The UCLS Newsletter

August 2023

What-Is-It?

On the southeast corner of Temple Square is a plaque which reads, "*Fixed by Orson Pratt assisted by Henry G. Sherwood, August 3, 1847, when beginning the original survey of 'Great Salt Lake City,' around the 'Mormon' temple site designated by Brigham Young July 28, 1847"* On that same date, July 28, Thomas Bullock recorded in his journal that Brigham Young instructed Orson Pratt to "tell Father Sherwood how many degrees of variation of compass there is at this spot, so that the City may be laid out perfectly Square North & South, East & West.

Measuring 20 x 15 inches, the map of Zion is inked onto a sheepskin which is wrapped around a wooden roller, The plat runs 15 blocks north to south and 9 blocks east to west. This original plan created each block as ten acres in size, subdivided into eight lots, each of which was a little more than an acre. The houses on each block were designed to alternate either an east-west orientation or a north-south orientation so that no house faced another. Several public squares for city buildings or parks are also included on the map.

Surveyors used the map of Zion as a template to lay out numerous towns and cities in the Territory of Deseret. Additionally, many of these cities and towns were named after those surveyors.

The subject of this What-Is-It Competition is to recognize those Utah cities and towns that were not named after a Surveyor, The first UCLS member to correctly identify three non-surveyor named communities from the following list, is eligible for a free lunch at their next UCLS Chapter meeting:

Burrville; Charleston; Fremont; Ferron; Gunnison; Hayden; Howell; Manilla; Payson; Pickleville; Price; Orem; Roosevelt; Stansbury Park; Sterling Washington; Wendover

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

In this issue: An article by David Gautron suggests that professional development hours should be mandatory, we continue with Part 6 of the Business Ethics Field Guide - Playing Dirty, and Knud Hermansen questions the removal of examination prerequisites.

This edition provides expert advice on avoiding ticks, Rudolf Staiger breaks down surveying techniques of four industrial revolutions, we recognize a National Trig-Star second-place winner being a student from Utah and we congratulate out young surveyors from Utah Valley University who recently participated in the NSPS 22nd Annual Student Competition.

The value of a monument is considered in the Last Versailles Border Stone article and we learn the rectangular state of Colorado has nearly 700 corners that define its boundaries.

Unfortunately, condolences are given to the family of another UCLS member who recently passed away.

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 out 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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Utah Council of Land Surveyors
PO Box 1032
Salt Lake City, UT 84110

Phone/Fax:
801-964-6192

Website:
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"Some days I'm up, some days I'm down. But I think one thing that does get you moving is hope."
- August Alsina

UTAH COUNCIL OF LAND SURVEYORS

PO BOX 1032, SALT LAKE CITY, UT 84110
Phone: 801-964-6192 / Fax: 801-964-6192 / E-Mail: ucls@ucls.org
www.ucls.org

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srmerrill@ucls.org

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Should Continuing Professional Development be Mandatory?

by: Daniel Gautron

Do surveyors need Continuing Professional Development (CPD)?
Absolutely!
At least I think we do.
Is it required in every state?
Unfortunately, no, it's not.
Thankfully it is offered by every licensing body across the country though.

Surveying is a dynamic profession. It requires people to have a very broad set of skills and knowledge including technical and soft skills, and legal and managerial competencies. The industry is also experiencing rapid changes at a faster pace than ever before.

CPD is an essential tool that can be used to help surveyors keep up with these changing times.

Surveyors are responsible for determining the legal boundaries of land and features related to those boundaries. We are also required to provide accurate information to clients in many different formats so that planners, architects and engineers can design projects accurately.

To perform these tasks effectively surveyors must have a solid understanding of surveying techniques, land use regulations, boundary law and client needs.

CPD is an easy way for surveyors to:

Keep up with changes in the industry

CPD allows surveyors to stay current with all the changes in the industry. This includes changes in laws that impact how we perform surveys. It includes changes to the governance structures and licensing bodies that regulate the profession in each state.

Maintain professional licenses

Most licensing bodies require that surveyors complete minimum hours of CPD each year in order to keep their licenses. Not doing this can lead to disciplinary action. This could include suspension or the loss of their license to practice.

Develop soft skills

Surveyors must have many soft skills on top of the technical skills needed to perform a survey. Surveyors need to have strong communication, project management and leadership skills in order to work effectively with clients, professionals from other industries and staff within their organization. CPD can provide excellent opportunities to develop and improve upon these skills.

Adapt to new technologies and techniques

Technology within the surveying industry is evolving at a faster pace than ever before. The last 20 years have seen the introduction of technologies that most people couldn't even dream of. GPS/GNSS, 3D laser scanning, UAV's with integrated aerial photography and lidar, robotic total stations and advanced software to handle the data collected by these new technologies are all recent additions to the surveying industry. CPD provides a way for surveyors to stay on top of the changing times.

The licensing bodies provide CPD opportunities to their members throughout the year in many formats. This makes it easier for surveyors to take part throughout the year. The formats include:
1. CPD sessions at annual meetings
2. In-person CPD sessions throughout the year
3. Online seminars
4. Publications from the licensing body

Outside of the CPD available from licensing bodies, there are many other great opportunities. Surveyors could attend continuing education classes at universities or colleges. Equipment manufacturers offer many learning opportunities as well. This includes conferences and online and in-person training on their equipment and software. There are also endless opportunities of online courses. Most online courses break up the information into small segments. This allows you to do them at your own pace when you have time.

There is no excuse for not improving your current skill set and learning new skills. What do you think, do surveyors need continuing professional development?

Should it be mandatory?

The Last Versailles Border Stone

Community Conributors - Published June 2, 2023

The last original stone marking the interwar border between Germany and Poland sits in this unassuming village park.

After World War 1, the 1919 Treaty of Versailles brought the Polish state back into existence after 123 years of division and occupation by the Prussian, Austrian, and Russian empires, formalizing the borders of this resurrected Poland by carving out territory from these three failing imperial powers.

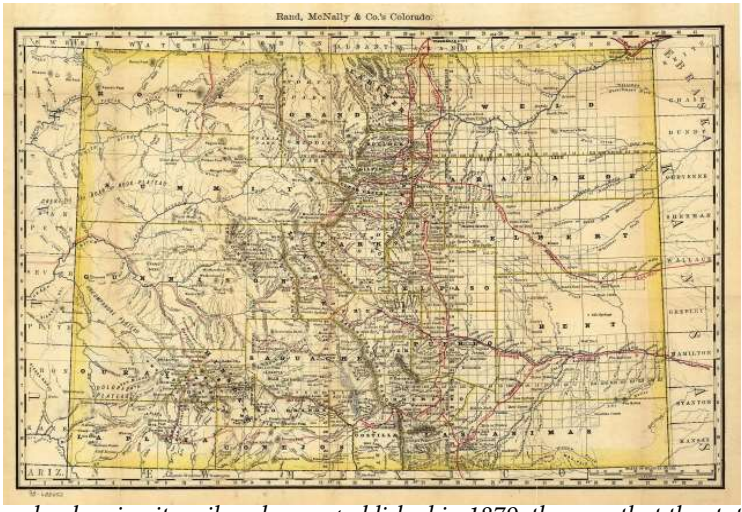
Poland's new border was moved even further west after World War II, but during the interwar period between 1919 and 1939, its border with Germany followed more or less the same course as the provincial delimitation between modern Poland's Lubusz and Wielkopolska Voivodeships. This former international border is today overgrown with thick forests that conceal many old, fortified border crossings and bunkers which have become popular landmarks for local hikers.

Only one of the original border markers from the Versailles era has survived to the present day, and it stands in a public park in the Polish village of Wierzbno. It's engraved with the date of the Versailles Treaty - June 28, 1919 - as well as a "P" for Poland and "D" for Deutschland (Germany). The actual border crossing was located about one kilometer further east along Poland's national road 24 where the Lubusz Voivodeship meets the Wielkopolska Voivodeship, and is commemorated with a small monument, and information board, and some crumbling ruins of the customs buildings that used to stand there.

Versailles border stone showing the "P" for Poland Gypsyblue

Colorado is Not a Rectangle - It has 697 Sides

By: Frank Jacobs, Big Think



This map of Colorado, showing its railroads, was published in 1879, the year that the state was first demarcated. It has been a state for three years by that point. - Library of Congress, Geography and Map Division

America loves its straight-line boarders. The only U.S. state without one is Hawaii - for obvious reasons.

West of the Mississippi, states are bigger, emptier, and boxier than back east. From a distance, all seem to be made up of straight lines.

Only when you zoom in do you see their squiggly bits: the northeast corner of Kansas, for instance. Or Montana's western border with Idaho that looks like a human face. Or Oklahoma's southern border with Texas, meandering as it follows the Red River.

New Mexico comes tantalizingly close to having only straight-line borders. There's that short stretch north of El Paso that would have been just 15 miles (24 kilometers) long if it were straight instead of wavy.

No, there are only three states whose borders are entirely made up of straight lines: Utah, which would have been a rectangle if Wyoming hadn't bitten a chunk out of its northeastern corner; Wyoming itself; and Colorado.

Except that they aren't. For two distinct reasons: because the earth is round, and because of those 19th-century surveyors laying out state borders made mistakes.

Congress defined the borders of Colorado as a geospherical rectangle, stretching from 37^0N to 41^0N latitude, and from 25^0W to 32^0W longitude. While lines of latitude run in parallel circles that don't meet, lines of longitude converge at the poles.

The Maroon Bells in the heart of the Colorado Rockies.

This means that Colorado's longitudinal borders are slightly farther apart in the south. So if you'd look closely enough, the state resembles an isosceles trapezoid rather than a rectangle. Consequently, the state's northern borderline is about 22 miles (35 kilometers) shorter than its southern one. The same goes, *mutatis mutandis,* for Wyoming.

That's not where the story ends. There's boundary *delimitation*: the theoretical description of a border, as described above. But what's more relevant is boundary *demarcation*: surveying and marking out the border on the ground. Colorado entered the Union in 1876.

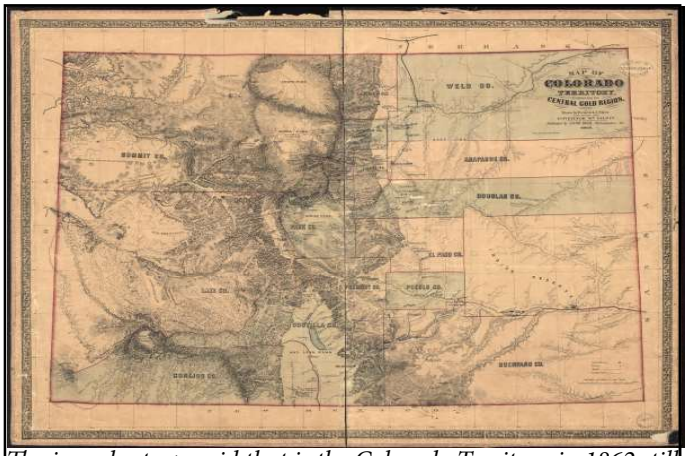
Only in 1879 did the first boundary survey team get around to translating Congress's abstract into actual boundary markers. The official border would not be the delimited one, but the demarcated one. Unfortunately, 19th-century surveyors lacked satellites and other high-precision measurement tools.

Colorado is Not a Rectangle continued

Let's not be too harsh: considering the size of the task and the limitation of their tools - magnetic compasses and metal chains - they did an incredible job. They had to stake straight lines irrespective of terrain, often through inhospitable land.

But yes, errors were made - and were in fact quite habitual. Take, for example, the 49th parallel, which for more than 1,200 miles forms the international border between the United States and Canada. Rather than being a straight line, it zigzags between the 912 boundary monuments established by successive teams of surveyors (the last ones in 1872-74). The markers deviate by as much as 575 feet north and 784 feet south of the actual parallel line.

The same kind of thing happened when the first surveying teams went out to demarcate the Colorado border. These maps magnify some of the most egregious surveying inaccuracies, where the difference between the boundaries delineated by Congress and the border demarcated by the surveyors is greatest.



The isosceles trapezoid that is the Colorado Territory in 1862 still had straight-line sides, because its borders hadn't been offically surveyed and demarcated (which is where errors crept in).
- Library of Congress, Geography and Map Division

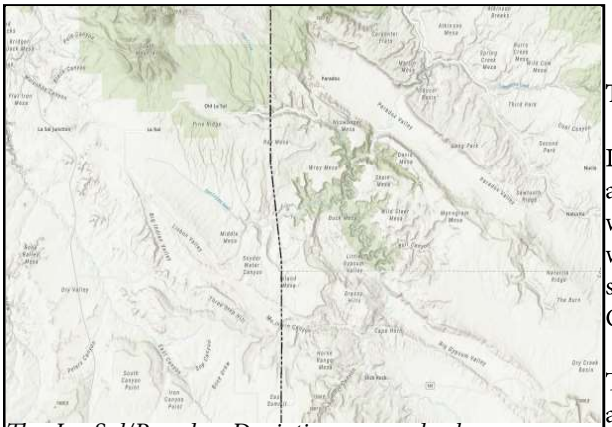
Four Corners (and Four More)

Located in a dusty, desolate corner of the desert, the Four Corners monument seems very far from the middle of anything. Yet this is the meeting point of four states: Utah, Colorado, New Mexico and Arizona. It is the only quadripoint in the United States. The monument's exact location is at $36^{0}59'56"$N, $109^{0}02'43"$W.

However, it's not where Congress had decreed the four states to meet. That point is about 560 feet (170 meters) northwest of the quadripoint's current location, at 37^{0}N, $109^{0}02'48$W. Did you drive all the way through the desert to miss the actual point by a few hundred feet?

No, you didn't: In 1925, the Supreme Court ruled that the borders as surveyed were the correct ones. But perhaps the original quadripoint deserves a small marker of its own, if only to provide the site with an extra attraction. Or why not go for three? Some sources say the original point deviates by 1,807 feet (551 meters).

The Four Corners Monument in Arizona, Colorado, New Mexico, and Utah marks where the surveyed borders meet, but not where Congress said they should.



The La Sal/Paradox Deviation occured when surveyors went wrong - but by the time is was observed, it was too late to fix.

The La Sal/Paradox Deviation

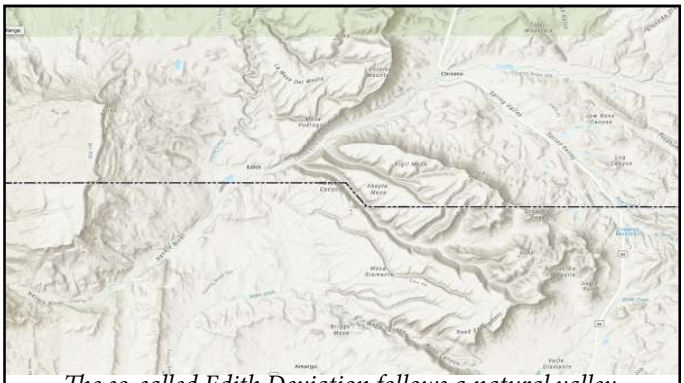
In 1879, a survey party marched north from Four Corners, placing markers at every mile. The surveyors eventually reached the Wyoming border, but not where they thought they'd end up. Later surveys, in 1885 and 1893, found out where the original surveyors had gone wrong, but by that time the border as surveyed had become the official one. Changing it would have required both Colorado and Utah to agree on a solution, and Congress to approve it.

The biggest error occurs just south of the road connecting La Sal, Utah to Paradox, Colorado. Across an eight-mile stretch, the surveyors strayed westward before regaining true north. The resulting deviation is 3860 feet (1.18 kilometers)

Colorado is Not a Rectangle continued

Things Go South After Edith

West to east, Colorado's border with New Mexico starts out fairly straight. However, just east of Edith, the border swerves southeast for about 3,400 feet (1 kilometer) before resuming its course due east, now 2,820 feet (860 meters) farther south than before.



The so-called Edith Deviation follows a natural valley.

Why? It seems that for once, the surveyors have given in to the dictates of topography: the deviation follows a small valley oriented north-west-southeast.

Panhandling Into Oklahoma

Almost at the end of their surveying mission, it seems the party lost the plot again. In the last 53 miles (85 kilometers) before the border turns north, the stretch where Colorado rubs against Oklahoma, the line again swerves to the south, by as much as 1,770 feet (540 meters).

Don't blame the terrain: Appropriately for a place so close to the Oklahoma Panhandle, it's as flat as a pancake. Perhaps the surveyors were confused by the very featurelessness of the place.

Colorado is a 697-Sider

These are just four of the biggest, most easily spotted surveying errors. In total, Colorado's borders have hundreds of twists and turns - most much smaller than the Big Four.

Accordingly, the state has not just four sides, but a total of 697 sides. So if Colorado is not a rectangle, what is it? Well, not a pentagon, (Greek for 5-sider), hexagon (6-sider), or a heptagon (7-sider), but a - hold on to something - hexahectaenneacontakaiheptagon (697-sider).

Don't Get Your Hopes Up, Wyoming

With Colorado thoroughly disqualified to as one of America's two truly rectangular states, does that leave Wyoming holding the crown all on its own? Nope. Turns out the surveyors who plotted the Equality State's outline were just as fallible as the Colorado set. Interestingly, Wyoming's deviations shown come in pairs, whereby the second ones seem to correct the deviation of the first ones.

So, while Wyoming is just as imperfect as Colorado, it does seem that at least it is better at admitting (and correcting) its mistakes than its southern neighbor.

This article originally appeared on Big Think*, home of the brightest minds and biggest ideas of all time.*

Last Publication Where-is-it Competition Results

We should not be surprised that Surveyor / Attorney, Mark Gregersen was the first UCLS member to correctly identify the Where-Is-It competition from our April 2023 Newsletter.

We received Mark's submittal a mere 24 minutes before Jason Willis responded. Mike Herbst and John Halleck were not far behind the winners.

Title 78B, Chapter 2, Section 226 reads:
78B-2-226. Boundary Surveys.
An action against a surveyor for acts, errors, or omissions in the performance of a boundary survey filled pursuant to Section 17-23-17 shall be brought within five years of the date of the filing.

This section of the State Code was renumbered and amended during the 2008 General Session to establish a Statute of Limitations for Boundary Surveys of Real Property. It provides protection to the land surveyor and encourages the Surveyor to properly file their Record of Survey Plats.

NSPS 22nd Annual Student Competition

Held by NSPS in conjunction with

NSPS Young Surveyors Network

March 29 – March 31, 2023 in Arlington, VA

MEET THE TEAMS FROM CALIFORNIA & UTAH!

CALIFORNIA STATE POLYTECHNIC UNIVERSITY - POMONA

Left to right:
Eric Lopez
Kathlyn Nguyen
Omar Madrigal (Captain)

UTAH VALLEY UNIVERSITY

Brandon Rogers
Austin Nelson
Kolby Rasmussen
Tyler Neilson
Sowmya Selvarajan (Advisor)

CalPoly Pomona

UTAH VALLEY UNIVERSITY

NSPS
STUDENT COMPETITION 2022
WASHINGTON, DC

The Business Ethics Field Guide - Part 6
Playing Dirty

By: Brad Yarbrough

This series features 13 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, while providing real life examples and insightful solutions. For more information, please refer to the cover story in the August 2021 issue.*

This ethics challenge is admittedly difficult to address. After all, isn't playing dirty unethical no matter what? But a past business experience illustrates the need to talk about this. In the oil boom of the 1980s, I borrowed money to purchase equipment being leased to oilfield operators. Monthly distribution of my share of the rental revenue was timely and provided a fantastic return on my investment. Soon, my friends were borrowing and investing too. But the revenue checks started to become irregular and after a year of payments, ceased altogether. Phone calls to the owner went unreturned. The bank's explanation made little sense while it continued to demand the loans repayment. I went to the office of the company and found it partially vacated with no one there, but the door was unlocked. I decided to go in and look around even if it was trespassing. Inside, I found boxes full of documents. Nervous, I began exploring and was appalled to find evidence of a Ponzi scheme. My revenue had been paid from new investor money that was supposedly buying more equipment. After involving the FBI, the owner was charged, convicted and imprisoned. He would no longer victimize others. Were my actions unethical or even illegal? I'm glad this dilemma rarely occurs, but when it does, we need the help provided in this article.

A Difficult Decision

Under normal circumstances, behaviors such as lying, cheating and stealing are considered to be highly unethical. But under certain circumstances, these behaviors might be morally justified. All ethical dilemmas are difficult to navigate, but "playing dirty" is the most difficult. The trick is to assure that the ends clearly justify the means.

When you make a decision to play dirty, you must realize that you are intentionally planning to act unethically. Such an extreme action needs to be justified and limited because it will put your personal reputation in jeopardy.

Questions to Ask

1. **Will your action really bring about justice?** When you are being treated unfairly the natural reaction is to strike back. What makes people virtuous is their ability to rise above the impulse. Usually acting out in anger only escalates the harm. Therefore, ask yourself if your action will create more harm or actually cause some good.

2. **Does your plan minimize the harm?** Unethical actions may be justified in certain circumstances, but such a justification should not be viewed as carte blanche to retaliate in any way. For example, if public disclosure of confidential information is likely to right a wrong, that doesn't mean that all the confidential information must be revealed. Restraint is prudent.

3. **Does your plan help others, not just yourself?** Self-interest is not a bad motivation, but you will more likely be seen as being morally justified when you are doing something for the benefit of others.

4. **Will the action harm your reputation?** While acting unethically might bring about a greater good, it might also invoke other consequences and change the way others perceive you. For instance, playing dirty might damage your reputation with an opposing party while strengthening your reputation with parties of high character. Try to assure that the parties who matter, including your family and friends, understand the merit of your motivation.

Business Ethics continued

5. **How will the other party react?** Inherent in this dilemma is the fact that the opposing party acted unethically. Ideally, your action will cause them to see their mistake and avoid doing it in the future. Perhaps they will even commend you for righting a wrong that they perpetrated. Alternatively, they could respond by escalating the situation even further and creating more harm. Be aware of that possibility.

Risks of Playing Dirty

There are a number of pitfalls in this dilemma, such as getting the facts wrong. Before doing something unethical, be absolutely sure you have all the facts. Try to get a complete understanding of the situation, including intent and steps that may have been taken to minimize the damage. Unethical behavior, even when justified, will put future trust in jeopardy. Make sure you are on sound footing.

Additionally, be careful not to be vengeful. Revenge for its own sake is wrong. Instead, the focus needs to be on righting a wrong. A lot of people have gotten themselves in trouble by seeking to punish others rather than seeking justice. Society is much more likely to accept unethical behavior for a noble purpose.

What Goes Around Comes Around

The boundary between clever, ethical business practices and unethical practices can be a very fine line. In my experience, this is especially true when those with whom you do business are seeking to take advantage of you or deceive you. In those instances, playing dirty might help protect yourself and your company.

For example, our company produced huge electrical connectors (plugs) that allowed ships to connect to on-shore power when docked. We negotiated a contract to sell five plugs over 24 months for $25,000 each. We delivered the fourth plug and anticipated an order for the fifth plug in the next month or so. To our surprise the customer called in a panic. Evidently, a ship pulled out of the port in Norfolk without disconnecting the plug. They needed a replacement when the ship arrived in Charleston in two days. I explained that we didn't have a plug in inventory but we could expedite the parts, rearrange the factory schedule, work some overtime and drive the plug to Charleston. I explained that our actions will result in $7,000 of added expense. The customer refused to pay the additional cost, insisting that we had a contract and I had to honor the price. We worked through the night, made the connector and drove it to the Port of Charleston on time - all at the contract price of $25,000. With the delivery of that fifth plug, our contract was completed.

Two days later, I received another call from the customer. When the ship pulled out of Charleston, the plug was not removed and was damaged again. I offered to deliver a new plug for $50,000. I wanted to recover the additional $7,000 for the fifth plug, $7,000 for the sixth plug and a bit more. With a few alternatives the customer agreed to pay.

Was that action playing dirty? On reflection, I believe that if the customer would have agreed to pay our added costs for the fifth plug, they would have received the sixth plug for the same price of $32,000, not $50,000. Perhaps this action will result in the customer being more "fair" in the future. The lesson is to be very careful to be fair with others; what goes around comes around.

In Summary

Playing dirty is difficult for people of character. It causes personal confusion and pain, and it should. To have a very high threshold before you would act unethically, even to right a wrong, is not a bad character trait. But remember that when you enter the arena of playing dirty, be very careful.

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.

Thoughts on Professional Practice and Education
Article 5: Removing Examination Pre-requisites

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

This is the fifth article I have prepared in the series offering thoughts on professional practice and education. In this article, I wish to discuss the timing of professional exams. In particular, I wish to advocate allowing an applicant to take their licensing exams before obtaining any required experience.

There are two common models of examination sequence found in the United States. The first model, that appears to be most common at the present time, requires the applicant take the professional surveyor exam and state specific exam after his experience requirements have been met.

The second model is to permit an applicant to take all three exams at or near graduation and before meeting minimum experience qualifications.

There was a third model that may still be present in some states. The third model was to require the experience first then allow the applicant for licensing to take all the exams within a short window of time. When I was first licensed almost fifty years ago, I took the first exam one day and the second exam the very next day.

In this article, I would like to advocate that states allow an applicant to take the exams on sequential days at or near graduation. I offer two reasons for my position.

For my first reason, I would suggest that taking the professional exams near graduation is the best time in life's journey to schedule and have time to take the exams. By the time the graduate achieves the pre-requisite experience for licensure, they are often married - perhaps with young children, involved in community activities, and have a full employment commitment. It is difficult to find time to study or even take time off from work for testing. College breaks are usually far less stressful and a less busy time than the hectic and stressful work schedule a graduate will encounter after graduation. To emphasize this, let me remind surveyors that as a full-time student in college, the student could count on two to three weeks off at Christmas, one week during Thanksgiving, and a one or two-week spring break. College breaks were known well in advance, allowing for professional test scheduling.

Once the graduate is employed, vacation time or personal days must often be used for testing. Time off from work must often be scheduled in advance and authorized only when work allows. While college can be stressful, the stress of college often pales in comparison to balancing family responsibility, home, and work commitments.

The second reason for allowing all tests while in college or shortly after graduation is the extent of retained surveying knowledge. Broad knowledge of surveying is usually at a maximum retention just before or soon after graduation. Therefore, the best chance to pass all three exams with minimum study is at or near graduation.

Some would argue that testing the graduate on knowledge retention after the graduate has some experience is a reasonable procedure to protect the public's safety. Perhaps this statement is true. Yet, on that basis, all licensed surveyors should be periodically tested from time to time to insure knowledge retention after the passage of time. I suspect there are very few licensed surveyors that would advocate that they be subject to periodic retesting to ensure knowledge retention.

Having given my opinion, I now offer advice by suggesting professional societies encourage statute or rule changes allowing all exams be taken at graduation or soon after. Of course, the soon-to-be graduate has another option. The student can apply to test in a state that does allow all testing at or near graduation. The applicant does not need to journey to a particular state since NCEES offers the same exams at testing centers throughout the United States. Perhaps the applicant would have to delay taking the state specific exam until they are eligible for licensing within that state. Of course, the one hurdle that may arise from this recommendation is a state that will not accept the NCEES test score for an exam taken before experience was achieved. I know of at least one state that will not accept the PE exam score if the PE exam was taken before experience was met. I know this does not make much sense but bureaucracies and their rules often do not make sense.

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

The Good, the Bad and the Ugly of the Surveying Profession

In the early days of surveying, surveyors were pioneers in charting the unknown. Today, with the Earth having been completely mapped to some degree, surveying has become a much more specialized field with different types of surveyors and sophisticated equipment. This article looks back on how the surveying profession has changed over the past two decades.

It has been more than 20 years since I graduated from the university. Back then, we were trained on both analogue and digital surveying equipment. Finding coordinates in new areas used to take us days or even weeks. Now, it can be done in minutes or even seconds with GPS or GNSS positioning. Analogue devices helped me understand measurement principles better. But more than that, for me, they led to a greater appreciation of modern surveying equipment.

The survey industry is in a period of change, and it's changing fast as technologies and needs evolve. Here are what I regard as some of the challenges currently shaping the industry, as well as the key priorites surveyors must bear in mind to thrive.

THE GOOD

The challenge: The demand for cost-effective services is increasing

The global digital market is projected to grow exponentially during the next years as industries accelerate their digital transformation. Geospatial data is fundamental to unlocking efficiency gains in many industries. Surveyors are best positioned to support this exponential demand for geospatial data. However, surveyors need to find innovative ways to ensure their clients understand the value of their services. Surveyors who can provide services that add value for their clients will stand out from the crowd.

The priority: Pair new technology with user-friendly workflow services

When it comes to technology, surveyors are increasingly using newer technologies to improve their productivity and accuracy and to expand their service offerings. According to research by Hexagon's Geosystems division, 95% of surveyors agreed that new technologies have made them more efficient at work, while 40% responded that they are already working with uncrewed aerial vehicle (UAV) systems. More surveyors will likely adopt UAV systems in the coming years, which will spawn new use cases for aerial reality capture. Solutions like autonomous laser scanning modules for robots are also enabling scanning with minimal human intervention. As an increasing number of surveyors appreciate the accuracy and ease of data collection that laser scanners offer, their use will continue to rise.

Surveyors must also pair this technology with the adoption of user-friendly workflow services that enable faster data transfer between the field and the office, helping professionals create valuable deliverables from collected data as efficiently as possible.

> *New technologies help surveyors become more efficient and accurate in how they collect, process and share information. Innovative positioning, measurement and reality capture technology can dramatically improve the way survey data is collected, processed, visualized and shared.

THE BAD

The challenge: Surveyors are facing increased competition from non-surveyors.

Technological advances have made it easier for people without a surveying background to complete many tasks involved in data collection. Although non-surveyors can now easily collect 3D data, they often lack the knowledge to represent the data in the required reference frame correctly. In addition, they often miss the technical skills to perfrom field procedures to ensure checks are correctly conducted to deliver the best data quality.

The priority: Become a data manger.

The professional surveyor can embrace this additional workforce and become the data manager who coordinates data collection and uses the most appropriate equipment to get the job done, using the personal available.

The Good, the Bad and the Ugly Continued...

THE UGLY

The challenge: The lack of skilled staff.

With construction continuing to boom, the worldwide demand for surveyors has never been higher. With fewer people choosing careers in surveying, finding talented individuals has become increasingly difficult. To make matters worse, many surveyors are nearing retirement age and leaving the industry, creating a significant skills gap.

The Priority: Keep up with innovations.

To bridge this gap, surveyors need to keep up with innovations in technology so they can do more with less. New technologies and equipment allow professionals to do many more things in a shorter amount of time. Many construction projects rely on surveying instruments that are becoming more advanced.

Today's surveying equipment allows you to be faster and more efficient during construction by keeping building information modelling (BIM) data accessible in the field for more accurate layout and as-built verifcation. A total station can be used to compare the as-built situation with the design on site by checking the flatness of concrete floors or wall verticality, while 3D laser scanners help surveyors to quickly conduct on-site quality checks for completeness and perfrom as-built documentation. Similarly, total station solutions that automate process steps, including tilt compensation or target locking, avoid errors on site and mean quantum leaps in terms of productivity.

*Surveyors optimize workflows and improve collaboration between field and office for enhanced project execution while ensuring the best quality.

THE BIGGEST CHALLENGE: PROTECTING THE PLANET

Extreme, climate-related physical events will become more intense and frequent. According to the Carbon Disclosure Project (CDP), four in five major cities are facing 'significant' climate risks. This year, 46% of the cities experienced extreme summer heat, 35% declared drought and 33% experienced urban flooding.

In a world that needs more renewable energy parks, modernized power grids and well-managed green spaces, surveyors help harness data that powers a sustainable future. Geospatial profesionals capture, create and manage the datasets to build a smart digital reality for a resilient infrastructure.

Surveyors are key players in offering cost-effective solutions that make data available to enable the shift to more sustainable practices, such as in building construction. Surveyors can bring together data creating a unified smart digital reality of a building to identify conditions and help understand what maintenance needs to be done during the building's lifetime to maximize its lifespan. With their knowledge of state-of-the-art geospatial equipment and workflows, surveyors have the skills to efficiently document entire buildings before embarking on repairs, renovations or fit-outs.

THE CHANGING WORLD

Surveyors are part of a changing world. Surveyors nowadays need to provide more value for their costomers while reducing costs and waste at the same time. This means that they need to choose their tools carefully while continuously adapting their business models to thrive in this new environment and evolve alongside the industry they serve.

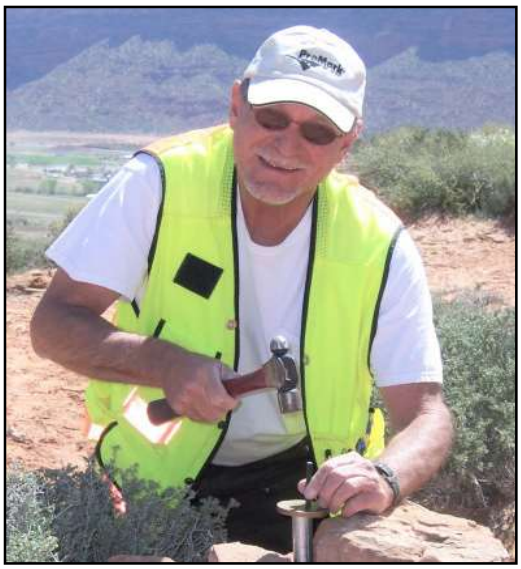
Investing in new technology has allowed surveying companies to grow their business by offering multiple reality capture services and entering new markets such as structural monitoring. Many of them have found new ways to diversify into different types of projects and services by investing in technology such as laser scanning, mobile mapping, utilty mapping and detection, and by becoming more efficient so they can do more with less.

The survey industry is undergoing a period of transition as it adapts to the challenges posed by new technologies and new regulations. Surveyors are being asked to do more with less, but they also have more opportunites than ever before to develop their businesses through innovation and collaboration.

*Innovations such as the Lecia AP20 AutoPole can help surveyors stay ahead of the curve by increasing productivity and allowing them to measure points that were impractical or unsafe to measure before.

Kent "Sam" Cantrell

October 15, 1958 - June 7, 2023



Sam Cantrell, given name Kent Bodie Cantrell, died June 07, 2023 after battling a long-term disease. Per his wishes there will be no official ceremony. He wanted folks to have a good party, and share funny stories and memories, if they were so inclined. Sam truly loved his family, friends, and pets from his life.

For twenty years Sam worked and trained in the San Juan County survey department eventually obtaining his license to become a Professional Land Surveyor. Being elected to the office of San Juan County Surveyor in 2014, Sam welcomed the opportunity to serve the public and protect the rights of property owners in the county.

Sam and his wife Robin send a huge thank you to all who helped him these last few months. Your kindness was much appreciated during a difficult time.

Ask an Expert - Tick Talk: Advice for Avoiding Ticks in Utah

by Kate Richardson

Ticks are tiny arachnids that pose a potential threat to humans and animals because they can transmit diseases. In Utah, the primary tick species of concern is the Rocky Mountain wood tick, known for transmitting Colorado tick fever. The only human-attacking tick capable of transmitting Lyme disease in Utah is the Western black legged tick. While the likelihood of encountering this species in Utah is low, it is important to take precautions. Ticks are of concern because pathogens such as bacteria, viruses, or protozoa can be transmitted when infected ticks feed oh humans.

Ticks are commonly found in Utah from the time of snowmelt through mid-July, and they can become active again in the fall. Ticks are usually found at ground level to three feet above in grass, low plants, and brush along the edges of fields and woodlands. They do not jump or fly; instead, they climb vegetation and wait for a host to pass by.

To protect against tick-borne illnesses, check yourself carefully after being in tick habitats. Pay close attention to the armpits, waistline, belly button, scalp, and crotch. Ticks may take a few hours to find a feeding site, which will allow you to detect and remove them promptly.

Proper removal of ticks is crucial to reduce the risk of disease transmission. For larger hard ticks, use tweezers to grasp the tick as close to the skin as possible, targeting the mouth parts. Pull the tick straight upward without twisting or crushing it. Use steady pressure until it releases. Smaller hard ticks can be scraped off with a knife blade or credit card edge. If the tick's head breaks off and remains in the skin, use a sterile needle to carefully lift or scrape it. Wash the wound with soap and water after tick is removed. Apply an over-the-counter antibiotic ointment to help reduce the chance of catching a disease or secondary infection.

After removal, save the tick in rubbing alcohol for identification in case symptoms develop. Seek medical attention if you develop any tick-borne disease symptoms, including fever, chills, headache, fatigue, muscle and joint aches, swollen lymph nodes, and a target-shaped rash at the tick site. Visit the Centers of Disease Control web page on Diseases Transmitted by Ticks for more information.

Prevention is the best way to avoid ticks and their potential pathogens. Consider these tips.

- Wear long pants and long-sleeved shirts. Tuck shirts into pants and pants into socks. Apply tick repellent to clothing before entering tick habitat.
- Wear light-colored clothing to make it easier to detect and remove ticks. Always complete a thorough check for ticks after being in tick habitat.

If you discover a tick bite, contact the Utah Plant Pest Diagnostic Lab at Utah State University. The lab can provide identification through photos submitted via email or phone. (Physical samples of ticks cannot be accepted due to safety protocols.)

The "Existing Conditions" Plan

By: Clayton Platt

About thirty-five years ago when I started surveying, there was some debate about the professional obligation to set monuments upon the completion of a survey. It was not uncommon to wait until all approvals were granted and then set pins - but only if the client agreed to pay for them (an extra?). It has always been my practice to set the monuments before final approval and have them on the recorded plan (whenever feasible). Fortunately, our profession has evolved, and we have less uncertainty as to whether a particular surveyor ever set the monuments indicated on the plan as "to be set."

I thought the general practice of setting monuments as an extra obligation was pretty much over - until recently. I was working on a Lake Survey/Site Plan and discovered that a larger company with a local office was working on the lot next door. There were a number of older re-surveys of both properties. We collaborated on our analysis - one pipe had obviously been moved up the property line (more or less) and neither of us found the pipe at the other common corner by the road. Sharing notes, we agreed as to the boundary location. No need for two lines a few inches apart once permits and construction started. I was ready to finish up and inquired as to whether they were planning on heading out, or if I should set the monuments along the common line. Lo and behold, I discovered that setting monuments was not part of their contract with the client.

How could this be? Industry Standards are clear that suitable monuments will be set at all corners. In the course of researching other parcels, I found the "loophole" - many of the surveys prepared by this firm are not titled "Property Survey" but "Existing Conditions Plan." Oh, to have an office with a legal team attached! The plans reviewed typically described the property lines to the nearest second and 100th of a foot. The ties to the proposed building were listed to a 100th of a foot - often .05' or so beyond the required setback. The corners of the property were shown as existing monuments or "calculated corner." No monuments set.

If it looks like a boundary survey and is treated like a boundary survey, it is a boundary survey. At least two of these sites moved forward with the "Existing Conditions Plans" to gain zoning compliance and permitting for multi-million-dollar buildings. Once construction begins, if the lines are not clearly monumented, there is no way to verify the boundaries or confirm compliance with the details on the permit. I contend that the scope of the project and required documentation is the determining factor in whether a boundary survey to industry standards are appropriate. If the City or Planning Commission required the boundaries to be shown, and a stamped plan be presented...then that plan must be the result of a BOUNDARY SURVEY and the monuments be included in the scope of work.

In the right circumstances, and existing conditions type plan is wholly reasonable. If someone is replacing a deck or doing some landscaping a property survey may be more than is needed. If you do this type of work, there is no reason to present the boundaries the same as you would if it was surveyed. I typically do not show any bearings or distances and label the lines as "approximate." This should serve as notice to anyone reviewing the plan in the future that at the time it was prepared, the exact location of the boundary was not important to the scope of the work at hand.

When a new house on the 1/2 acre lot is being designed, it is our job as professionals to do what is expected by the clients and City officials reviewing the plans. If you are doing a boundary survey, call it what it is and set the monuments. If you work for a company that couches their work in semantics, consider raising this issue at the next staff meeting. Let's not go back 30 years to when there was some debate as to whether setting monuments was part of a proper survey.

The Surveyor 4.0

Which technical skills are needed today?

By: Rudolf Staiger

Over the centuries, all four industrial revolutions have influenced surveying instruments and the profession as a whole. This article explores which different skills and capabilities surveyors are required to develop as a result of the latest revolution: Industry 4.0.

Surveying is a classical profession that goes back at least 500 years, and perhaps as many as 3,000. The technical development of surveying instruments has been very well documented over the past 400 years, and many of our classical instruments - levels and theodolites - can be traced back to the Middle Ages. Technological progress in surveying ran - and still runs - in parallel with the developments of the industrial revolutions (IRs). As the instruments and their capabilities change, surveyors are required to develop different skills in order to operate them in the field.

The main drivers of surveying in modern times are military purposes and the desire for land registration (cadastre) and objective taxation. Today's surveyors use a variety of different measurement systems derived from the main instruments of the digital level, the electronic tachometer (total station) and the GNSS receiver. These systems make it easier to acquire geodetic data (angles, distances, height differences and coordinates) faster and more accurately than before, provided that the surveyor has the right skill set.

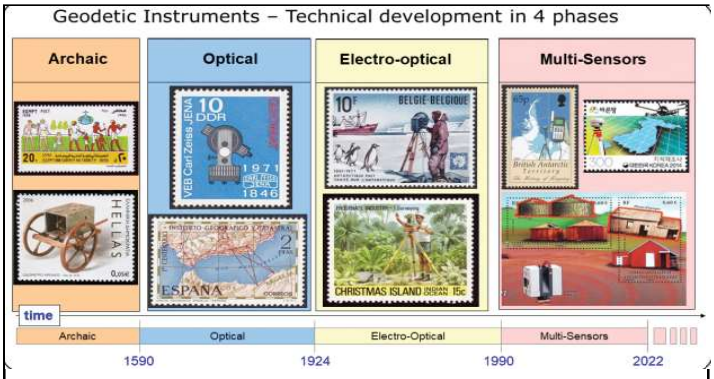


Figure 1: The technical development of surveying instruments can be divided into four phases, as depicted on stamps by postal services around the world.

Geodetic instruments over time

The archaic phase: Few details are known about the early surveying instruments, but they are thought to have been simple in nature (e.g. the Roman groma). This phase ended in 1590 with the invention of the optical telescope.

The optical phase: During a period of more than 300 years (1590--1924), technical developments produced instruments with opto-mechanical components such as telescopes, microscopes, circles and axes, which allowed the measurement of horizontal and vertical angles. Overall, the pace of advancement was slow. The instruments did not really become handy or easy to use compared to current technology until the early 20th century. Setting up a theodolite involved about an hour of assembly and adjustment at each site before the measurement activities could begin. Then the ingenious Heinrich Wild (co-founder of WILD in Heerbrugg, Switzerland) invented the T2, an instrument that allowed surveyors to begin measuring almost immediately after setting up the theodolite. This was not only the starting point for all modern surveying instruments, but it was also the climax of the optical phase. More famous optical theodolites followed, including the WILD T3 and T4 and the KERN DKM3.

The electro-optical phase: This period was characterized by the arrival of electronic distance measurement, electronic or digital calculators, and digital storage of geodetic measurements and data. It lasted until 1989.

The multi-sensor phase: This phase took off in 1990 with the rollout of the first digital level, the first usable GPS receivers and the first one-man total station. We are still in this phase.

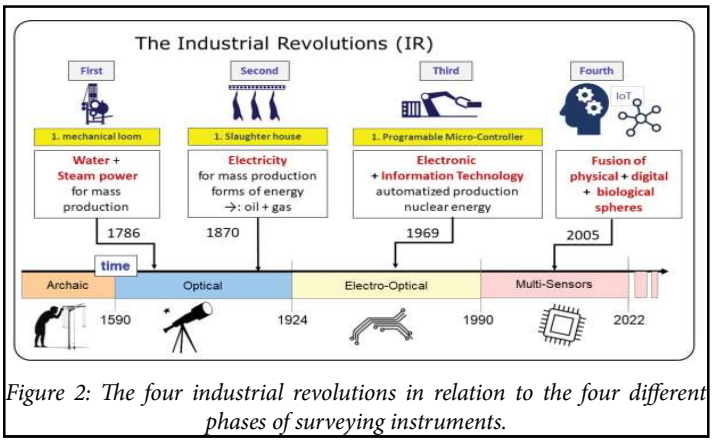


Figure 2: The four industrial revolutions in relation to the four different phases of surveying instruments.

The impact of the 4 industrial revolutions

The first two industrial revolutions (Figure 2) had no significant impact on the technical progress of geodetic instruments. However, the third industrial revolution resulted in significant changes, not only to surveying instruments themselves but also to the surveyor's whole work approach due to the arrival of electronic distance measurement (EDM), the digital storage of measurements, and digital calculators. In the subsequent decades, the development and application of software (e.g. mainframe computers and PCs) became very important and shaped an entirely new job profile for the surveyor.

The multi-sensor phase

The multi-sensor phase began in 1990 with the appearance of the first digital level, the first usable GPS receivers and the one-man station. In the early years, a technological rally took place between tachometry and satellite-based surveying (namely, GPS). Today, this competition is over; GNSS receivers are commonly used in combination with total stations. Over the last 30 years, the

The Surveyor 4.0 Continued...

industry has introduced huge technological progress to the market, and this era is still ongoing (see Figure 3).

In general, all types of instruments have become significantly more productive, more accurate and more versatile. Productivity is based on a variety of different aspects and criteria, such as the duration of a single measurement, the range of measurable distances, the number of measured distances per battery charge, as well as the skills of the operator needed for high-quality measurements. At the same time, there have been notable reductions in the amount of effort required from users thanks to instruments with a smaller size, lower weight and convenient accessories such as reflectors and tripods. Additionally, the costs have decreased in terms of not only financial investment, but also the time needed to train the operators.

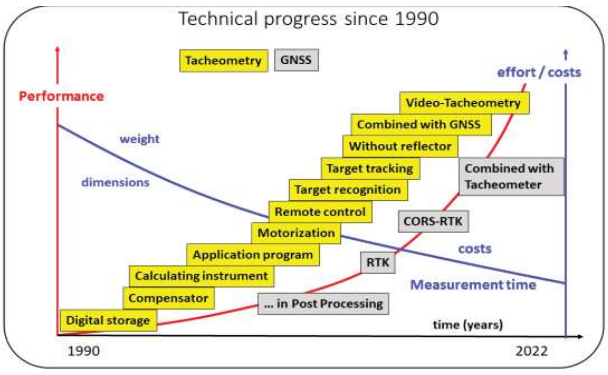


Figure 3: The technical progress of total stations and GNSS receivers over the last 30 years.

The measurement process, past and present

In the past, operators of surveying instruments were called 'observers' because they had a direct influence on the measurements and their quality. Operators of optical levels or theodolites were sharp-eyed, weather-proofed and experienced in manual calculations. Until 100 years ago, they were also skillful mechanics. The observer read the raw observations and eliminated the influence of instrumental errors by numerous repetitions in well-defined observation schemes (e.g. double-face measurements with systematic rotation of the horizontal circle between the sets, reversed order of targets in the opposite face). Such repetitions not only reduced the number of personal errors by the observer, but also ensured effective control against blunders and calculation mistakes.

Today's operators, rather than being observers, are users of mobile PCs with geometrical sensors. Apart from the setup of the instrument on site, they have no direct influence on the measurements. The measurement process itself is fully automatic, and the resulting values that the user accesses are the product of multiple automatic readings from one or more sensors, which are numerically compensated based on complex geometrical and physical correction models. Nowadays, 80% of the measurements in the field are executed without any redundancy because the theoretical accuracy of a single measurement by the system is sufficient, given that the measurement devices are properly working within their specifications. Users often believe that their results are true values, without any deviations. Useful checks against known values are not often carried out.

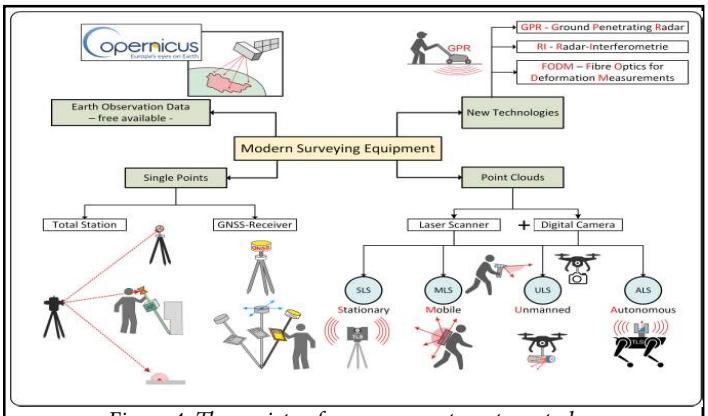


Figure 4: The variety of measurements systems today.

Four measurement technologies

Users can nowadays choose from a rich toolbox of different measurement technologies. These can be divided into four categories (See Figure 4).

Acquisition of single points: The total station and the GNSS receiver are the main devices for capturing single points, which means that each point represents and an individual geometrical object. Poles for the antennas and reflectors with integrated inertial measurements units (IMUs) make it unnecessary to set the pole precisely upright. This feature not only allows for the measurement of inaccessible points, but also offers increased accuracy and speed.

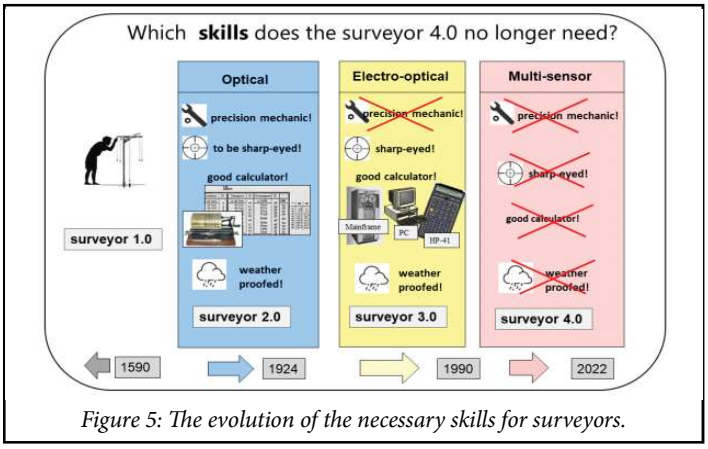


Figure 5: The evolution of the necessary skills for surveyors.

Acquisition of point clouds: Laser scanners first appeared on the market 25 years ago. They produce entire point clouds in a very short period of time. While single points have no specific meaning, subsets of the point cloud represent geometircal elements like planes, spheres and cylinders. Often combined with digital cameras as today, laser scanners offer peerless productivity and versatility in the sub-categories of stationary, mobile, unmanned and autonomous laser scanning. The high measurement speed (one million points per second) opened up entirely new fields of application where traditional techniques would fail due to technological and economic limitations.

The Surveyor 4.0 Continued...

Use of new technologies: new measurement technologies have recently appeared, including ground-penetrating radar (GPR), radar interferometry space (RI) and fiber optics for deformation measurements (FODM). The latter two technologies focus on the detection of small changes in the objects (deformation analysis) through repetitive measurements.

Use of freely available remote sensing data: High quality, up-to-date sets of remote sensing data are now available to everyone free of charge, such as from the Copernicus Services, following the open-source strategy of the European Union. However, these datasets require adapted analysis software approaches (big data and AI), because the smallest dataset that can be downloaded amounts to 1.6GB.

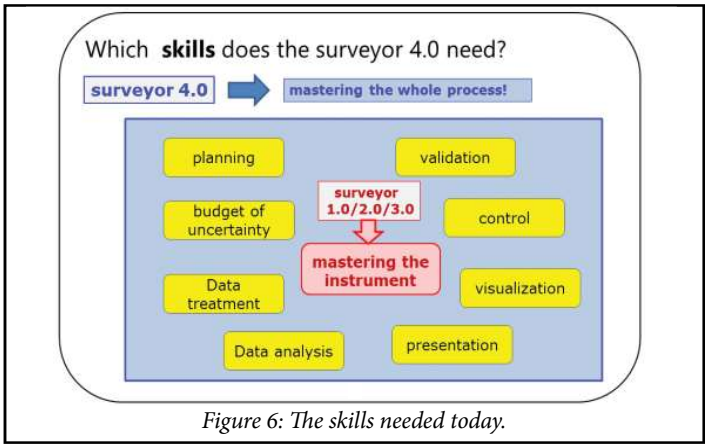


Figure 6: The skills needed today.

Obsolete skills

To answer the question of which skills today's surveyors need, it is useful to start by examining which skills have become obsolete. Although there are few details about how the earliest surveyors worked, we know that Surveyors 2.0 and 3.0 were sharp-eyed, weather-proofed and experienced in manual calculations. Their calculation tools changed over time, but a lot of manual work still remained. For the surveyor 4.0, it is now a very different story, because the measurements have become fully automatic (e.g. with automatic target finding, tracking and laser scanning). There are numerous software packages available for conducting calculations. Meanwhile, the operating time in the field has become much shorter than it was decades ago and in the case of autonomous systems it has often been reduced to almost zero.

The Surveyor 4.0

So which skills does the Surveyor 4.0 need? In order to achieve accurate and reliable data, the previous generations of surveyors spend a lot of time and effort on mastering the instrumentation.

While mastering the instrumentation has become easier over the past years, today's surveyors now have to master not only the instrumentation itself but also the whole process, from the acquisition, treatment and analysis of the data to the visualization and validation of the final result (see Figure 6).

Moreover, what is the impact of the internet, ubiquitous connectivity and computing power that are driving the fourth industrial revolution? It is safe to say that the modern surveyor is already using significant parts of technologies such as AI, big data, IoT, expert systems and cloud computing.

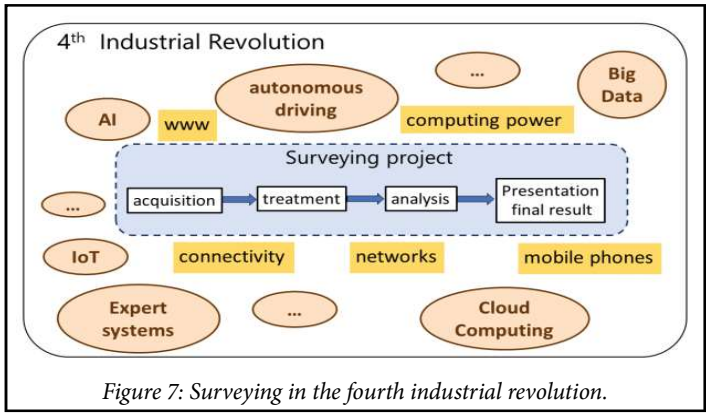


Figure 7: Surveying in the fourth industrial revolution.

In the past, surveying decisions were relatively simple. There were only a few measurement methods and, in contrast to the current situation, there was no need to choose between different types of instruments because there was a specific instrument for each task. In general, the execution of all data acquisition was guided and controlled by regulations, and there was no room for individual decisions regarding the measurement procedure. The measurements determined only points - in the horizontal positions or heights - and the final results were either a map of predetermined fixed scale or a numerical analysis (Figure 9).

Today, both the possibilities and the actual demands are wider and more varied. A surveying project can be divided roughly into three phases: planning & design, data acquisition, and data treatment (Figure 10). In former times they were executed consecutively. Nowadays, however, the execution phase is preceded by a much longer planning phase, and the first part of the data treatment runs in parallel with the data acquisition phase. Due to the far more efficient equipment used for data acquisition and treatment, a project can be finished much faster than in the past. At the same time, the results can be used for a greater variety of purposes, such as planning, mapping at different scales and with different levels of detail, volume determination, and so on.

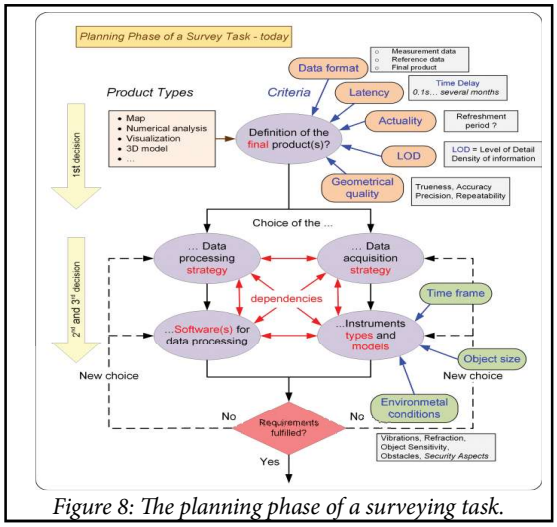


Figure 8: The planning phase of a surveying task.

The Surveyor 4.0 Continued...

This has transformed the Surveyor 4.0 from a skilled observer into a project manager, creating and producing geodata. At the start of each project, the surveyor needs to define the task, including the type and shape of the final result. Each subsequent step, from the data acquisition to the final result, much then be determined. For the best data acquisition strategy, the Surveyor 4.0 needs to know all about the technical restrictions (e.g. if it is only possible to perform measurements at night) and the relevant safety regulations, not to mention the economic aspects of the project.

Once a data acquisition concept is established, the Surveyor 4.0 needs to check whether the measurements goals (e.g. accuracy, point density, acquisition speed, required distances between the sensors and the objects) can be achieved. In addition, they are recommended to validate the acquired data.

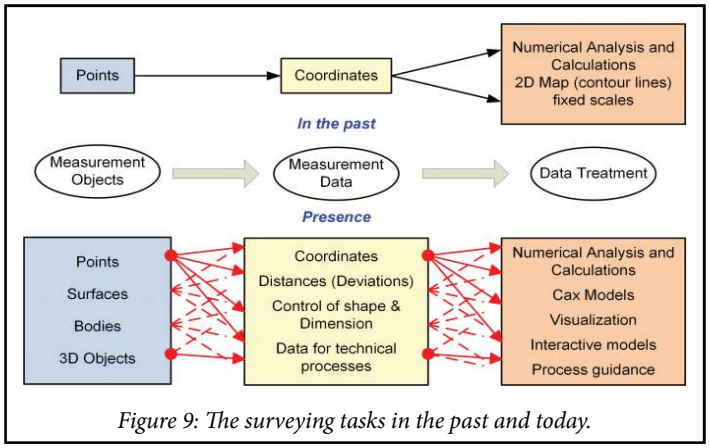


Figure 9: The surveying tasks in the past and today.

Summary of skills

The skills required by the Surveyor 4.0 to meet the current needs can be summarized as follows:

Measurement technologies: Thorough knowledge of all the potential measurement systems and technologies, including their limitations and restrictions (both legal and technical), is necessary in order to optimally choose the acquisition and data treatment strategy. Knowledge about the quality of the data and the specific output formats is also required.

Mathematics: In particular, mathematical knowledge should cover geometry, statistics, least squares adjustment and blunder detection.

Business administration: To include a comparative cost calculation between the different measurement options in the decision process, knowledge and experience related to calculating costs is needed.

Programming: A project often calls for the surveyor to filter, select, transfer or manipulate the acquired or processed data. Therefore, programming capabilities in appropriate programming languages are required.

Soft skills: The success of a surveying project depends on a close and constructive partnership between the surveyor and the customer, especially during the planning phase. This is supported by soft skills such as communication skills, presentation skills and teamwork.

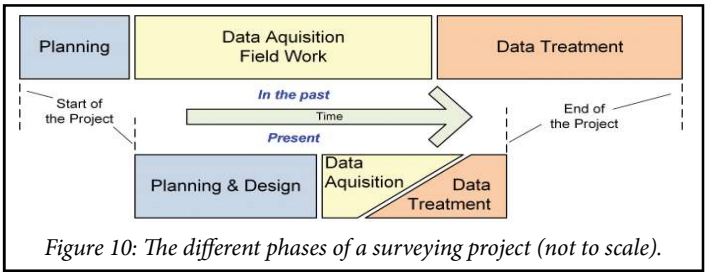


Figure 10: The different phases of a surveying project (not to scale).

Conclusion

The unique selling point of surveyors has always been their ability to acquire precise and detailed geometrical information about large objects, whether natural or artificial. This has not changed over the last century. However, the surveyor of today has become a versatile producer and manager of precise geometrical data. Whereas in the past it was the only task, mastering the instrument is nowadays reduced to just one task out of many.

National Trig-Star Committee Selects Winners of the National Trig-Star and Teaching Excellence Awards

The National Society of Professional Surveyors (NSPS) is pleased to announce the recipients of the 2023 Richard E. Lomax National Trig-Star Awards. The Trig-Star committee met on July 20-21, 2023 to determine the top three high school students from the national examinations submitted by state winners. This year there were 32 state winners submitted.

The Richard E. Lomax National Trig-Star Awards are as follows:

FIRST PLACE

$2,000

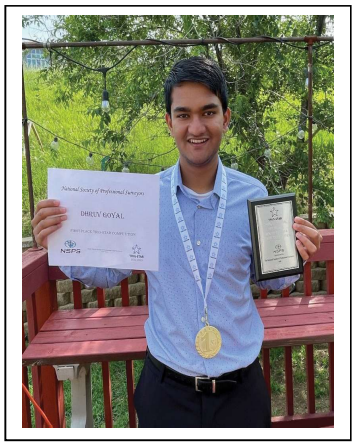
Zachary Clark
Hankinson HS
North Dakota

SECOND PLACE

$1,000

James Willden
Gunnison Valley HS
Utah

THIRD PLACE



$500

Dhruv Goyal
St. Thomas More HS
South Dakota

The Richard E. Lomax National Teaching Excellence Awards are as follows:

$1,000

Larry Skjoiten
Hankinson HS
North Dakota

$500

Mark Otten
Gunnison Valley HS
Utah

$250

Brandon Kandolin
St. Thomas More HS
South Dakota

State Winners:

Ben Cusmariu, Alabama
Emily Owens, Alaska
Kevin Lu, California
Naomi Huang, Colorado
Matthew Pan, Connecticut
Katie Bonnette, Georgia
Xinjie Wang, Illinois
William Hancock, Indiana
Joseph Schneider, Iowa
Jackson Reichenberger, Kansas
Sam Baker, Kentucky
Luke Spooner, Maine
Callie Alkire, Maryland
Lucas Stiver, Michigan
Matthew Bohnsack, Minnesota
Layla Biby, Missouri
Sosaia Tupou, Montana
Kenny Truong, Nevada
Kazuya Okada, New Hampshire
John Wu, New Jersey
Nathaniel Carswell, North Carolina
Sam Vogel, Ohio
Elizabeth Law, Oregon
Amir-Ahmad Samadian, Pennsylvania
Gavin Ockert, South Carolina
Sydney Wall, Texas
Mason Siwicki, West Virginia
Zeke Jeske, Wisconsin
Amalie Scherbel, Wyoming

TURN GPS IP Address Change

Hello all TURN GPS Users,

This is a very important message for all users.

The past year, during user groups and conferences, we have announced an upcoming move to a new TURN GPS network server that requires all users to connect to a new IP address and port to continue receiving Real-time corrections.

The day has come for everyone working within the footprint of this coverage map to move the new server.

http://turngps.utah.gov/Map/SensorMap.aspx

The current production server will be shut down on September 1st, so please begin making the transition now to avoid downtime.

You can alter your controller settings (survey style) to make a connection to the following IP address and Port using your current username and password:
IP Address: 165.239.144.5
Port: 2101

The coordinate frame and all base station sites are exactly the same as the ones being used right now, so there is no need to recalibrate or change anything on your projects.

Once you are connected to the new server and begin receiving corrections for existing projects, it is possible an error message will come up saying the base station is not compatible, or that changes were made to the base station. If you select continue, or ignore you can move forward using the corrections with no issues. **Please verify your positioning by measuring existing project control before moving forward.**

You may need to contact your equipment vendor for help altering the IP address and selecting the appropriate mountpoint.

This is a list of the new mountpoints with a brief definition.

- GNSS-VRS-NAD83-CMRx (Full GNSS network solution including GPS, Glonass, Galileo with CMRx output format)
- GNSS-VRS-NAD83-RTCM32 (Full GNSS network solution including GPS, Glonass, Galileo, BeiDou with RTCM32 output format) (*Recommended for the majority of all users*)
- VRS-NAD83-CMRp (Full network solution including GPS, Glonass with CMRp output format)
- VRS-NAD83-CMRx (Full network solution including GPS, Glonass with CMRx output format)
- VRS-NAD83-RTCM1 (Full network solution including GPS, Glonass with RTCM31 output format)
- VRS-NAD83-RTCM32 (Full network solution including GPS, Glonass with RTCM32 output format)
- MS-NAD83-CMRp (Single base solution from the closest base, determined by the system, including GPS, Glonass with CMRp output format)
- MS-NAD83-CMRx (Single base solution from the closest base, determined by the system, including all available satellite constellations from that receiver with CMRx output format)
- MS-NAD83-RTCM31 (Single base solution from the closest base, determined by the system, including all available satellite constellations from that receiver with RTCM31 output format)
- MS-NAD83-RTCM32 (Single base solution from the closest base, determined by the system, including all available satellite constellations from that receiver with RTCM32 output format)

Please notify all those in your office that may be impacted by this change.

For questions please contact Sean Fernandez at sfernandez@utah.gov and Mike Heagin at mheagin@utah.gov

Thanks for your support,

GPS Network Support Team