ethics Field Guide - Part 3

By: Brad Yarbrough

This series features articles from Brad Agle, Aaron Miller and Bill O'Rourke, co-authors of *The Business Ethics Field Guide*. Each article focuses on a common work dilemma, provides real life examples and insightful solutions.

This article addresses the oft-faced ethical challenge of keeping promises. Indeed, establishing expectations and keeping our word is at the heart of the right of way profession. Many difficulties arise when the bonds of trust between parties are broken. I vividly remember when I assigned an agent to a client's maintenance project involving a short pipeline and handful of landowners. The agent faced unexpected resistance from owners who recounted the numerous promises broken years earlier during the initial pipeline construction. Though eventually successful in regaining their trust, the outcome could have been reached more quickly and less costly if the pipeline operator had been better about managing obligations in the past. Had they listened to the following advice I believe they would have succeeded.

We all make lots of promises. Some are small and casual, while others are formal. Some are even long term, personal commitments such as the promise to love, honor and respect a spouse for a lifetime. No matter what the promise is, many involve a degree of uncertainty.

Think about a small commitment like promising to take someone to the ball game, but then it rains. At the time the promise was made, there was little known of the future, yet the commitment was made anyway.

A basic moral principle is that we will live up to our promises. We like to think that our word is our bond. However, in a world of uncertainty, conflicts are sure to arise. Keep in mind that:

- Breaking some promises will be necessary to live a moral life.
- People remember when promises are kept or broken.

### Unrelenting Circumstances

Sometimes the choice is straightforward. You had promised to mow your neighbor's lawn, but then you receive a phone call that your spouse was in a traffic accident. Most people will agree that the unforeseen event warrants breaking the promise to satisfy a higher priority. Most of the time, however, the choice is not so clear.

In business, we can oftentimes predict changes and plan for them. For instance, if there is a possibility that the price of a commodity can fluctuate, then the contract to supply that commodity should provide for price fluctuations.

Communication helps establish new expectations when the world changes.

### Alternate Solutions

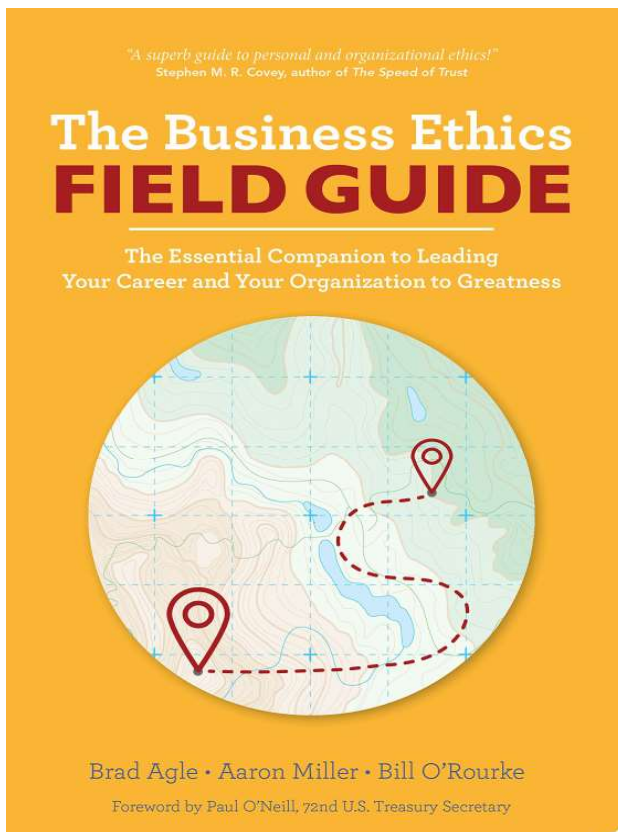
Perhaps the other party may not even want you to keep the promise. If an economic panic makes it impossible for you to fulfill an order, then perhaps a customer who is facing the same circumstances no longer wants the product. Communication helps establish new expectations when the world changes.

There may be an alternative course of action that would fulfill the original intent of the promise. You promised to provide financial support for a local youth group and the group is forced to disband because of a crisis at the group's national level. Perhaps giving to another organization will achieve helping the community.

### Communication is Key

Don't decide alone. The foreman of a plant shipped a large product order on the day it was promised. The order specified that the shipment be inspected. However, the inspection equipment was broken. The foreman decided to ship the items on the promised date, rationalizing that no product defects had been found in the previous five years.

When his supervisor learned of this, he insisted on calling the customer and explaining what happened. The boss gave the customer the option of shipping the product back or accepting it. If something happened with the product later, the boss promised to fix it. The customer accepted the product, but the foreman should have contacted the customer before unilaterally deciding on the action. Communication is valuable.



## In Summary

Here's some guidelines for avoiding or mitigating these issues:

- **Be careful of the promises you make**

Try to predict and plan for potential changes. The majority of contract discussions don't merely deal with the straightforward aspects of the contract (quality, delivery and price), but also the impact of potential future changes. It's critical to address where responsibility will fall in the event those changes happen.

- **Don't overbook yourself**

It's difficult to estimate the time required to meet promises. Ensure there is time for unpredictable developments. Being too busy is seldom accepted as an excuse for breaking a promise.

- **Build good relationships**

By honoring your commitment as a matter of course and often going above and beyond the expectations, you will build social capital. That social capital will serve you well when you are faced with breaking or modifying a promise.

**“Communication helps establish new expectations when the world changes.”**

- **Moral Imagination**

Moral decisions must not consist of just two alternatives. Instead, using your imagination can result in developing a creative solution that satisfies the moral obligations of all the involved parties. While moral imagination doesn't always produce such solutions, you might be surprised at how often thinking through alternatives will lead you to a creative solution.

## 13 ETHICAL DILEMMAS

Upcoming articles in this series will take a closer look at each dilemma.

- 1. STANDING UP TO POWER**  
Someone in power is asking you to do something unethical.
- 2. MADE A PROMISE**  
Conflicting commitments force you to choose.
- 3. INTERVENTION**  
You see something wrong. How do you proceed?
- 4. CONFLICTS OF INTEREST**  
Multiple roles put you at cross purposes.
- 5. SUSPICIONS WITHOUT ENOUGH EVIDENCE**  
You believe something is going on, but you're not sure.
- 6. PLAYING DIRTY**  
Achieving justice but by doing something unethical.
- 7. SKIRTING THE RULES**  
Bending the rule for a better outcome.
- 8. DISSEMBLANCE**  
Misrepresenting the truth for better outcome.
- 9. LOYALTY**  
Giving up ethical stance to protect valued relationship.
- 10. SACRIFICING PERSONAL VALUES**  
Living ethically might put burden on others.
- 11. UNFAIR ADVANTAGE**  
When opportunity exists to wield an unfair upper hand.
- 12. REPAIR**  
When you are responsible for a mistake.
- 13. SHOWING MERCY**  
You could grant forgiveness, but you don't know if you should.

AmericanAncestors.org: Rhode Island Roots Volume: 5, No.1 Page(s): 1



# R.I. Roots

Volume 5 Spring 1979  
Number 1 Published by The Rhode Island Genealogical Society

## EARLY SETTLERS OF PROVIDENCE PLANTATIONS


When the General Court of Boston, in 1635/36 decided that Roger Williams should be sent back to England, he really did change the genealogical pattern of the new world. The friendly Narragansett Indians welcomed him and he obtained a grant of land from Massasoit, who we know, was the father of King Philip. Unfortunately, after developing some of the land and trying to make a home, he was informed that he was still under the jurisdiction of the Plymouth Colony. He and five of his friends who were settling with him left Seekonk and traveling by canoe, finally finding a river, traveled it until they found a spot to their liking. Here they found a spring bubbling forth and it seemed inviting to Williams so he decided to settle there and named the settlement Providence, in thankful prayer to God for His guidance.


Along with Roger Williams in that spring day of 1636 was William Harris, John Smith (the miller), Thomas Angell, Francis Wickes and Joshua Verin. These men proceeded to build a new colony but Williams stood fast to his beliefs and made arrangements with the Indians to obtain deeds to the land they were settling. The first deeds were signed 24 March 1636. Canonibus and Miantonomi, sachems of the Narragansetts were the two original Indians involved in the transfer of the lands. Roger Williams founded Rhode Island and Providence Plantations on the right of religious freedom and clear conscience and he held true to his own convictions that the Indians were the rightful owners of the land.


### The Deed


A true Coppye of the Towne Evidence, as followeth.

Att Nanhiggansick, The 24th of the first Month Comonly called March in the Second yeare of our plantation, or planting at Moshausick, or Providence.  
Memorandum, That wee Caunanicusse and Meluuantunomu the two chiefe Sachims of Nanhiggansuck, haveing Two yeares since sold unto Roger Williams the lands & meadows upon the two fresh Rivers called mowshausuck & wanasquatuckett, doe now by those lands from the Rivers & ffields of Pautuckett, The great hill of Neotaconkonitt on the Norwest and the towne of Mashapaug on the west. As also in Consideration of the many Kindnesses & services he hath continually done for us both with our friends of Massachusetts, as also at Quinitikticut, And Apaum or Plimouth wee doe freely Give unto him all that land from those Rivers Reaching to Pautuxett River, as also the Grasse & meadows upon Pautuxett River. In witnes where of wee haue hereunto set our hands in the presence of

The mark of Scotash 

The marke of Assotemewett 

The marke Caunanicusse 

The marke of Msiantenomu 

9318

*Rhode Island Roots*. Warwick, RI: Rhode Island Genealogical Society, 1975-. (Online database. *AmericanAncestors.org*. New England Historic Genealogical Society, 2018.)  
<https://www.americanancestors.org/DB487/i/13202/1/234836040>

Providence Rhode Island was founded by Roger Williams in 1638, The City is located upon land purchased by Roger Williams from four native American chiefs. the conveyance was documented by a deed that contains the mark of the four chiefs.

The Grantee, Roger Williams, is a tenth great grandfather of Steve Keisel.

## Thoughts on Professional Practice and Education

### Article 2: FS Exam as a Student Graduation Requirement

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

This is the second article focusing on professional practice and education. While I suspect there is support for the thoughts I am going to reveal among the profession, many academic administrators and faculty will disagree with what I am about to say. Agreement of all is never possible. Even the best of advice is often dismissed. (Not that my advice is always the best.) There is an old Jewish saying "If God lived on earth, people would break His windows."

By way of introduction and upon which my thoughts will be measured, I introduce myself briefly. I taught surveying for more than 30 years and still do contract teaching for surveying and engineering programs. I was a surveyor and engineer for over twenty years in the military before retiring. I have been licensed in several states as a surveyor, engineer, and attorney - almost fifty years as a surveyor. I still have an active license for each profession in at least one state.

The focus for this article will be to advocate requiring the fundamentals of surveying exam in order for a student to graduate from a surveying or geomatics program. Note and I emphasize that I am not advocating the student pass the exam in order to graduate, merely be required to take the exam.

I suspect those reading this article are familiar with the three exams required for licensure. Briefly, the first exam is the fundamentals of surveying (FS) exam. The second exam is the professional surveyor's (PE) exam. The third exam is the state specific exam. The FS exam tests the examinee on topics that a quality surveying program should cover in its curriculum. Most states, if not all states, allow senior college students to take the FS exam. Therefore, there is no barrier to prevent a surveying program from requiring students take the exam as a pre-requisite for graduation.

I provide three arguments for a surveying program to require students take the FS exam.

First, I believe a primary purpose for any surveying program is to provide graduates to feed the needs of employers and the profession. Whether the graduate seeks employment in the private or public sector, licensing is generally required to achieve more pay and higher positions. Licensing is required to own or manage surveying firms offering services to the public. What better way to begin the transition from academics to a professional stature than require the first professional exam while still involved in academic learning.

Second, the breadth and depth of surveying knowledge will never be more retentive than at or near graduation. After graduation, the graduate tends to increase their depth of knowledge in limited topic areas of surveying while forgetting knowledge in other topic areas. By way of example, the new employee that spends the next four years after graduation doing drone mapping is likely to have forgotten a great deal of knowledge they once possessed on boundary law, measurement adjustment, and so on. Therefore, the best chance for passing the FS exam that tests on a broad range of surveying topics is immediately prior to or shortly after graduation.

I have heard students claim they will be better able to study for the FS exam later after they are employed and without the academic burdens of course attendance, homework, and course exams. I caution otherwise. My experience shows that the new graduate is often immersed in long hours at work and is soon distracted with marriage, home ownership, child raising, and family commitments. All too often the graduate who has not taken and passed the FS exam while in college, fails to pass the exam later or cannot commit the time to prepare and take the FS exam later.

For a third reason, I believe a graduate that has passed the FS exam, and placed this achievement on their resume at graduation, has many more opportunities for employment and advancement upon graduation than a graduate who has not taken the FS exam. And employer will seek out graduates and pay a higher wage to those that have already passed the FS exam. These students have proven a mastery of topics seemed necessary for professional practice and advancement.

While other compelling arguments can be made, I believe these three arguments are sufficient for those reading this article to understand the basis for my opinion. So why don't all survey programs incorporate the requirement that students take the FS exam as a pre-requisite for graduation?

I will give two reasons that seem to be prevalent reasons told to me. The first reason is that some programs rely on large number of foreign nationals to increase enrollment numbers and finance university coffers that rely on tuition money. Foreign nationals have no interest or need to pass any professional exam that is not recognized or necessary in their counties of residence. Such is their disdain for this requirement that when forced to take the exam, they select answers without contemplation. These programs fear the



Thoughts on Professional Practice and Education continued...

foreign student will switch their studies to another program that does not require the FS exam for graduation.

The second reason, perhaps partnering with the first reason, is that program administrators do not want the FS scores to be used to judge the extent of their graduate's knowledge and ultimately the quality of the surveying program. It is no secret among the profession that many surveying programs are on tenuous grounds due to low enrollment or faculty deficiencies. Often students that should not be in college, let alone a surveying program, are admitted and moved along much as many public schools move students along to graduation. Perhaps this happenstance is the eventual outcome of a society that gives a trophy to all participants, not just the winners. I will say no more as rational arguments sometimes get lost or ambushed when placed in this arena.

Having given my opinion, I now offer advice. My advice is for professional societies to press their local surveying programs to initiate this requirement if the requirement is not already a mandate. If the program seeks the support of the profession than the profession should seek the commitment of the program toward the profession by demanding students take the FS exam.

\*Other books and articles by Knud can be found at <https://umaine.edu/svt/faculty/hermansen-articles/>



**Richard Sorensen**

1928-2022

Richard Paul Sorensen, lovingly and fondly known as “Gramps”, passed away peacefully at his home on April 8, 2022 just two months shy of his 94th birthday. We were certain he would hit his 100th birthday so this came as somewhat of a surprise. He enjoyed good health and remained active right up to the end.

Dad was born June 14th, 1928 to George and Lillian Sorensen in Salt Lake City, Utah and was the oldest of four boys. He spent his childhood in the family home on “F” Street in the Salt Lake Avenues area and attended Bryant Junior High and West High School prior to joining the military and serving in the Occupational Forces in Japan following WWII. After receiving an Honorable Discharge from the Army, he enrolled in Civil Engineering School at the University of Utah. This was an endeavor that was one of his most difficult, yet it began a lifelong love of Engineering and Land Surveying. He spent college summers surveying in Alaska laying out the Glen Highway and another working on a ranch in Montana.

While attending the “U”, he noticed a beautiful brunette, Patricia Whitehead and her little brother Don, walking by the gas station he was working at. Negotiating through Don, he was able to make her acquaintance which began a courtship that led to marriage in the Salt Lake Temple on September 24, 1951.

After graduation, working for the Utah State Highway Department he spent his time designing roads and bridges mainly in Southeastern Utah, including the roads from Blanding to Monument Valley through Bluff and Mexican Hat, Price to Green River and south to Hanksville. He worked for Sharp Engineering for a number of years before starting Jackson & Sorensen Engineers. In the early 1960’s, He went on his own starting the Richard P. Sorensen Company, Consulting Engineers and Land Surveyors and actively worked into his 90’s.

Dad thoroughly LOVED his work, provided well for his family and employed his kids and many of his nephews, nieces and kids from the neighborhood. His brother Ron worked with him through the years running the survey crew while dad did the engineering and design work. They made a great team that did excellent work. He designed numerous subdivisions, small dams, sewage treatment plants, and worked on many large commercial projects including the Huntsman Center, the Salt Lake Water Treatment Plant and the refineries in North Salt Lake. He was a charter member of the Utah Council of Land Surveyors and is still licensed as a Land Surveyor and Consulting Engineer.

A founding member of the Sports Mall, he and mom played tennis weekly until he was over 90 years old. They shared a love of Lake Powell and vacationed there with their family every year since the lake started filling.

Dad and mom served as Inner City Missionaries in downtown Salt Lake. He served in many church callings and was a much beloved Scoutmaster and Bishop. He was very instrumental in building the 6th & 10th ward building in the Big Cottonwood Stake. He took in the homeless, supported many missionaries and was a mentor and confidant to those he served. Dad was inclusive before we knew what inclusive meant. He rarely met someone he didn’t like and took a genuine interest in those he met and made friends for life. He was particularly kind to the downtrodden and those in need. He was a lifelong advocate and student of the Gospel of Jesus Christ and followed the example of his Savior as a humble servant to his fellow man.

Dad loved his Sweetie and had a special relationship with each of his children, grandchildren and great grandchildren. He had an uncanny ability to make each one think they were his favorite. In truth, they are all his favorites.

Dad is survived by his children Steven Michael (Colleen) Sorensen, Richard Bryan (Alison) Sorensen, Rebecca Pedersen Sorensen, James Walter (Lisa) Sorensen, Cydney Lynette (David) Maisey. 23 grandchildren plus 15 spouses, and 38 grandchildren all of whom he adored and loved. He was preceded in death by his eternal sweetheart, Patricia Ann Whitehead Sorensen, son Rodney Stuart Sorensen and daughter Tricia Lynn Sorensen, his parents and brothers Alan Sorensen, Fred Sorensen and Ron Sorensen.

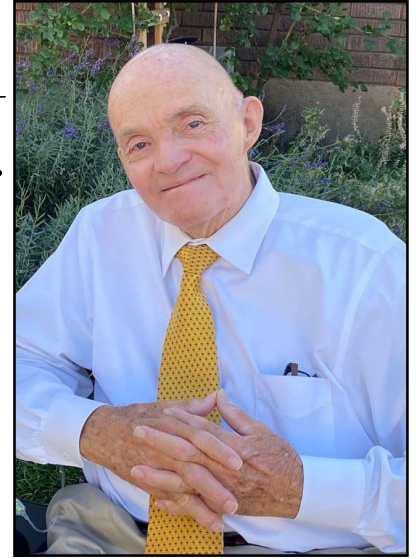
Funeral will be held Thursday, April 14, 2022 at 11:00 a.m. at the Salt Lake Big Cottonwood Stake Center, 1750 East Spring Lane, Holladay. There will be a visitation at the church on Wednesday April 13 from 6:00 p.m.-8:00 p.m. and prior to the funeral on Thursday from 10:00 a.m.-10:45 a.m. Interment will be at the Holladay Memorial Cemetery.



## Bing Christensen

One of the great land surveyors of the West has finally traversed his last range line, taken his last backsight, and pounded his last rebar. Our beloved husband, father, brother, grandfather, and great grandfather, Bing Christensen, 79, passed away on February 4th, 2022 at his home in the presence of loved ones. He was the endlessly grateful husband of Geri (Geraldine Hope Gee) Christensen with whom he shared 59 cherished years of marriage.

Born in the redrock beauty of Moab, Utah, he was the son of Ted and Lenna (Newell) Christensen. He also lived in White Salmon, Washington; Boise, Idaho; Anchorage, Alaska; and Orem, Midway, and Provo, Utah. He attended Brigham Young University where he earned a Bachelor of Engineering Science in Civil Engineering. He practiced land surveying professionally his entire life and worked for various companies, including Rollins, Brown, and Gunnell, (Provo), Aspen Engineering (Orem), MCM Engineering (Heber City), Summit Engineering (Heber City), and Christensen and Plouff Surveying (Midway). He also surveyed in Alaska for the Bureau of Land Management and owned his own business in Heber Valley, Utah, for many years.



He was a life-long member of The Church of Jesus Christ of Latter-Day Saints and loved serving in the temple and teaching Primary. He was very athletic and especially enjoyed running, walking, and hiking for many years. He also loved the outdoors, reading, music, cowboy westerns (especially starring The Duke), and any number of decadent desserts. He will long be remembered for his honesty, work ethic, love for his family, and love for and faith in his Savior, Jesus Christ.

He is survived by his wife Geri, brother Edward (Erin), son Shawn David (Lisa), son Brent Edward (Tammy), son Dane Newell, son Boyd Allen (Melissa), daughter Anna Lynn (Steven), daughter Erin Leigh (Aaron), and daughter-in-law Holly, 24 grandchildren and 3 step-grandsons and 2 great grandchildren and 10 step-grandchildren. He was preceded by his father and mother, sister Jeannette Dejong, and sister Tammy Sue.

The funeral service will be held on February 11th, 2022, at 2:00pm at the Grandview 13th Ward meetinghouse located at 1260 West 1150 North, Provo, Utah (viewing beginning at 12:45), with interment at the Sunset Memorial Gardens cemetery in Moab, Utah, the following day.

...and there arrives a lull in the hot race  
Wherein he doth for ever chase  
they flying and elusive shadow, Rest.  
An air of coolness plays upon his face,  
And an unwonted calm pervades his breast.  
And then he thinks he knows  
The hills where his life rose,  
And the Sea where it goes.

from "The Buried Life" by Matthew Arnold

## Timothy W. Burch Appointed New Executive Director of NSPS

The Board of Directors of the National Society of Professional Surveyors (NSPS) is pleased to announce the appointment of Timothy W. Burch, PLS, as its new Executive Director. Mr. Burch is the current President-Elect of NSPS and is a Professional Land Surveyor licensed in the states of Illinois and Wisconsin. Tim has been involved with the organization for more than 20 years as Secretary of the Board of Governors as well as the Board of Directors, NSPS Vice President, a member of the Certified Survey Technician Board, Joint Government Affairs, and ALTA/NSPS Land Title Survey committees. Along with content contributor for NSPS social media, he is creator and producer of the NSPS podcast "Surveyor Says!" and a contributing writer to the NSPS newsletter "News and Views."



Tim has been involved with the land surveying profession for more than 30 years and has represented NSPS at numerous functions and conferences. He has provided testimony on behalf of the profession at both the State and Federal levels as well as having established a partnership with "Get Kids into Surveying." Tim is currently the Chair of the FIG Working Group 1.1 (Professional Ethics) and is Chair-Elect for FIG Commission 1 (Professional Standards). He is also a contributing editor for the GPS World Magazine "Survey Scene" column.

Mr. Burch will succeed Mr. Curt Sumner, who has been the Executive Director for the past 23 years, on January 3, 2022.



In 2022, there will be a spectacular sky show. Two stars will merge into one, pushing out excess gas into an explosion known as a red nova. At magnitude 2, it will be as bright as Polaris in the sky, and just behind Sirius and Vega in brightness. The collision in the constellation of Cygnus will be visible for up to six months.

For more info, visit:

<http://www.astronomy.com/news/2017/01/2022-red-nova>

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## 2021 Western Regional Virtual Survey Conference Recordings

The Western Federation of Professional Surveyors (WFPS) is pleased to announce that they have partnered with the seven western state associations that co-sponsored the 2021 Western Regional Virtual Survey Conference to make the conference recordings available.

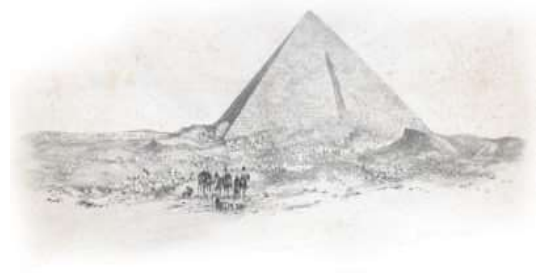
You can order the full conference, specific individual sessions, or groups of sessions by conference tracks.

For more information visit <http://wfps.org/publications.html>

## What's a Rope-Stretcher?

By: Emily Pierce, PS, CFEDS

Every year our field bags get increasingly loaded with technology - total stations, GPS units, lidar, drones, apps, and software - tools that make things easier, allow us to generate more data, and expand our reach. It makes me wonder how difficult things were for surveyors of the past to complete their jobs!



However they did it, they sure knew what they were doing.

As most surveyors know, Egypt likely produced the first known surveyors, known as “Rope-Stretchers” [harpedonaptae in Greek]. They earned that name because one of the tools used in surveying was a calibrated rope. These ropes were specially-treated to hold their length by being stretched out taut between stakes and then rubbed with a mixture of beeswax and resin. They were graduated by 13 knots tied at equal intervals (small or large, depending on the intended use). A commonly-used rope was made up of 12 royal cubits (a cubit is the length from the bent elbow to the tips of the fingers, or approximately 20.59 inches). This tool was more than just a knotted rope. It was the key to practicing sacred geometry, the purview of priests and royalty.



Hatshepsut with Seshat founding the Red Chapel

The inherent harmony in geometry was accepted by the ancient Egyptians as evidence of the divine plan that upholds the entire world. The use of geometry allowed humans to determine and incorporate this preexisting divine order into their structures. Sacred geometry, where all figures can be drawn or created using a straight line and a compass, was used to produce harmonic proportion, and the practitioners of this geometry were surveyors. The act of laying out buildings was literally done religiously - with an elaborate ceremony. Royal tombs, temples, pyramids and palaces, even the Pharaoh took part in the ceremony, playing the part of the chief surveyor.

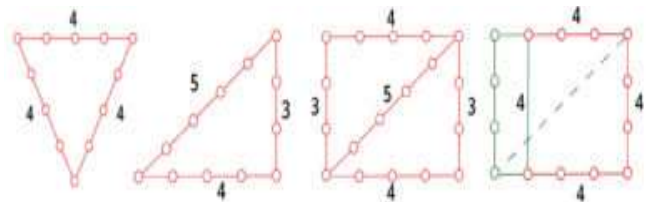
*“The most famous depiction of the ceremony comes from the temple of Edfu. Here the king is shown with the goddess Seshat, who is the personification of the art of writing and knowledge. Alongside the image is an inscription that reads, “I take the stake and I hold the handle of the mallet. I hold the measuring cord with Seshat.” So the king basically acts as a chainman in the ceremony. The king also took part in the celestial observations, at least ceremonially, to establish the alignment of structures.”*

*-Surveying in Ancient Egypt, Joel F. Paulson, presented at FIG Working Week 2005 GSDI-8*

So for special occasions, the Pharaoh got to pretend he was a surveyor! That sounds pretty harmonious to me.

### More than a knotted rope

The equally-spaced 13-knot cord was the basic tool used to establish various geometric shapes. For example, the rope can be used to create an equilateral triangle, where the three sides are made up of four units each. It can also create a right-angle triangle with sides 3, 4 and 5 units.



Of course, once you have a right triangle with the proportion of 3:4:5, you have the basis for rectangles and squares, which can be used to design almost any building. Most important of all, this rope can be used to create a circle, which is the symbol for the Egyptian god Re (the cosmic creative force). When the cord is looped as a full circle, that radius is 1.91 cubits ... which also happens to be a meter. Did those ancient surveyors know something prescient?

*What's a Rope-Stretcher? continued...*

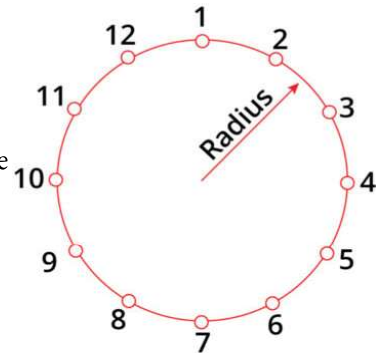
## How did they make sure the pyramid was level?

A water level was used to create a level base. The bedrock was networked with narrow trenches, then filled with water. The waterline was marked on all the trench walls, the protrusions cut down, and the trenches re-filled with stone to create a level base.

The second type of level was an A-frame with a plumb bob suspended from the apex. Since the Egyptians understood the isosceles triangle, stones could be cut and chiseled square, then mortared into place using this instrument for precision. With these tools, the Egyptian surveyors were able to build structures that are testaments to their understanding of geometrical harmony and complex engineering principles.

Using the simple knotted rope, and two types of levels, the Egyptian surveyors were able to create structures that are acknowledged as wonders of the world to this day.

The geometry of the Great Pyramid of Giza remains a hot topic of conversation today. The facts are pretty straight-forward. The Pyramid was the largest monument of its kind ever constructed and remains one of the Seven Wonders of the Ancient World. It was built with approximately 2.3 million blocks of stone, many of which weigh more than 3 tons, with the total weight calculated to be about 6 million tons.



## However, its geometry is the pyramid's most stunning aspect.

- If  $2\pi$  is multiplied by the perimeter of the Pyramid, that sum is equal to its heights.
- The azimuth of the Pyramid during summer solstice sunrise measures from true north (with only  $3/60$ th of a degree of error), and the sides seem to cause a shadow effect to make it appear to have eight sides instead of four.
- The base of the Pyramid is level to within just 2.1 centimeters; the average deviation of the sides from the cardinal direction is 3 feet 6 inches of arc.
- The greatest difference in the length of the sides of the Pyramid is 4.4 centimeters.

That's some amazing surveying!!

However, not all Egyptian surveyors worked on building pyramids - there was a great deal of work surveying nearby fields. Most of the land was owned by the Pharaoh, which meant that the Pharaoh was very interested in collecting rents and taxes on the land. (After all, there were tombs and pyramids to build, and they didn't come cheap). What's interesting is that this dichotomy of survey roles is still true today. Surveyor duties can range from new construction on large projects like skyscrapers to residential property line marking. Like the Pharaoh understood back in the day, both skills are the bedrock of a successful culture.

In those days, surveying had to be done yearly, due to the annual flooding of the Nile. Some monuments survived the flooding, but the land would have to be re-surveyed and so the Rope-Stretchers were brought in to put order to things.

Herodotus (484-425 BCE) wrote in Item 109 of Book II *Egypt* as follows: *Egypt was cut up: and they said that this king distributed the land to all the Egyptians, giving an equal square portion to each man, and from this he made his revenue, having appointed them to pay a certain rent every year: and if the river should take away anything from any man's portion, he would come to the king and declare that which had happened, and the king used to send men to examine and to find out by measurement how much less the piece of land had become, in order that for the future the man might pay less, in proportion to the rent appointed...*

*What's a Rope-Stretcher? continued...*

In learning more about how ancient Egyptian rope-stretchers did their work, I became aware of one elementary theory. “The more things change, the more they stay the same.” In other words, even though the ancient Egyptians’ tools seem rudimentary today, the principles of measuring and construction are still the same as it was then. We rely on the same sacred geometry, trigonometric formulas, and universal mathematic language, and it will continue to be the fundamental principles that will be relied upon centuries into the future.

*Emily Pierce is Berntsen’s business development manager. The former president of the Wisconsin Society of Land Surveyors, Pierce has decades of experience as a surveyor and leader. Prior to joining Berntsen, Emily served as director of surveying operations and senior land surveyor for Steigerwaldt Land Services, LLC in Tomahawk, Wisconsin. She also served as the county surveyor for Marathon County, Wisconsin.*

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## France - Belgium Boundary

A farmer in Belgium caused a stir recently after inadvertently redrawing the country’s border with France. A local history enthusiast was walking in the forest when he noticed the stone marking the boundary between the two countries had moved 7<sup>1/2</sup> ft.

The Belgian farmer, apparently annoyed by the stone in his tractor’s path, had moved it inside French territory. Instead of causing international uproar, the incident has been met with smiles on both sides of the border.

“He made Belgium bigger and France smaller; that’s not a good idea,” David Lavaux, mayor of the Belgian village of Erquelinnes, told French TV channel TF1. That sort of move causes a headache between private landowners, he pointed out, let alone neighboring states.



The border between France and what is now Belgium stretches 390 miles. It was established under the Treaty of Kortrijk, signed in 1820 after Napoleon’s defeat at Waterloo five years earlier. The stone dates back to 1819, when the border was first marked out.

“I was happy, my town was bigger,” the Belgian mayor added with a laugh. “But the mayor of Bousignies-sur-Roc didn’t agree.” “We should be able to avoid a new border war,” the amused mayor of the neighboring French village, Aurelie Welonek, told La Voix du Nord.

Local Belgian authorities plan to contact the farmer to ask him to return the stone to its original location. If that doesn’t happen the case could end up at the Belgian foreign ministry, which would have to summon a Franco-Belgian border commission, dormant since 1930. Mr. Lavaux noted that the farmer could also face criminal charges if he failed to comply. “If he shows good will, he won’t have a problem, we will settle this issue amicably,” he told Belgian news website Sudinfo.

## NGS GPS on Bench Marks

Welcome to the 2022 kick-off edition of GPS on Bench Marks Update. Now that NGS has officially extended the GPSONBM Campaign's cut-off date until December 31, 2022, there's time to get out there to fill remaining data gaps. Partners are encouraged to collect and submit GPS data to NGS for use in developing products to be launched with the Modernized National Spatial Reference System.



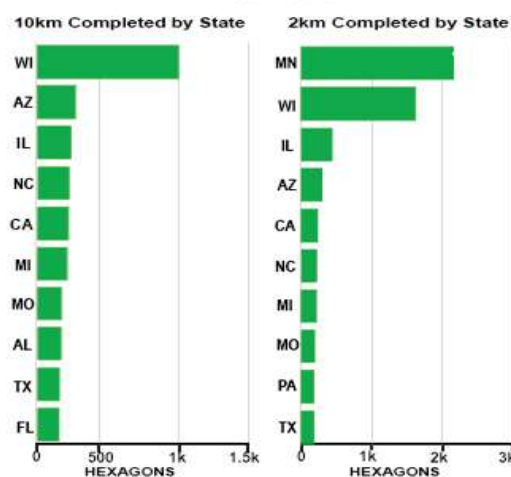
### Campaign Countdown

We now have another 11 months until the December 31st, 2022 cut-off date to collect and submit GPS data to NGS for use in products to be launched with the Modernized National Spatial Reference System. NGS will use the GPSONBM data received by the cut-off date to compute the initial set of 2020.00 Reference Epoch Coordinates (REC) that will be released with the modernized system. This initial set of RECs will be used to build the 2022 Transformation Tool. By getting your data to NGS before the cut-off, you can help us improve the transformation tool in your area and be ready with updated coordinates on the marks you use when the Modernized NSRS is released.

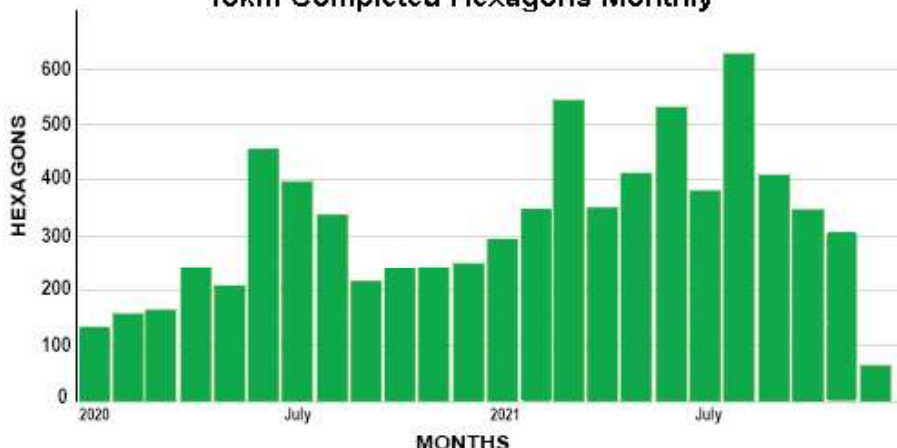
### Recent Progress

Thanks to the enthusiasm and dedication of people around the country, record amounts of valuable geospatial data were submitted to NGS every month throughout 2021! The graph illustrates that the momentum we generated in 2020 increased significantly in 2021. The map shows that data came in from all over the country last year. While Minnesota and Wisconsin have led the pack for the last two years, many other states made great strides toward their data coverage goals in 2021. Check out the GPSONBM Progress Dashboard to see how your state is doing. If you are up for a little competition (or collaboration), check the OPUS Shared Solutions Dashboard to see who in your state is submitting GPS data.

**GPSONBM SCOREBOARD  
FINAL RESULTS FOR 2021**

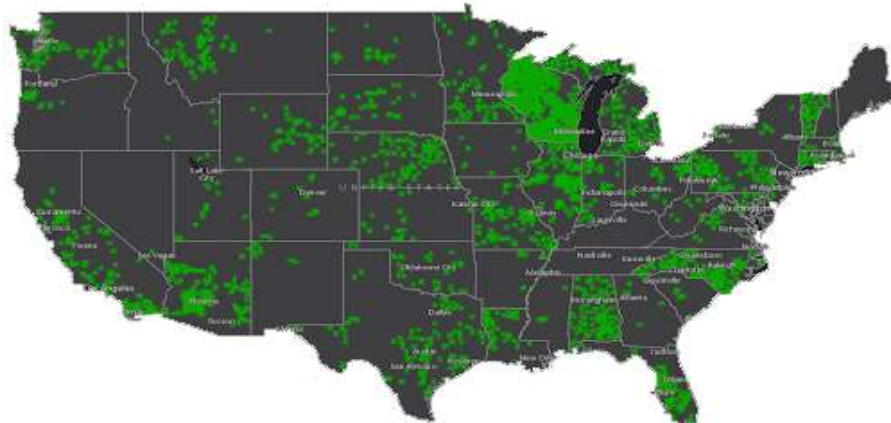


**10km Completed Hexagons Monthly**





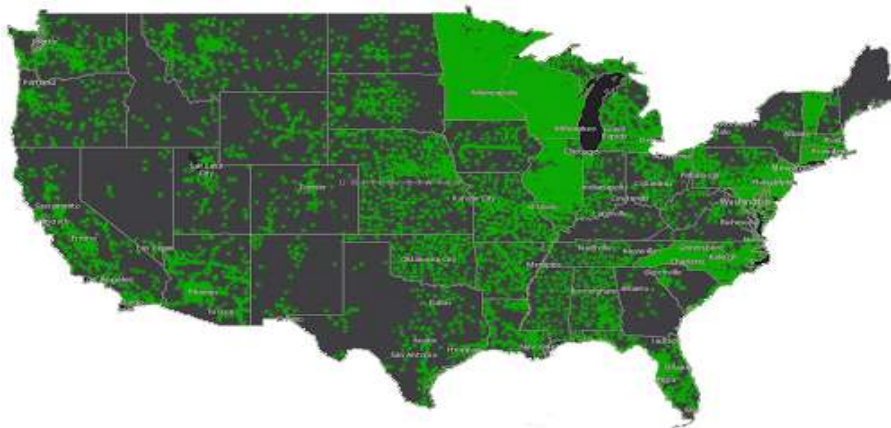
NGS GPS on Bench Marks continued...



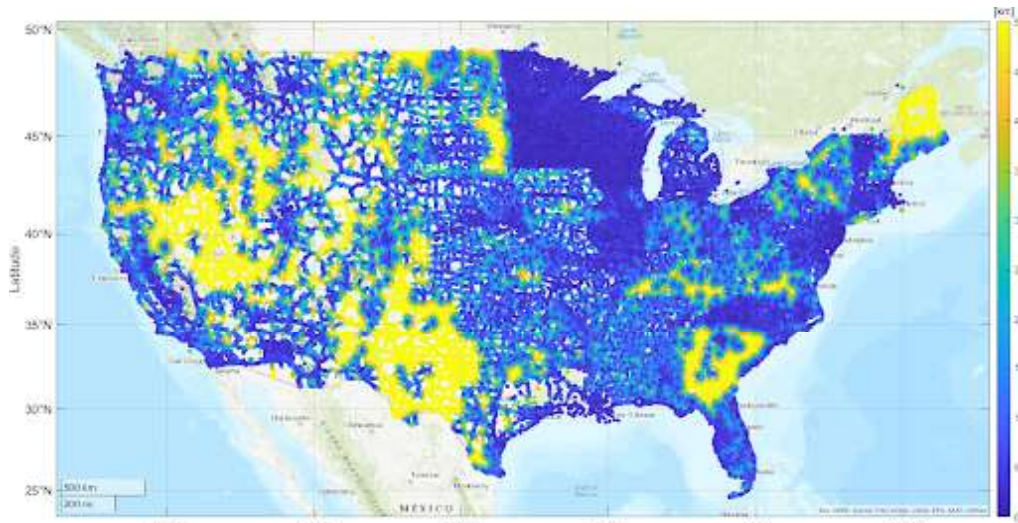
10 km hexagons completed in 2021

### Opportunities in 2022

All the green hexagons in the first map below show where we now have data for the transformation tool. Despite all of this progress around the country, there are still areas with large data gaps. By necessity, NGS will interpolate over areas without GPSONBM data, meaning that the transformations will be less accurate in those areas. The final map below shows remaining data gaps of 50km or more in yellow.



Total 10 km hexagons completed to date



Remaining Data Gaps: Yellow areas are data gaps of 50 km or more

NGS GPS on Bench Marks continued...

### Partners Helping to Get the Word Out

We've hit the ground running in 2022 with an outreach blitz that has been greatly amplified by our partners across the country. First, I had a great discussion about the value of collaboration on mutually beneficial efforts with Tim Burch, the new Executive Director of the National Society of Professional Surveyors, on his podcast "Surveyor Says!" Check out our episode (#111) at [surveyorsays.podbean.com](https://surveyorsays.podbean.com). NGS looks forward to working closely with Tim and the team at NSPS on getting our community ready for the Modernized NSRS. Please consider getting your state surveying society and/o your local chapter involved in a GPS on Bench Marks project (again) this year. If you get started now, you could be ready to hold an event during Surveyor's Week March 20-26. You can also use such events to highlight the crucial role that surveyors play in all of the infrastructure projects getting underway around the country.

Next out of the gate was Gavin Schrock's excellent article in xyHt "GNSS on Bench Marks?" Gavin expertly describes the value of the program, some of the challenges we face in carrying it out, and the exciting developments that NGS is working on to improve productivity. I was hooked by his epic opening line, "**The GPS on Bench Marks Campaign of the National Geodetic Survey is a triumph of constituency participation to improve the nation's geodetic infrastructure.**"

Finally, we were honored to kick off this year's [NGS Monthly Webinar Series](#) with a webinar titled GPsonBM: NSRS Modernization Campaign Continues through 2022, featuring two inspiring guest stars, Mick Heberlein from Wisconsin DOT, and Jacob Heck, the NGS Great Lakes Regional Geodetic Advisor. Mick and Jacob described how they teamed up to encourage participants across the state to complete observations on nearly all of the priority bench marks in Wisconsin in 2021. Follow their example and take advantage of this extra year of data collection to prepare your communities to derive the full suite of benefits from the Modernized NSRS to come!

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## Education Committee Update

First off, thanks to all those that donated or bought at this year's scholarship auction in Vegas. We are still waiting on final numbers from the conference organizers; but preliminary numbers indicate that we will have raised more than any before.

Over the last year the Education Committee has been working on formalizing the Walter M. Cunningham Education Scholarship program. We've put specific details, time frames, amounts and awarding processes.

Our next goal is to increase the amount and type of outreach the UCLS does. The Education Committee has partnered with the Davis School District Catalyst Center, and alternate high school in Kaysville. The Catalyst Center is a cutting edge CTE (career and technical education) school that opened this spring. They offer an unmanned aerial systems program. The students in the program are graduating with their Part 107 license. These kids are flying a couple of sites owned by the school district and are designing a mini city that will be judged by the Golden Spike Chapter, city council style.

We are also looking at CTE and STEM fairs across the state. Getting surveying in front of jr. high and high school students is one of the key ways we can get more surveyors into the profession. We've all heard the statistics about retiring surveyors and the lack of new surveyors. The best way to combat this is to get surveying as a career in front of these kids.

This is where we need your help. If you hear about a CTE or STEM fair, please reach out to a member of the education committee. We have posters, stickers and other swag/resources set aside specifically for these events.

Additional resources for surveying/outreach and education:

<https://mentoringmondays.xyz/>

<https://www.getkidsintosurvey.com/>

# UCLS Officer Installation 2022

By combining conferences this year in Las Vegas, we will not have the ability to honor our UCLS Officers in our preferred manner.

Please accept our sincere apologies for this and continue reading for your 2022 UCLS Officers.

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## Outgoing Past Chair Doug Kinsman



*On behalf of the Utah Council of Land Surveyors, I would like to thank Mr. Kinsman for his worthy service as our State Chair during this past few years. For his wall he has received a wonderful plaque to commemorate his years of service. Display it proudly Doug and I thank you for your service.*

- Todd Jacobsen

2

## State Chair Elect Andy Hubbard

*On behalf of the Utah Council of Land Surveyors, I would like to introduce your new State Chair Elect.*

- Todd Jacobsen



3

## State Chair Sean Fernandez

*Mr. Fernandez has been handed the Honor Vest, which is his symbol of this office. The vest represents the knowledge and wisdom of his predecessors, which provide a network of support from all past Charis, to call upon in difficult times. He will wear this vest with integrity and pride and with the understanding that he will pass this vest and his wisdom on to his successor that he will begin training from this day forward.*

- Todd Jacobsen



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## Past State Chair Todd Jacobsen



*On behalf of the Utah Council of Land Surveyors, I would like to introduce your new State Past Chair.*

- Sean Fernandez

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## Outgoing UCLS Officers

### Scott Vernon

Book Cliffs Chapter President

### Andy Hubbard

Golden Spike Chapter President

### Ken Hawkes

Golden Spike Chapter Vice-President

*On behalf of the Utah Council of Land Surveyors, I would like to thank those listed on the right for their meritorious service. For their wall they have received a wonderful plaque to commemorate their year(s) of service. Display it proudly gentlemen, and I thank you for your service.*

- Sean Fernandez

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UCLS Officer Installation 2022 continued...

## Incoming UCLS Officers

Ladies and gentlemen, the following individuals have graciously offered to share their time and talents to lead our Association for the coming year.

Being elected to a position of leadership in any organization is a great honor and being selected to serve in our professional society is an even higher distinction.

It is symbolic of the **confidence** and **trust** placed in them by you the membership.

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## Incoming UCLS Officers

These gentlemen solemnly and sincerely swear that they will perform the duties of the office to which they have been elected to the best of their ability, and in conformity with the bylaws of the Utah Council of Land Surveyors; that they will faithfully adhere to our Code of Ethics and will uphold and support our association in all its activities.

They will always be guided by the highest standards of honesty, justice and fairness; they will, in every manner possible, promote and safeguard the interests and ideals of the UCLS and the welfare of our community.

- Sean Fernandez

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## Incoming UCLS Officers

Will you, being a member of the UCLS, support the elected officers in the performance of their duties?

Will you insofar as possible, serve on committees, provide direction, encourage new membership and support UCLS programs and activities?

If so, answer to yourself, "I will"

Thank you!

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## State Chair Officers

**Andy Hubbard**

State Chair Elect



**Sean Fernandez**

State Chair



**Todd Jacobsen**

Past State Chair

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## Incoming UCLS Officers



**Ryan Allred**

Book Cliffs Chapter President

**Bahy Rahimzadegan**

Golden Spike Chapter President



**Jason Felt**

Golden Spike Chapter Vice-President

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## Book Cliffs Officers

**Ryan Allred**

Book Cliffs Chapter President

**Paul Hawkes**

Book Cliffs Chapter Representative

**Martin Pierce**

Book Cliffs Chapter Vice-President

**Mitch Batty**

Book Cliffs Chapter Secretary/Treasurer



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UCLS Officer Installation 2022 continued...

### Color Country Officers

**Arthur LeBaron**

Color Country Chapter President

**Mike Draper**

Color Country Chapter Representative

**Brad Petersen**

Color Country Chapter Vice-President

**Daryl Brown**

Color Country Chapter Secretary/Treasurer



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### Golden Spike Officers

**Bahy Rahimzadegan**

Golden Spike Chapter President

**Steve Porter**

Golden Spike Chapter Representative

**Jason Felt**

Golden Spike Chapter Vice-President

**Matthew Murdock**

Golden Spike Chapter Secretary/Treasurer



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### Salt Lake Officers

**Christopher Donoghue**

Salt Lake Chapter President

**Steve Dale**

Salt Lake Chapter Representative

**Matt Peterson**

Salt Lake Chapter Vice-President

**Matt Stones**

Salt Lake Chapter Secretary/Treasurer



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### Timpanogos Officers

**Chad Hill**

Timpanogos Chapter President

**Travis Warren**

Timpanogos Chapter Representative

**Riley Lindsay**

Timpanogos Chapter Vice-President

**Travis Anderson**

Timpanogos Chapter Secretary/Treasurer



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### UVU Student Officers

**Hunter Wilcox**

UVU Student Chapter President

**Vacant**

UVU Student Chapter Vice-President

**Vacant**

UVU Student Chapter Secretary/Treasurer

FYI - Students in the UVU Surveying & Mapping program elect a Club President of the UVU GEOSPATIAL Society. This person also serves as the UVU Student Chapter President who serves for one year consisting of Fall and Spring Semesters.



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### NSPS, WFPS, & UCLS Officers

**Dale Robinson**

National Society of Professional Surveyors (NSPS) Representative

**Mike Nadeau**

Western Federation of Professional Surveyors (WFPS) Representative

**Brad Mortensen**

UCLS Treasurer

**Susan Merrill**

UCLS Administrative Secretary



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# NORMAN GAMMON'S REEL

"This invention pertains to a new and improved surveying device, and more particularly to a surveying device which is designed so as to hold a plumb line and which is designed so as to serve as a target and so as to automatically retrieve the plumb line" reads the first sentence of Norman P. Gammon's patent application. Mr. Gammon, of Westminster, California filed his invention on January 15, 1962 and patent #3,172,205 for the Gammon Reel was granted on March 9, 1965.

Before the Gammon reel, controlling the length of plumb bob string relied upon the skill of the user, and when not in use the string would be neatly wound around the bob and tied off. When the surveying instrument was to be centered over a point, the plumb bob was suspended at the correct height using an adjustable slip knot. There was a metal gadget offered in 1930's surveying catalogs called the "automatic plumb bob adjuster" which looked tricky to use, but whose manufacturer promised "you will never be without one after you have once used it." However, not many must have tried it, for that device did not appear in 1940's catalogs.

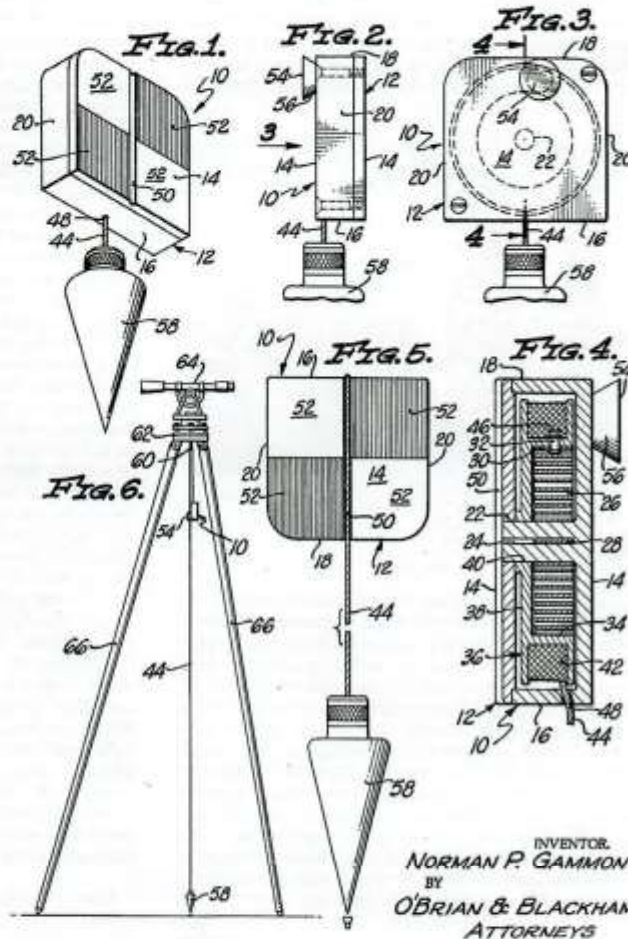
Gammon's device kept the string on a closed retractable reel, which was easy to control for length, and had a projection which one would wrap the string around in order to suspend a plumb bob beneath an instrument. The flat side of the reel box had a surveyor's target. It was genius, and soon in use by surveyors everywhere. In 1980 another patent was issued for a Gammon reel which could hold 12 feet of string, its patent relating to "the structure and location of the resilient member which serves to retrieve the string." Also in 1980, the U.S. International Trade Commission ruled "In the Matter of Certain Surveying Devices" that the John Woods Surveying Equipment, Ltd. company of Canada were infringing upon Gammon's patent. The Woods' gambit was to make a modification, so that the groove on the back of the Gammon reel was replaced by

metal nodules. In their ruling, the ITC wrote, "An examination of a sample modified device submitted by Woods reveals that the nodules can be pulled out of the cord guide means in a matter of seconds by one exercising minimal skill in the mechanical arts. Without the nodules, the cord guide means is unobstructed and again capable of functioning as required by the 3,172,205 patent." ■

March 9, 1965

N. P. GAMMON  
SURVEYING DEVICE  
Filed Jan. 15, 1962

3,172,205



INVENTOR,  
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BY  
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ATTORNEYS

**IMPORTANT  
NOTICE**

A gentleman is going around the country, getting hired on with a company, and then stealing their equipment. For more information please go to <http://www.nsp.us.com/page/StolenEquipment>