

May 2019

# SIDE SHOTS

Professional Land Surveyors of Colorado

Volume 50, Issue 2



## 2022 Colorado State Plane Coordinate System

By: B. John Hunter, PLS  
Colorado NGS Geodetic Coordinator

*see page 19*

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# SIDE SHOTS

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Hello PLSC,

Spring is here, the economy is good, and my guess is you are facing an incredibly full field season. This is the perfect opportunity for bringing new surveyors into the profession. Of course, snatch up those graduating from the surveying programs across the country, like the one at Western Colorado Community College, but I'd say also reach out to that highly competent grade-checker, GIS technician, engineering intern or high school graduate. Remember how you were brought up as a surveyor, that first summer, and I'd encourage you to consider their upbringing. Of course, give them the baptism under fire, rite of passage they deserve, but also send them out with your best field surveyor to teach them the ropes and give them the confidence they need to choose surveying as a career. Encourage your new hires to study for the NSPS CST exams, take the PLSC review courses, let them see the field to finish work flows, and generally invest in them, welcoming them to the profession. As our numbers necessarily increase with the demand, let's bring them up right, purposefully, with their futures as our next generation of professionals in mind.



I also want to encourage our membership to get involved. If you showed an interest in a committee in the past, that committee chair is going to reach out to you and give you an opportunity to participate in the committee. Currently our committees are the following:

- Education committee chair – Don Hulsey
- Rocky Mountain Surveyors Summit – Kayce Keane
- Legislative committee chair – Ralph Pettit
- Membership committee chair – Ralph Pettit
- QBS, Ethics and Fair Practices committee chair – Eric White
- Elections and awards committee chair – Leif Joy
- Website committee chair – Shaun Lee
- Trig Star committee chair – Heather Lassner
- CST committee chair – Alan Blair
- Scholarship committee chair – Tom Sylvester
- Outreach committee chair – Brian Dennis
- GIS in the Rockies liaison – Peggy Streicher

Our NSPS representatives are JB Guyton and Becky Roland, our WestFed Delegates are Todd Beers and Roger Nelson, and our Colorado NGS Geodetic Coordinator Group chair is John Hunter. Also, depending on response, we may start a Young Surveyors



# FROM THE EDITOR



On behalf of all of the members of the PLSC, we welcome Steve Parker, PLS as our new President, and a well deserved thank you to our outgoing one, Todd Beers. Welcomes also to Ralph Pettit as Vice President and Shaun Lee as Treasurer, as well as the new board and committee members for

the PLSC and the six chapters. Clearly the PLSC is in good hands.

This issue features an informative article on the 2022 State Plane Coordinate System by John Hunter, PLS, who is the Colorado NGS Geodetic Coordinator. This is a follow up to his November, 2018 article, "The 2022 Modernization is Coming. Are You Ready?" As before, this issue will feature John's graphics in color. Another very informative and a historical article in this issue is "Guided by a Star" by Gaby Neunzert, PLS about the surveying of the Mason Dixon line and the Tangent Line that separated Maryland and Delaware, and the role that astronomy played back in 1763. This is the same 40-degree N arc of latitude that runs right by my house in Boulder.

Earl Henderson wrote about CRS 38-51-106 (1)(f) and Board Rule 6.13 and the difficulties that arise in creating the proper descriptions for all monuments found and set. The Governor's proclamation of Surveyor's Week appears, even though it has already happened – March 17<sup>th</sup> through the 23<sup>rd</sup>. And a report from WFPS, Western Federation of Professional Surveyors, features the interesting brief reports from each member state.

A transcript of the annual Chapter Summit, which took place during the Rocky Mountain Surveyors Summit, appears in this issue, and can give you a good picture of the discussion that occurred. There are also board of director minutes from January 7<sup>th</sup>, a detailed budget spreadsheet showing 2018 actual vs. budgeted items, and the news from each regional chapter.

New articles on surveying, GIS, geodesy, aerial mapping, use of social media, etc. that you wish to write and share with your fellow Colorado surveyors is always welcome. It is gratifying to see a new generation of surveyors entering our profession, and I hope that *Side Shots* remains as a useful resource to learn from those that came before them.

JB Guyton, Editor

## President's letter *continued*

Committee. This professional society is only what we make of it, so I encourage you to start by plugging into your local chapter and get involved. Just pick one committee that interests you, you won't be sorry, as I am continually surprised at how much the PLSC does for both individual surveyors and the profession.

As the new president, I have received numerous suggestions for growing and improving the PLSC, and at

a recent NSPS meeting I was able to collect some great ideas from the discussions and listening to what other states are doing. I am open to change, so please reach out to me in writing with your positive, creative and solutions-based ideas.

Sincerely,  
Steven Parker, PLS CFM CFedS  
PLSC President

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March 19, 2019

Mr. John B. Guyton, Editor  
Side Shots  
3825 Iris Ave.  
Boulder, Colorado 80301

Dear Mr. Guyton:

This letter informs you of official BLM cadastral surveys in Colorado that have been accepted from November 28, 2018, through February 5, 2019, officially filed, and are now available in the Public Room, Bureau of Land Management, Colorado State Office, 2850 Youngfield Street, Lakewood, Colorado 80215. The surveys will also be available at <https://glorerecords.blm.gov>.

The accepted surveys are listed below by township, range, meridian, group number, type, approval date and number of plats.

<u>Township</u>	<u>Range</u>	<u>Meridian</u>	<u>Group No.</u>	<u>Type</u>	<u>Approved</u>	<u>Plats</u>
T. 37 N.	R. 3 E.	NMPM	1697	Suppl. Plat	11/28/18	1
T. 7 S.	R. 93 W.	Sixth	1703	Suppl. Plat	02/05/19	1

As other surveys are completed, I will advise you of their acceptance. You may circulate this letter among the membership of the Professional Land Surveyors of Colorado.

Sincerely yours,

Randy Bloom  
Chief Cadastral Surveyor for Colorado

# Rule of the Month: CRS 38-51-106(1)(f) and Board Rule 6.13

By Earl Henderson, PLS

A few years ago I wrote an article, published in Side Shots in the May 2012 edition, about this statute. That article skipped over the first sentence of the statute and focused on the remainder as it is written. I am now going to circle back and focus this article on that first sentence. The statute requires that all land survey plats include, “A description of all monuments, both found and set, that mark the boundaries of the property and of all control monuments used in conducting the survey.” Seems pretty simple on the surface. The statute is further delineated by Board Rule 6.13 which provides examples of acceptable descriptions and unacceptable descriptions. But if this is so simple, why is this article being written? The answer is that this statute and rule are cited quite often when reviewing survey plats. It’s surprising how often. It’s even more surprising because it’s so simple. So, let’s break it down.

The survey plat must show and describe all the monuments, either found or set, that mark the boundaries of the subject property. I don’t think many PLS’s have difficulty with this. But there are a significant number of PLS’s that have difficulty describing the monuments properly as exemplified in BR 6.13. What’s even more surprising is how often a description of a monument perfectly mirrors the examples of unacceptable descriptions in BR 6.13.3. “Come on son!” Imagine sitting on the witness stand in front of a judge trying to explain that your survey is superior to that from the opposing side while such a simple aspect of your survey is obviously substandard. Your credibility in the eyes of the judge is likely to be somewhat diminished and your client is likely to be somewhat unhappy. So, I suggest a review of BR 6.13 to ensure that your monument descriptions meet the standard and don’t meet the unacceptable standard.

But CRS 38-51-106(1)(f) goes beyond the limits of the subject property of your survey. It also requires that you properly describe “...ALL control monuments used in conducting the survey.”(emphasis added) This obviously means all the monuments used beyond the limits of the

subject property that were utilized in determining the corner locations of the subject property. Of course, I’m assuming here that the PLS went beyond the limits of the subject property to find monumentation in order to either re-establish the corners of the subject property or confirm the found monumentation of the subject property. If the PLS set any monuments at the corners of the subject property then the PLS must investigate beyond the limits of the subject property. How else is it possible to determine the line upon which the monument is to be set and the appropriate distance upon that line at which to set it? And of course, I’m making another assumption here that the PLS is not simply relying on the record dimensions to set missing property corner monumentation. If the PLS were doing that they wouldn’t be conducting a proper retracement survey but simply “deed staking”. But even if the PLS found all the property corners monumented, it is incumbent upon the PLS to investigate beyond the limits of the subject property to ascertain if those monuments were set accurately (notice I did not use the word precisely). If all the found monuments are determined to be the original monuments, thereby defining the corners, the PLS is likely to accept them as correctly marking the corners. But that situation is quite uncommon in this day and age. So as a Professional LS, we should require of ourselves to investigate to the extent that we can determine if the found, unoriginal monuments correctly mark the property corners. Which means investigating beyond the limits of the subject property. Furthermore, take notice of the mention in the statute of the words, “...all control monuments...”. The definition of a monument is not limited to rebar with caps, or properly marked stones, or brass caps in concrete. Fences can be determined to be monuments, as can many other physical objects. So, it’s important to keep our eyes (and ears) open while conducting the field work.

And finally, it is also important to note that even though you may have done extensive surveying in a particular area and that you have accumulated a significant amount of data and evidence in that area, that you are still required to show on the plat what that evidence is and how it relates to determining the corners of your



subject property each and every time you complete a survey in that area. Your experience, knowledge and data may give you a leg up on your competition. But you're still required to show some leg on your plat. I remember talking with some "old timers" about surveying some of the mountain towns in Boulder County. Back in the day, different PLS's had done enough work to figure out each of the mountain towns so that they each had, in effect, a monopoly on surveying in "their" town. Whenever a call would come in to survey in such a town the client would be referred to the PLS who had the most knowledge about that town. Each PLS would refer to the others in this way and in the end the clients were better served by the PLS with the most experience and local knowledge of the area. But that PLS still had to show on each and every plat they completed in that town just how they obtained their results.

Seven years ago, when first writing about this statute I said, "And let's face it, describing the monuments you've found and set is easy." And that was the extent to which I included this one sentence in the statute. Now you can see, I hope, that it's not as easy or as simple as I may have led you to believe then. And I hope you can also see how important it is to read carefully and fully understand any one sentence in our statutes. Because the implications lead us beyond the limits of our subject property and hopefully result in an accurate and complete survey product with fully and properly described monumentation for our clients.

Be safe out there.



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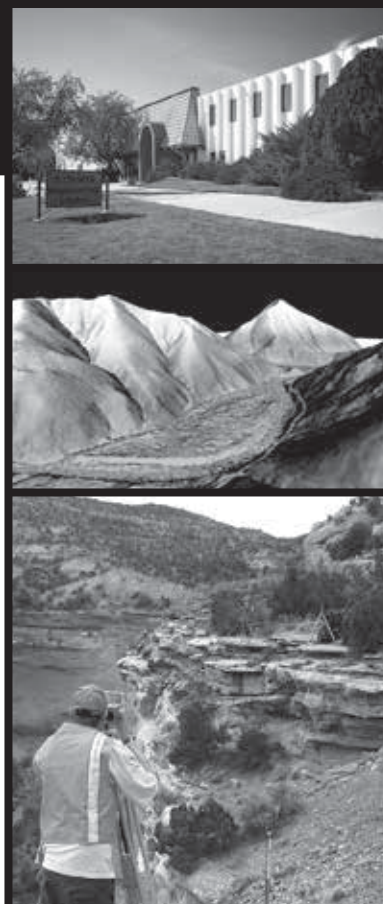
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*WHEREAS, there are over 45,000 professional surveyors in the United States; and*

*WHEREAS, the nature of surveying has changed dramatically since the Colonial Era when the profession was defined by the description and location of land boundaries; and*

*WHEREAS, today, the surveying profession has expanded to include hydrographic surveys, engineering surveys utilized in the study, selection, and design for engineering construction, geodetic surveys to determine precise global positioning for such activities as aircraft and missile navigation, and cartographic surveys used for mapping and charting; and*

*WHEREAS, professional surveyors provide important services through the use of legal principals, procedures, sophisticated surveying equipment and techniques, including satellite-borne remote sensing devices and automated positioning, measuring, recording, and plotting equipment; and*

*WHEREAS, the role of the surveyor has been, and remains, of vital importance in the development of Colorado and the United States; and*

*WHEREAS, Coloradans are encouraged to recognize professional surveyors and important work provided for our communities and this state, and to reflect on the historical contributions of surveying and the new technologies that are constantly modernizing this honored profession; and*

*Therefore, I, Jared Polis, Governor of the State of Colorado, do hereby proclaim March 17 through March 23, 2019 as*

#### **NATIONAL SURVEYOR'S WEEK**

*in the State of Colorado.*

*GIVEN under my hand and the Executive Seal of the State of Colorado, this seventeenth day of March, 2019*



A handwritten signature in black ink, reading "Jared Polis".

**Jared Polis**  
Governor

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# Guided by a Star

by Gaby Neunzert, PLS

Using the stars for guidance or reference has been an integral part of surveying since ancient times. When the two Brits of Mason-Dixon fame initially were contacted, it is doubtful that neither Charles Mason (1728-1786), the astronomer nor Jeremiah Dixon (1733-1779), the practical surveyor, had any idea of the magnitude and the pioneering astronomical concepts which had to be developed after their arrival in America in 1763. This presentation details how Mason used stars for surveying and solves the “secret” on how the movement of a fixed star was used to align the Tangent Line. In principle, the surveyors used the stars to stay at a constant latitude for the “West Line” and then again as a foresight for the “Tangent Line”. Unlike conventional presentations, this writeup attempts to explain the logic of how and what was physically involved with a surveying job larger than anything in modern times.

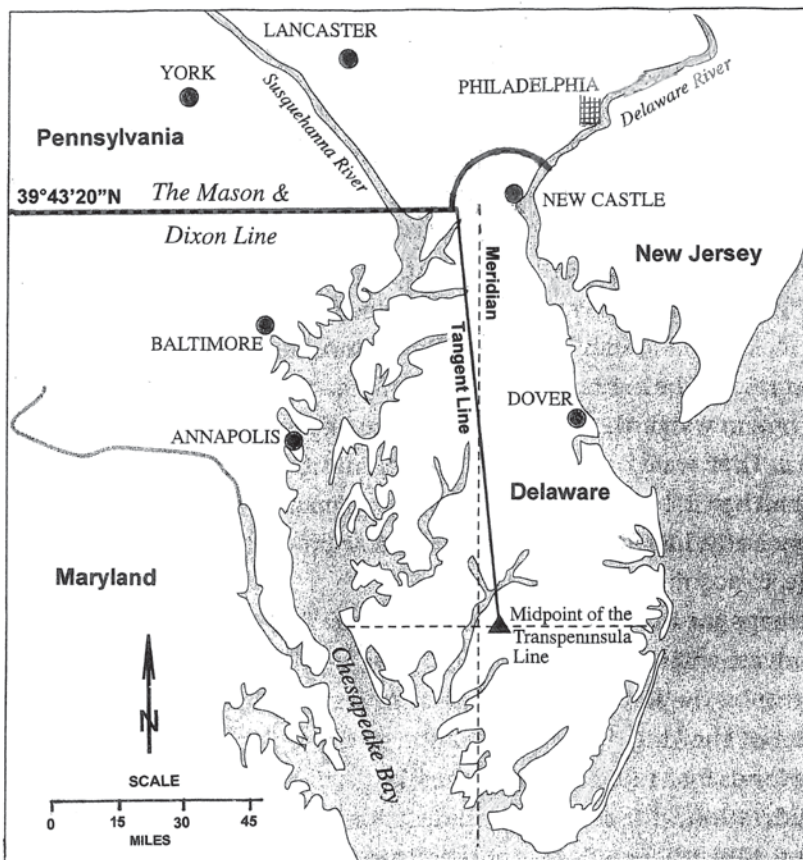
Based on the legal agreement between the Penns of Pennsylvania and the Calverts of Maryland, the border between the (now) two states was to be a small circle route,  $39^{\circ}43'20''$  N then called the “West Line” and now the “Mason-Dixon Line”. Thus, the surveyor’s task, given the surveying equipment of the time, was to follow this

specification for 344 miles unless prevented by external circumstances, such as attacked by hostile Indians.

First, given their 3 ft quadrant (similar to an archaic modern sextant) and probably graduated to the nearest  $\frac{1}{4}$  degree, or a magnetic compass with an open sight, would prove to be most unsuitable to turn an angle from the meridian to the west. Even aligning a straight line with an open sight instrument for any distance would have been very difficult at best. An old method, probably only practiced very infrequently by modern surveyors, is the technique of a “random line”. In short, a line is run roughly in the general direction of the objective (property corner, etc.) – see “temporary line” on Fig. 1. The offset in distance and direction is the difference between the random and desired endpoint. By proportions, the offset is then mathematically and physically worked back to establish the finished line, either as a straight line or a small circle arc.

Now, back to Mason’s west line. There is no record why a roughly 11 mile length for each line segment was selected, but it could have been the length of 10 minutes of arc at the required latitude. A temporary observatory

was set up at the endpoint and the latitude was astronomically determined. Laying on their backs and on rough soil, Mason and Dixon would take turns with their 6 foot zenith instrument, sighting circumpolar stars for equal altitude observations. Timing the sightings and bisecting the horizontal angle allows

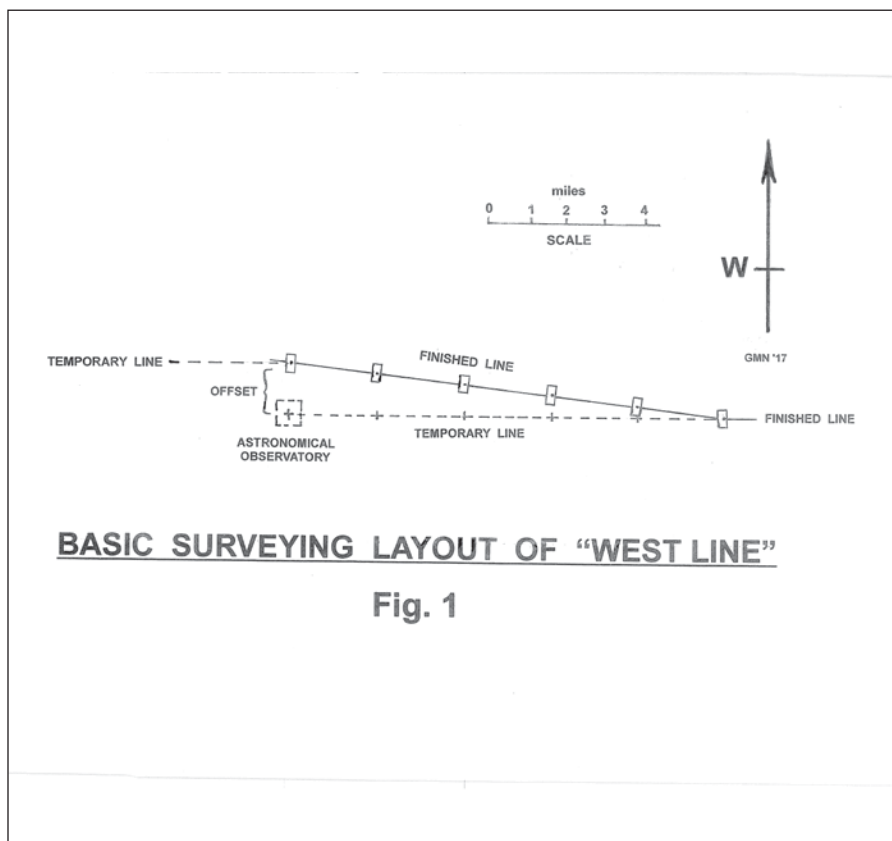


Modified from Danson 2006

GMN'14

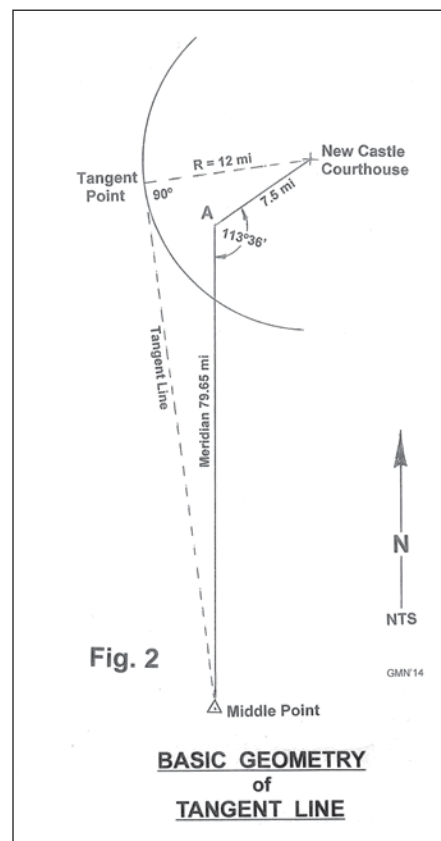


Stone boundary monuments ornamented with the Penn and Calvert coats of arms, imported from England, were placed at 5 mile intervals.



for the determination of the meridian. Finally, with the meridian established, it was then only necessary to measure the vertical angle of a star's meridian passage and together with the star's declination calculate the latitude. Knowing that one second of arc is roughly equivalent to 100 ft, the endpoint could then be moved either north or south as needed, in order to stay at the required latitude. Note: the offset can be either north or south; Fig. 1 only shows a correction to the north. It is this author's biased opinion, that it was physically impossible to point and read Mason's zenith sector to the nearest 1/100 second of arc, despite the fact that it is mentioned on many subsequent transcriptions; even to the nearest second of arc is improbable. A historical note: for transport, the 6 foot zenith sector was bedded on a "feather bed" and finally stone boundary monuments ornamented with the Penn and Calvert coats of arms, imported from England, were placed at 5 mile intervals.

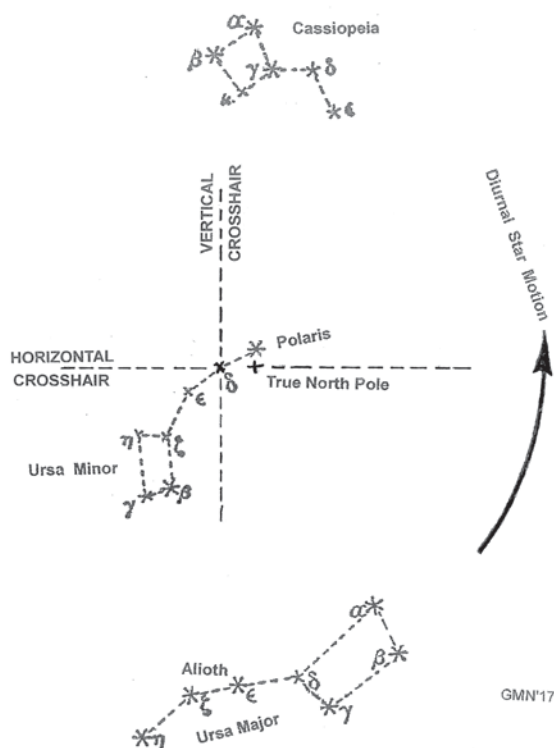
The Tangent Line, as the boundary between Maryland and Delaware, unlike the West Line, posed a different challenge to the surveyors. By definition, the line started at the Middle Point, proceeded north for about 82 miles and then was to become tangent to the 12 mile circle about New Castle, see Fig. 2. The first step for the solution was to establish the basic geometry. As shown on the edited sketch from Mason's journal, a meridian line was run from the Middle Point for 79.85 miles and arbitrarily stopped inside the circle. In turn, a tie of 7.5



miles to the courthouse in New Castle was made and the deflection angle of  $113^{\circ}36'$  was measured. This data now allowed the calculation of the  $N\ 3^{\circ}33'57''\ W$  bearing for the tangent line. A historical note: Mason's Journal shows two sets of angle values; angles to the nearest minute of arc which most probably came from field measurements, and values to the nearest second of arc which most probably came from calculations. Given the instruments and procedures of the time, it would have been impossible for Mason and Dixon to survey a straight line some 80 miles long by simple prolongation. Mason the astronomer found a method to "freeze" the movement of a star and use it as a "fixed" sight, even though the stars make a complete circle about the celestial pole during a diurnal day.

The solution to Mason's secret of using a moving star for a fixed alignment lies in the knowledge that a star's position in the sky is fixed when sighted with a known vertical and horizontal angle. However, there are 2 necessary steps which must be taken:

First, as already mentioned, it was necessary to calculate the bearing ( $N\ 3^{\circ}33'57''\ W$ ) of the Tangent Line from the existing geometry. Next, by occupying the Middle Point and possibly with the experience gained from the survey of the West Line, a meridian was established by the equal altitude method. Finally, from the meridian the deflection angle of most probably  $3^{\circ}34'$  to the west was turned and staked.



### ALIGNMENT ON DELTA – URSA MINOR

Fig. 3

Secondly, it was now necessary to select a “fixed” star. For a modern writer, only generally familiar with astronomy, Mason’s logic for aligning the Tangent line poses a puzzle. When seen from earth, the stars scribe a circle, with the radius from the pole to the star (Fig. 3). Mathematically: the radius = called polar distance =  $90^\circ - \text{Declination}$ . Theoretically, any star and preferably a circumpolar star could have been used. It appears that the key to the secret referred to in the literature is the selection of a star with the proper declination. Thus, of all the many possible stars, Mason selected the Delta star in Ursa Minor, a rather dim star with a

relative brightness 4.35, which in 1763 had an average declination of  $N86^\circ32'$ . In turn, this now produced the desired number with the polar distance of  $90^\circ - 86^\circ32' = 3^\circ28'$ . Fig. 3 attempts to graphically explain that at western elongation, Delta Ursa Minor is within 4 minutes of arc of the desired bearing or well within the tolerances of the instrument used at the time. All that remained to be done was to physically observe the star when it changed its western movement to a vertical motion, i.e. western elongation! To observe a star at elongation, an observer has at least an eight minute window of time where the star would “ride the wire”, i.e. stay on the vertical crosshair. With the horizontal motion locked, the alignment for the subsequent day’s work was in place. It is freely admitted that the procedure illustrated above was valid for roughly only a three month period of night observations. However, with minor changes in procedure, it would have been possible to use any other circumpolar star.

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# Western Federation of Professional Surveyors

## Highlights from the Western States

The Western Federation of Professional Surveyors (WFPS) held a Board of Directors meeting on February 16, 2019 in Anchorage, Alaska. The meeting was held in conjunction with the Alaska Society of Professional Land Surveyors annual conference. WFPS Secretary/Treasurer Ben Petersen presented a talk on Defensible Settlement Monitoring and Ancient Survey Methods.

### **ALASKA (ASPLS) Steve Buchanan & Neil Robicheau**

– Current membership is 187. ASPLS has a new website [www.alaskapls.org](http://www.alaskapls.org) which includes an online membership renewal portal. ASPLS has implemented a go-to-meeting service for Board of Director meetings and has updated their by-laws to include an ex-officio membership category.

**ARIZONA (APLS) Mike Fondren** – Current membership is 578. Conference will be held May 9-11, 2019 at the Hilton Scottsdale Resort and Villas in Scottsdale, AZ. APLS is reviewing the structure of chapters and the possibility of combining some chapters. APLS is opposing House Bill 2231 which is moving to deregulate occupations and professions and is also working with AGIC and NGS to develop language to address the 2022 datum. APLS has a new website [AzPLS.org](http://AzPLS.org).

**CALIFORNIA (CLSA) Ray Mathe & Keith Spencer**– Current membership is 1684. The CLSA-NALS Conference will be held March 23-26, 2019 at the Silver Legacy Hotel in Reno, NV. CLSA is monitoring legislation that would require a licensee to notify the board of registration of known violations a licensee has direct knowledge of and a requirement to add a statement referencing accuracy standards on a Record of Survey.

**COLORADO (PLSC) Roger Nelson & Todd Beers** – Current membership is 368. PLSC members have been participating in GPS on Benchmarks program from the NGS to assist with data to build the geoid model for the 2022 datums and with additional observations to support the transformation programs being developed by the NGS. PLSC is actively participating in QBS meetings in Colorado and outreach activities including hosting a booth with a virtual sandbox at the guidance counselor conference. PLSC has committed \$150,000 of their \$250,000 goal towards starting a survey degree program at two colleges.

**HAWAII (HLSA) Meyer Cummins** – Current membership is approximately 104. The Conference is tentatively scheduled for March 21-22, 2019. HLSA continues to work on addressing land surveying and title issues that rose from the 2012 legislation that facilitated the process for registered lands in Hawaii's Land Court to de-register from that system.

### **MONTANA (MARLS) Dick Smith & Russ Kluesner**

– The 2019 Montana Legislature is in session and MARLS is tracking several bills including changing the requirement for licensure to include a bachelor's degree plus a minor in surveying and reduce the apprenticeship time from 4 ½ years to 3 ½ years. An attorney in Montana summarizes all survey-related court cases in Montana each year and provides to MARLS.

### **NEVADA (NALS) Nancy Almanzan & Matt Gingerich** –

Current membership is 256. The CLSA-NALS Conference will be held March 23-26, 2019 at the Silver Legacy in Reno, Nevada. The NALS Advanced Education Committee is working with the University System to promote a Minor in Land Surveying. 80<sup>th</sup> Session of the Nevada Legislature is underway. A bill tracking service will be used by the committee instead of a lobbyist. One item NALS will be following closely is legislation that would raise the amount that triggers QBS.

### **NEW MEXICO (NMPS) Allen Grace & Darryl Coster**

– Current membership is 230. The Conference will be held April 13-14, 2019 at the Buffalo Thunder Resort in Santa Fe. The NMPS publication, *Benchmarks*, is now online. NMPS is researching statute of limitations in the State of New Mexico and is working with an expert with experience in dealing with survey claims and current laws. New Mexico has a very active Young Surveyors Group.

**UTAH (UCLS) Mike Nadeau** – Current membership is 400. UCLS is currently working with the Surveyors Historical Society to bring the 2019 Survey Rendezvous to Utah. More information can be found at <http://www.surveyorshistoricalsociety.com>. UCLS is monitoring a bill that would create a state-wide system that counties can adopt and penalize engineers for not showing monuments that will be disturbed on their plans, as well as the contractor for not pulling the permit before destroying the monument. This bill is slated for this legislative session, has been vetted by the Weber County Attorney, the Utah Association of Counties and the Legislative Committee of the UCLS.

### **WASHINGTON (LSAW) Ben Petersen & Jeff Lynch**

– Current membership is 887. Senate Bill 5443 has been introduced in the 2019 Legislature to separate the Board of Registration from the Department of Licensing. Recent changes in the law require PLS licensees to acknowledge that they have reread the Washington state survey laws prior to license renewal.

**WYOMING (PLSW) Mark Corbridge** – Current membership is 262. PLSW is working with the GIS Community on a possible joint conference in the

near future. The Fall Technical Session will be held in November 2019 in Casper. The University of Wyoming has a Minor in Land Surveying as well as a Land Surveying Certificate Program. PLSW will be working with schools in November on the "Adopt a Surveyor" program.

## WFPS FOUNDATION

The WFPS Disaster Relief and Scholarship fund has been established through the NSPS Education Foundation. Donations are now being accepted. The criteria and application information has been sent to all State Associations and can be found on the WFPS website. Urgent assistance is needed for land surveyors that have been affected by the California wildfires.

The WFPS Foundation has awarded a California surveyor relief funds to aid after their home and all belongings were lost in the recent California wildfires.

**Donations can be made mailed to WFPS: 526 South E Street, Santa Rosa, CA 95404.**

<https://www.nsps.us.com/donations/donate.asp?id=18191>

## WFPS AREAS OF FOCUS

### Providing Resources to Benefit State Associations

WFPS is dedicated to providing resources to state associations. Following are a few of the resources that are available:

1. Speakers Bureau
2. Article Bank for Association Magazines
3. STEM Outreach Flyer
- 4 Elevator Pitch

### Sample Elevator Pitch

WFPS We're really good at math and measuring. We use light beams, satellites and drones. You know that GPS in your car or phone? Well, that's accurate to about 10 feet. Good enough to get you to a restaurant or Home Depot. The stuff we use? We're talking millimeters - about the thickness of a dime. Did you know there's four faces on Mt. Rushmore and three of them are surveyors. The other guy started the Panama Canal and got teddy bears named after him. We also show you the limits of what is probably the most expensive thing you will ever own - your property - so you stay friendly with your neighbor and out of court. And when you make your fortune, and that ship pulls into harbor with your new jet-black BMW? Well, we surveyed the sea floor to make sure it doesn't bottom out. You know those steep curves on the NASCAR tracks? A surveyor laid those out .... just right so the cars don't jump over the top. Well, sometimes they do anyway! And when you get back from your Caribbean cruise, and it's been pouring rain

and your plane lands at 200 miles per hour at (name of airport)? You know why you don't skid off the runway and make the 11 o'clock news? Because we banked the runway so the water runs off. We saved your life. Your welcome.

## Serving as a Regional Voice

WFPS has adopted a resolution to support Quality Based Selection (QBS). The resolution is attached for your use. Should your state need a letter of support from WFPS regarding a QBS issue please contact the WFPS Office [admin@wfps.org](mailto:admin@wfps.org).

WFPS reviewed the Amicus Brief to the Louisiana Supreme Court in the case of Crooks vs. the State prepared by NSPS and made a motion in support of the effort to the reconsideration of the court ruling.

### About WFPS - PowerPoint

Get to know WFPS and how we serve the 13 western state surveying association. Visit the WFPS website, click "About WFPS" and download the WFPS PowerPoint.

### About WFPS

The Western Federation of Professional Surveyors (WFPS) was formed in 1979. The Board of Directors includes two delegates from each of the 13 western states. WFPS serves as a regional voice for Land Surveyors and meets quarterly to discuss practice issues affecting western state surveyors. For more information about WFPS and the state associations, visit [WFPS.org](http://WFPS.org)

#### WFPS Executive Office

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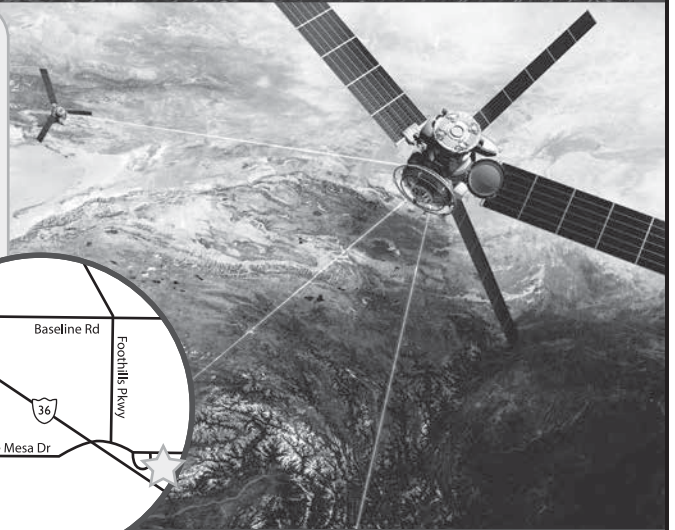
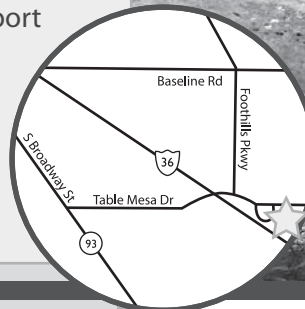
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# 2022 Colorado State Plane Coordinate System

By: B. John Hunter, PLS

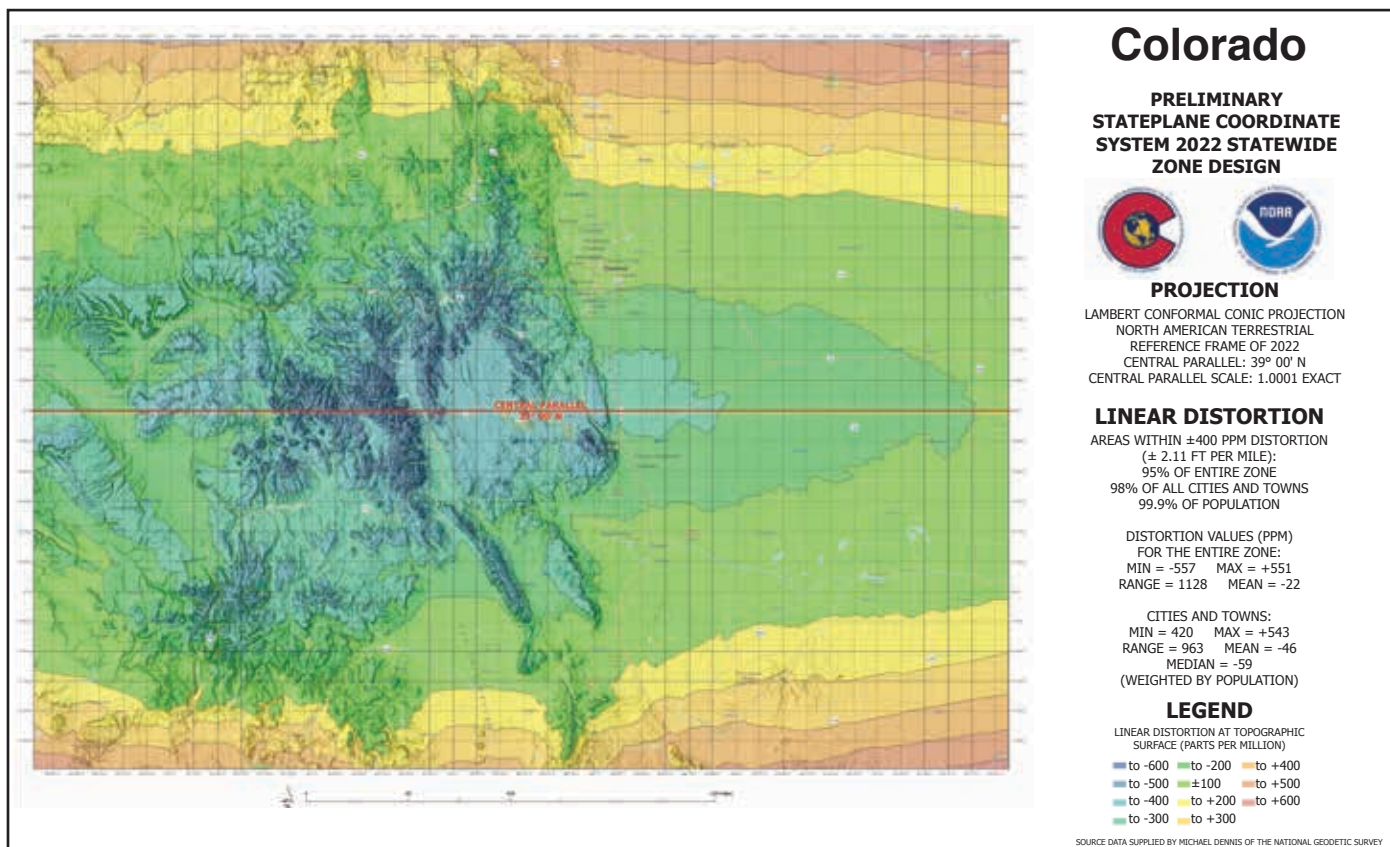
Colorado NGS Geodetic Coordinator

In the November 2018 issue of *Side Shots*, titled, “The 2022 Modernization is Coming. Are You Ready?” three major components of the Modernization of the National Spatial Reference System of 2022 (The Modernization) were discussed:

- North American Datum of 1983 (NAD83) will be replaced with the North American Terrestrial Reference Frame of 2022 (NATRF2022) along with terrestrial reference frames for the Pacific, Northern Mariana and Caribbean tectonic plates. Up to 4-foot horizontal shifts are expected in Colorado.
- North American Vertical Datum of 1988 (NAVD88) will be replaced with North American Pacific Geopotential Datum of 2022 (NAPGD2022). Up to 2-foot vertical shifts in orthometric heights are expected in Colorado.
- New State Plane Coordinate Systems (SPCS2022).

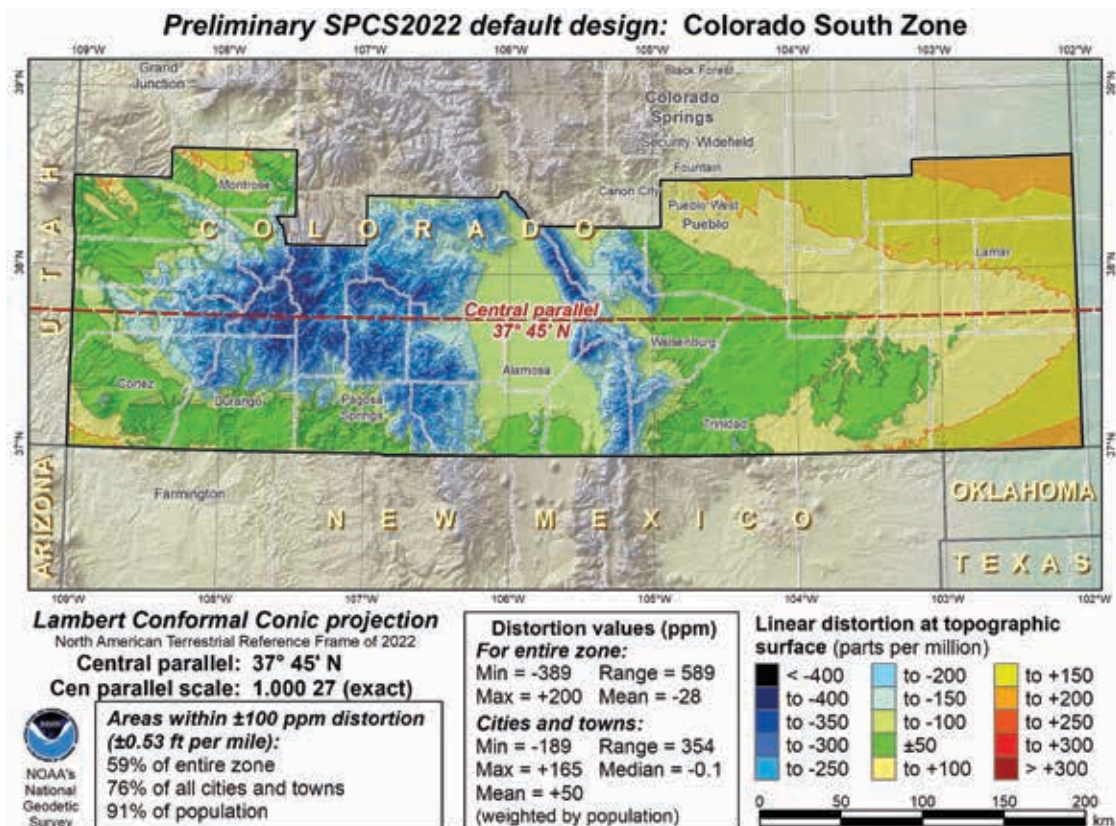
Since that article was published, the National Geodetic Survey (NGS) has finalized the SPCS2022 Policy and Procedures that set the SPCS2022 rules. Based upon these Policy and Procedure documents, Colorado has some decisions to make for SPCS2022. The focus of this article is to provide a summary of the SPCS2022 options for Colorado:

- Colorado SPCS2022 Options.
- Default Projections.
- Requesting Projection Designs from the NGS.
- Designs with Less Than 50 ppm and or Low Distortion Projections (LDP).
- The Colorado Geodetic Working Group: LDP.
- The Colorado Geodetic Working Group: Provide Feedback.
- Additional Resources.



**IMAGE 1:** Conceptual State-Wide Projection is Required and Designed by NGS (Stone, 2018).





**IMAGE 2:** Colorado Default SPCS2022 Design of South Zone, Tangential (1-Parallel) Lambert Conical Projection (NGS, 2018).

The NGS is set to release the final policy and procedures for SPCS2022 soon. Colorado needs to decide what they want for SPCS2022 so your input is critical. Below, I explain the details of our options and what I recommend. We will be soliciting your input by means of a survey through the PLSC as well as the recently formed Colorado SPCS2022 working group and the existing Colorado Geomatics Coordinator working group. If you are not familiar with the latter, it is a group that I lead to represent the geospatial community of Colorado on NGS issues related to the State. Other members include Joey Stone, Denver Water, Thomas Breitnauer, formerly with Denver International Airport and now City and County of Denver, Rick Corsi, State Office of Information and Technology, Annabelle Montoya, GIS Colorado, and Darren Shanks, CDOT.

## Colorado SPCS2022 Options

The NGS has allowed each state to have a maximum of three layers. A layer is defined by the NGS (NGS 2022 Policy and Procedures, 2019) as:

A zone configuration where two or more sub-zones are contained entirely within a larger zone. A state

can only have one, two, or three zone layers, as follows:

- A single zone covering the entire state which is required for all states.
- Up to two more sub-zones contained entirely within the state boundary.

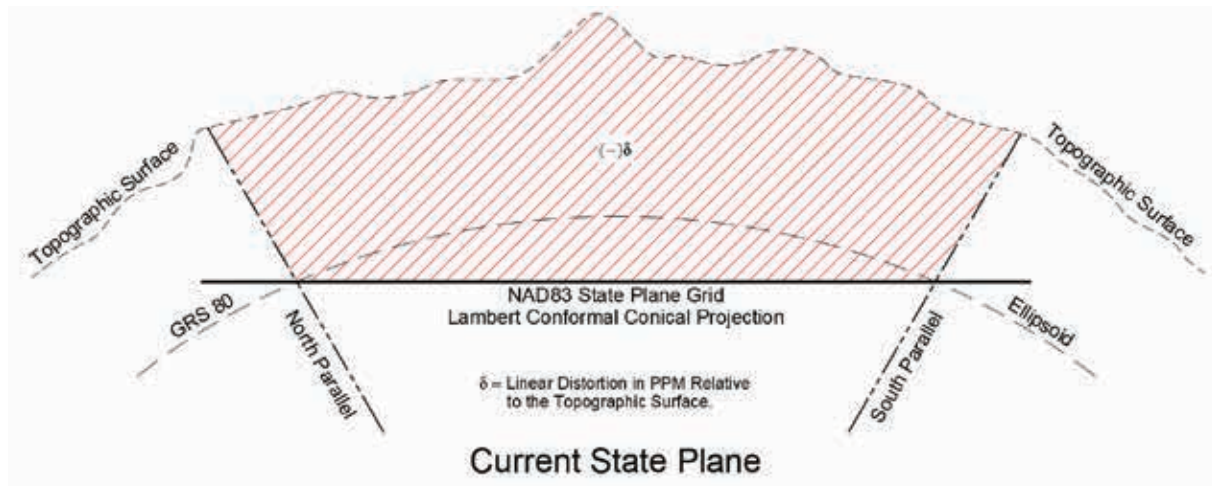
Note: There cannot be more than three corresponding SPCS2022 zones and or sub-zones for any given single point within the state.

Colorado will be allowed a maximum of three layers of coordinate system zones. One of those zones must be a single state-wide projection (**See Image 1, previous page**).

Additionally, Colorado can choose up to two additional sub-zones from the following options:

- Default Projections (designed by NGS).
- 50 ppm Projections (designed by NGS).
- Projections with less than 50 ppm design criterion, namely LDP's (can be non-contiguous or Contiguous and must be designed by the states).





**IMAGE 3:** Colorado NAD83 SPCS Secant (2-Parallel) Lambert Conical Projection and distribution of linear distortion.

Note: If a non-contiguous set of zones are chosen, the other layer must contain zones that have state-wide coverage.

Example of layer usage:

- Layer 1) State-wide Projection
- Layer 2) Default Designs (3 zones)
- Layer 3) Non-Contiguous LDP (Undefined number of zones)

### Option: Default Projections

The NGS will design and provide Colorado with a default projection unless Colorado officially communicates to the NGS they would like to adopt a projection or a combination of projections different than that of the default. The default projection will adopt the same administrative zone boundaries as currently defined in NAD83 Colorado SPCS (*See image 2, previous page*).

However, the SPCS2022 will have major projection changes. Current NAD83 Colorado Lambert Conical State Plane Projections are secant (2-Parallel) in that the mapping grid intersects the ellipsoidal surface at the north and south parallels (*See Image 3*).

The default design of the Colorado SPCS2022 will change to a tangential (1-Parallel) and a scale factor will be applied at the projection axis to bring the mapping plane to the topographic surface (*See image 4, next page*).

### Option: Request Projections from the NGS

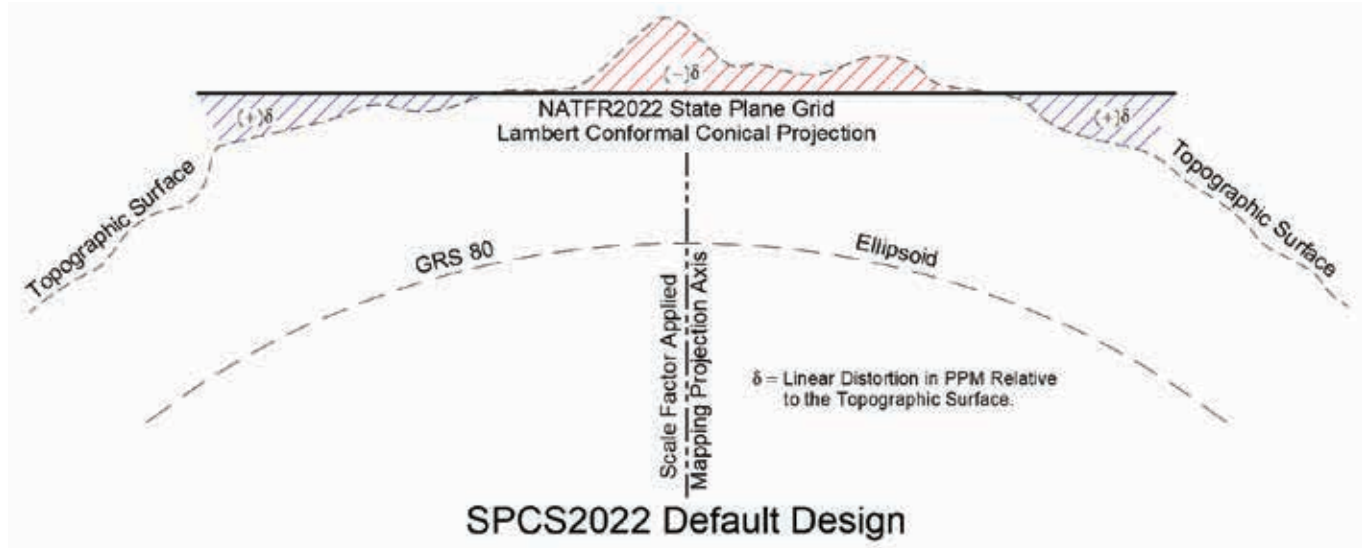
Colorado has the option of requesting projections and coordinate system zones to be designed by the NGS. The request can specify one of three conformal projection types, zone boundaries, and linear distortion criterion greater than 50 ppm. However, all designs must be consistent and conform to the NGS SPCS2022 Policy and Procedures.

### Option: Designs with Less than 50 ppm and or Low Distortion Projections

Colorado also has the option of Low Distortion Projections (LDP) or other projections with less than 50 ppm design criterion. These projections must be designed by Colorado, or what the NGS refers to as Contributing Partners. In other words, the NGS will not design coordinate system zones with a linear distortion criterion of less than 50 ppm. LDP zones can be non-contiguous which provides each geographic Colorado community the opportunity to develop LDP zones that best meet their unique challenges. In large part, state-wide coverage of LDP zones are impractical due to the severity of the variations in topography that makes up Colorado. Again, these LDP zones must meet the design criterion and conform to the NGS SPCS2022 Policy and Procedures.

### The Colorado Geodetic Working Group: Low Distortion Projections (LDP)

While the Colorado Geodetic Working Group is still collecting feedback for Colorado SPCS2022, so far there seems to be a desire for the development of LDP zones in Colorado. For example, at the Rocky Mountain Surveyors Summit this past February 90 percent of



**IMAGE 4:** Colorado NATRF2022 SPCS Tangential (1-Parallel) Lambert Conical Projection and distribution of linear distortion.

the respondents answered "yes" when asked, "Do you want an LDP or other projection with less than 50 ppm distortion that is designed specifically for the region in which you perform most of your work (such as Denver Metro, Grand Junction, or Pueblo)?" (PLSC Colorado SPCS2022 Survey, 2019).

The Colorado Geodetic Working Group is taking the lead on exploring the various options for Colorado, soliciting input and has completed research to create various LDPs for Colorado. The Working Group has received requests from volunteers to take part in efforts to implement LDP zones in Colorado, if indeed Colorado chooses to incorporate LDP as one of the SPCS2022 Layers.

Thank you to those volunteering to assist. Joey and I presented a workflow process and design tools used to design LDP zones to the NGS SPCS2022 Project Manager, Michael Dennis, to get feedback on ways to streamline the design process. While all the tools are not in place yet, I can confidently report that Joey and I have developed tools and workflows that we plan to share with the SPCS2022 in the near future. We want to be able to understand NGS' LDP design criteria so we and the entire working group can either design LDP zones or aide in the design of LDP zones for your geographic community or review the design of LDP zones for all of Colorado.

All designs will need to be submitted to the NGS through the working group. NGS has established deadlines for the individual states to submit proposals (see Proposed Deadlines on page 23). However, we want to gather the input across the State and in the various disciplines in advance with an initial deadline of August 31, 2019. That

will provide sufficient time to disseminate our plans to the various stakeholders and submit our design proposals to NGS by December 31, 2019. We will than have a year once approved by NGS to submit the actual designs to NGS. NGS requires design submittal to be from one entity in the state, defined as contributing partners. The plan is to have the Colorado Geodetic Working Group be the voice of all Colorado contributing partners.

### The Colorado Geodetic Working Group: Provide Feedback

From now until **August 31, 2019** the focus is getting feedback and input on what you want for Colorado SPCS2022. If you have a current email address registered with the PLSC, you will receive a link to a survey via email in which you can provide your feedback on Colorado SPCS2022. However, you do not need to be invited by email, and the survey can be accessed from the PLSC.net website.

### Conclusion

In future *Side Shots* issues, I will be writing about other details of the modernization of the National Spatial Reference System and keeping Colorado surveyors informed on this historic transition into 2022. These are exciting times for surveyors, and exciting times for our profession. I encourage each of you to get involved in the several NGS supported 2022 modernization campaigns including GPS on BM's. As always, Pam Fromhertz and I are available to provide additional information, answer questions, or field comments and thoughts on all geomatic topics involving the state of Colorado at [CoCoordinator@plsc.net](mailto:CoCoordinator@plsc.net). I also encourage

you to become familiar with these topics and help shape the future of geospatial, and geodetic positioning for Colorado. We are providing details on the PLSC website under 'Resources' and then 'Geodetic Resources'.

## Proposed Deadlines

Feedback from Colorado Geospatial Community on Colorado SPCS2022 must be received by the Colorado Geodetic Working Group by **August 31, 2019**.

Requests for zones designed by NGS or proposals for zones designed by contributing partners must be received by NGS no later than **May 31, 2020**.

For NGS-approved proposed designs by contributing partners, final defining parameters must be received by NGS no later than **May 31, 2021**.

Confirmation of final design characteristics and computations will be provided by NGS to stakeholders and contributing partners no later than **December 31, 2021**.

Note: All dates could change with little to no advanced warning. Continue to stay informed through the Colorado Geodetic Working Group.

## Information on the 2022 Modernization:

<https://geodesy.noaa.gov/datums/newdatums/index.shtml>

## Information on SPCS2022:

<https://geodesy.noaa.gov/SPCS/draft-policy.shtml>

Information on GPS on Bench Marks:

<https://geodesy.noaa.gov/GPSonBM/index.shtml> and

[https://www.plsc.net/geodetic\\_resources.php](https://www.plsc.net/geodetic_resources.php)

The PLSC website has resources specific to Colorado including how to see what has been completed, how to "sign up" to survey a GPS on BM and other resources. The new priority list for GPS on BM's should be released by the NGS soon, but generally surveys are highly desirable on all marks with either zero or one observation. Check [plsc.net](https://www.plsc.net) on 'GeodeticResources' for updates.

## References

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The Colorado Geodetic Working Group, Conceptual Designs (2019), Joseph Stone.

## Contributions to this article by:

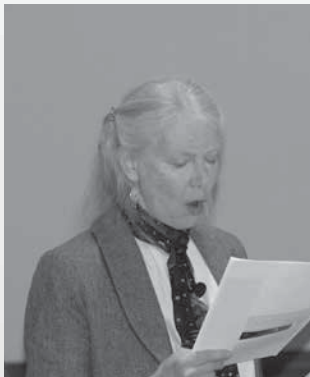
Pam Fromhertz, NGS Rocky Mountain Regional Advisor

Joseph Stone, Denver Water & Colorado Geodetic Working Group



# Scenes from the Summit







# PLSC Chapter Summit

## February 6, 2019, The Arvada Center



### Attending:

Steve Parker, PLSC President  
Chuck Hutchins, Vectors  
Todd Beers, past PLSC President  
Dustin Hoaglin, Vectors  
Shaun Clarke, Central Chapter  
Derek Brown, Central Chapter  
Shaun Lee, Central Chapter  
Don Hulse, Southern Chapter  
Brian Dennis, PLSC Director  
Ralph Pettit, VP PLSC  
Chris Power, *Side Shots*  
JB Guyton, NSPS Director, Facilitator  
Becky Roland, PLSC Executive Director  
Frank Kohl, Northern Chapter  
Jay Kay Seymour, former President of CSLA  
Julia Keilman, Central Chapter  
Robert Boehm, Central Chapter, VP  
Tom Sylvester, WCCC, PLSC Director  
Laine Landau, Northern Chapter, VP  
Heather Lassner, Northern Chapter  
Mike Greer, Central Chapter, Scholarship Chair

Steve (Parker) – As in past meetings, let's go around the room and introduce yourselves. I will start. I am Steve Parker, I am the incoming PLSC President and also the Secretary of the Southern Chapter. (Introductions spoken). This is a good opportunity to have multiple chapters in one room to cooperate, air grievances, a night to speak up. JB will help us stay on track and on topic, and we will adjourn at 9:00, two hours from now.

JB (Guyton) – The first agenda item is an update on the CMU/WCCC program. Tom?

Tom (Sylvester) – I am the instructor of land surveying and geomatics at Western Colorado Community College. It was this group that worked so hard to get traction to begin the program at WCCC, a subsidiary of Colorado Mesa University. Being the instructor has been challenging but also a lot of fun. A year ago, I had three students, and teaching three classes. We have both the Associate of Applied Science program in land surveying to meet the two-year requirement of the state board for licensure, and a Bachelors certificate. There are eight survey classes for both programs. We have on campus and distance learning, 85 percent of students are now distance learning and most are along the Front Range. I teach four courses on campus in the fall, the other four are distance, and in the spring I flip flop, so students have a choice. Wide variety, from an 80-year-old to newbies out of high school. I had 13 people in the introduction field lab, 6 to 8 taking the boundary law classes. I am hoping to have our first graduate in May. I welcome feedback from all of you on what we can do better.

JB – What is the total number of students?

Tom – I think that I am up to 35 to 40 in all classes combined, or about 18 actual people, some taking multiple classes.

JB – Is that viable, looking 3 to 4 years out?

Tom – Yes, we are trying to grow the program, and we recognize the state law that hits in two years, which will increase enrollment.



JB – Without Todd, it wouldn't have happened.

Todd (Beers) – Tom, you need to let us know if you need equipment, help with teaching, whatever you need, just let us know. We are here to help.

Brian (Dennis) – Tom, of the students you have, are any from the other schools like Laramie?

Tom – I have a few from Laramie, a few from Buena Vista, one from Great Basin in Nevada.

Ralph (Pettit) – Tom, it's a 2 year program, correct? Any plans to add on?

Tom – The sequence is to get the program up and running, then there is a period of time to get ABET accredited, then you pursue the long term goal of a four year program.

Ralph – Are your students interested in going into a 4 year degree?

Tom – Unknown at this time.

JB – Do you have an assistant?

Tom – No.

JB – Todd is next.

Todd – On the continuing education bill, Rep. Valdez was a strong supporter. Our lobbyist was also good on our behalf. The bill passed the house committee, the house, went to a Senate committee to die. To my knowledge, they did not inquire of the state board. Paul put together a 160-page application with support letters from other states. It's an empirical issue, if mandatory really helps or not. There was a change, pre-bill and after-bill. Someone said it was unnecessary because only 0.8% of surveyors had complaints brought to the board. That was the only thing that came up this year. The ACEC, engineers, supported the DORA report that it was not necessary, even though this had nothing to do with engineers. Only three minutes to build our case, no one followed up. Two were convinced, and apologized to our lobbyist. We were defeated. The chair was rude with our representative. The bar at DORA for establishing continuing education is too high, and they are looking into that and this issue can be revisited in the future.

Brian (Dennis) – Why is the bar so high?

Todd – That's the way it always has been.

Brian – If it is done again, would we get any farther?

Todd – If we did, there is only the one metric in the report they are holding. The complaints that come through are not board complaintable. There is a lack of education and failure to understand what's going on, that's the problem.

JB – There was some success with the legislature on part B, and there is some rapport now with Rep. Valdez, correct?

Todd – Most definitely. Capitol Hill Day was

important, we took pictures with them, had coffee, meetings. The more they know about our profession, the more chances we have of succeeding. Last year, we were involved and they read a proclamation during surveyor's week to the entire house and we have to do that again this year.

Steve – What was their motive to change their stance?

Todd – Concern has always been that CE for land surveyors will bleed over to engineers.

Becky – Marilyn told me beforehand that one member company who had engineers and surveyors was concerned about the added cost of having continuing education for surveyors, so ACEC was against it because it would affect engineers, and also there is no proof of a benefit.

Todd – One of the arguments is that, as a professional, you are expected to continue your education and invest your time, so why do it after the fact.

Tom – As a PE and a PLS, I have observed how the profession has changed over the last 50 years. There is still a perception with the public that surveyors are still the stepchildren of engineers. We need to point out to the legislature that we are completely different from architects and engineers.

Todd – And, an argument from the engineers' standpoint, if a surveyor is not competent in providing the information, the project using that data will be trash. Why would the engineers want that? As we know, just having a license does not prove competency.

Becky – The ASCE is pro-continuing education, and they have tried to pass that in the last few years. In addition, they have taken on surveying within their membership, and it's a big group, with 18,000 members. It may be time for PLSC and NSPS to side with ASCE to get this through.

Todd – There was a representative from the ASCE who spoke in support. So, it's a disappointment, and Paul really took it to heart. But I am an eternal optimist, everyone did a great job, but it was preordained; we made our point and will be able to get it eventually.

JB – So this will be a topic again next year. It's time to hear from Shaun Lee about the website.

Shaun (Lee) – I have a friend in the ACEC with a Facebook page, engineering companies in Colorado, with a leadership development program. Website committee formed with Becky, myself, Don and Paul DeGraff, made some progress on ideas from other state web pages, still a lot of work to do.

Becky – We can always use help, focus of site is the public education side and the resource side for our members. We spoke of having links to commonly used websites such as county sites, for members.

Laine (Landau) – We have done this for our company and links become outdated.

Becky – We would monitor monthly for broken links, but understand we are opening a can of worms with this. But links to things regularly accessed important.

Brian – About website, we have had more thinkers, not enough doers. John, Becky has done a lot, same people for a while, Shaun being the newest. But it has to be more than three people. We have funneled website items to Becky for security and having some form of control, don't want it to become a melee.

Shaun – Chapters need access when they create content and need to do content updates.

Brian – We have talked about how the PLSC and chapters have competing websites. As long as chapters have a website, why would they contribute to ours?

Shaun – Central and Northern chapters are on board.

Todd – We have had a budget for a number of years to get a web designer/consultant, \$4,000 for the last four years.

Shaun – Social media consultants could also be used, and could also change the website.

Becky – If there is anyone in the chapters who would like to have access to post articles, I can allow access to that and provide training. It's a simple editor kind of thing, or you can send to me and I will update. At this point, we don't know what to ask a contractor to bid for.

Robert (Boehm) – Our website was down for two months, and nobody said anything. Before designing a site, must determine what is wanted, and what they go to the website for.

Chuck (Hutchins) – How often do you go to your own company website? Studies show that unless you are selling something, it won't be successful. Must be more of an interactive community instead of just a website. Must be a common area for people to interact with each other, not just posting things. Websites for companies are a dying thing, not coming back.

Brian – We want it to be a one stop shop, links to take you from point A to B.

Chuck – I can show you how to do that without a website, via Microsoft.

JB – Can Chuck be on the website committee? I happen to know that a lot of people read *Side Shots* from the website because I hear from them.

Jay (Seymour) – I'd like to say that there is another point, we have 50 state associations, California has a wonderful website. We post daily opinions, each of our 26 chapters are on our website. The work is done at a local level and activity is moved up to the main organization. Get on our website, get with other states. Don't reinvent wheel. We made mistakes but are on

track now. We have a behind the scenes for members only. We have a webmaster and an executive director who would love to help you out. We budget \$5,000 for maintenance yearly, and spent about \$25,000 to have professionals redesign it completely. Social media keeps changing, some coming, some going. One of our 23 chapters has a better site than our state.

Shaun – Don Hulse and I have discussed more media, membership use only, for chapter minutes, video, some webcasting, email notifications. Can be podcasts, not always live. Digital, new age information now, not just email, to bring in next generation. Should have an email list of non-members so that they can come to meetings, get interested.

JB – Very productive. I look at the CLSA site frequently. Our next subject is about making membership more value added. We have a trove of articles, such as David Pehr's contributed articles, that might go on a members only part of the website.

Todd – Paul may be doing the last of his series of books of statutes and board rules, another thing that could be compiled and used on the site. We need to identify what we have, and roll it out over time, to keep members engaged. About memberships, we don't reach out to the 1,700 non-members. We can't download those from DORA for this purpose, rules against that. We could send out a letter every year about joining, worth the \$400 postage cost. I would bet at least 40% don't know we have a state society.

Brian – Most of the non-members are small business owners, and you will only attract them if you help them make money, or save costs. It's a business decision for them.

Heather – I will volunteer for the Dave Pehr project. We did letters in the past to every licensed surveyor, were ineffective, zero response. Phone calls worked better. Have a marketing volunteer do the letter, something different.

Don (Hulse) – We use Nextdoor.com, which has the capability to send push notifications to cell phones, no need to email.

Steve – There are pros out there who can do that, have always told them to bug off, but maybe we should look at that. Our church uses Facecam, with full chatrooms, documents.

Shaun – We have many different technologies, but we need to come up with an approach to pool information, in one place, share them with each other.

Tom – I'm an older guy, and get so much email. I ignore 99% of it.

Derek (Brown) – We are surveyors, not marketers or site designers, we must hire someone who knows what they are doing to avoid wasting time on things that don't work.

Steve – We have the funds; there are a lot of quacks out there who claim to know how to do this.

Dustin – I think it is important to go to other states who have successful websites.

Todd – There is so much out there, we don't even know what we don't know. We must be taught what is out there to get a specific direction.

Heather – I agree about building a community, but speaking to the value side, I agree with Brian that small businesses want to see a return on their dollars. ACEC is business oriented, they have HR, finance and marketing people that members can access.

Brian – I think we can reach out to our current members and ask what things we could provide for making or saving them money.

Ralph – Can we do a Survey Monkey? I respond if less than seven questions.

Ralph – Email is what we kind of have, but it's badly broken. I was unable to vote on the ballot that I was on. This is low hanging fruit. We are not reaching a tenth of surveyors.

Shaun – When enrolling for a conference, check to see if your information is correct. Company information changes frequently.

Todd – We should be asking for personal and business emails.

Becky – Send me the information, we have the ability to update emails.

Shaun – We try but you can't force people to update or provide their email.

Becky – When you register, you had to provide your email. It's the information for non-members and prospects we don't have that is an issue. We can open up access and send blast emails through the website.

Heather – Would like access to a real time list of active members, to reach out to and welcome new Northern Chapter members.

Steve – Any way to push chapter information to the chapters periodically? Southern chapter has multiple mailing lists with obsolete information. Perhaps revisit how we are doing dues, discounts.

Brian – Maybe we can do a volume discount, for groups in a company signing up. Would still make money because more people are coming.

Becky – There are a lot of ideas being generated, would suggest a quarterly call with chapters on issues, specific to one topic or benefit.

Ralph – Single sourcing this contact list is important, possibly use website for list.

Becky – If you send me a spreadsheet, I simply have to upload it. If you can give me 2 or 3 folks, I can do an

online training. (Ralph, Steve and Heather will start).

Brian – Before next quarterly meeting, should revisit videoconferencing. At Galloway, we use it extensively.

Dustin – The local chapter in Albuquerque uses webcasting all the time.

Brian – We have four chapters that are not here, and no means for them to join in, a drawback. We need to have it internally, not at companies.

Mike (Greer) – We used video for the refresher courses.

Shaun – We just recently looked at equipment, 4k cameras, mixing boards, pre and post processing, etc. Price tag now is around \$4,000 for what we are considering. Can do live, one microphone. Post processing a recording more involved, costly. Each chapter should probably have one of these.

Becky – Refresher course is a class of 30 people. We bought a tripod and webcam for \$75, picks up sound fine, use GoToMeeting for slides and webcam video. 3 to 4 people on the western slope logging in, I check to make sure they can see and hear.

Shaun – Richer experience; Owl 360 camera can point to speakers in a room and focus, higher level of quality. Shows what environment you will see if you come to our meetings.

JB – Let's keep moving, less than a half hour remaining. Let's turn it over to Don.

Don – For venues, I did some research. One, the Gaylord Resort, wanted over \$100,000. Doubletree Hilton about the same price as Arvada. But we need more people from Colorado Springs.

Shaun – Vendors say one of the most popular venues is Wyoming. Social atmosphere after the conference is a big deal. Conference is in a hotel. Company sponsors. Another in Hershey draws a thousand people. We don't have a social component to our conference.

Laine – Northern chapter used to have our own conference in Greeley. We have always been frugal, harder to justify.

Brian – The NSPS Young Surveyors met at a casino, drew people from many states.

Todd – This conference is about 85% of the PLSC annual budget, so its critical. Could be that these other groups have continuing education revenue to pay for their meetings. I would love to see all of this, but it takes work. This location is near the biggest demographic in our state. Fort Collins or Colorado Springs may be different.

Shaun – How many attended the one in Greeley?

Laine – I think our largest was 120 and it was profitable. We teamed with Wyoming and had one in



Cheyenne at a community college.

Brian – For the central chapter, there is east/west mobility. I went to a counselor's conference at Keystone, drew a crowd that was looking forward to it. Not being in Denver didn't stop them.

JB – These are all good ideas. Todd's point about the revenue being 85% of our budget, we do have to be careful. When I was President, we were broke. Need to be careful.

Steve – We are going to make reservations for next year, but we are going to explore options.

Mike – Do a Survey Monkey for this – if not in Denver, the numbers may not be there.

Becky – I can do a survey but need to have it reviewed before it is sent out.

JB – Moving on to the next item, Brian will now talk about outreach.

Brian – Virtual sandboxes are being built for the southern and central chapter, for education, and we have one out there right now. We have taken to several conferences, scouts, schools, counselors. Have given out cards, fantastic response. Kindergarten through 12<sup>th</sup> grade.

Tom – As you give out cards, tell them about the WCCC program.

Brian – If the western chapter wants one, we can build it or give them the plans. If you have advertising materials to hand them, that would be great.

Todd – Funding for educational materials is available. We have Power Point presentations for middle and high schoolers. Should take advantage of what NSPS already has.

JB – Just a reminder that I need Colorado writers for *Side Shots*, including content-driven educational articles. Something of interest to readers, added value. Older print media, but seems to be of value, has won awards. Warren Andrews was excellent, but no longer writing.

Laine – Leadership development classes as a long term goal. Teaming with AGC member possible for workforce development. Train for 8 weeks, gets a certificate.

Steve – Thank you to everyone for coming tonight. We have a list of action items as a result.

Digital Terrain Models

Digital Elevation Models

Orthometric Photos



Topographic Mapping

3-D As-Builts

Contour Maps

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# PLSC Board Meeting Minutes

January 7, 2019

Call to Order: Beers

Name	Position	Chapter	Attending?
Todd Beers	President	Central	x
Steve Parker	Vice President	Southern	x
Alan Blair	Secretary/Treasurer	Central	x
Becky Roland	Executive Director	n/a	x
Paul Bacus	Director	Northern	x
Teresa Smithson	Director	Central/Western	
Eric Carson	Director	Central	x
Brian Dennis	Director	Southern	x
Leif Joy	Director	NW ¼	x
Ralph Pettit	Director	Central	x
Paul DeGraff	Director	Central	
Tom Sylvester	Director	Western	x
Parker Newby	Ex-Officio	Southwest	
Roger Nelson	Non-Voting	Past President and WFPS Delegate	x
J.B. Guyton	Non-Voting	NSPS Delegate	x
Guests:			
Pam Fromhertz		NOAA/NGS	
Don Hulsey		Southern Chapter	x
Heather Lassner		Trigstar and Northern Chapter	x
Shaun Lee		Central Chapter	x

2. Determination of Quorum (6 voting): Blair

3. Any changes to the Agenda?: None

4. Approval of Minutes from November 2018 Meeting  
**MOTION:** To approve the November 2018 Minutes as presented.

**Approved unanimously**

6. Review of Action Items from Last Meeting: Beers

6. Financial Items: Beers/Blair/Roland

a. 2018 Financials

**MOTION:** To approve posting \$50,000 to Operations and remaining amount from the Merrill Lynch transfer to the NSPS Foundation.

**Approved unanimously**

b. Investment Update from Key Bank

c. 2019 Budget Approval

**MOTION:** To approve the 2019 Budget as presented.

**Approved unanimously**

d. Board consensus is to give the Van Sickle book to Refresher students. The cost of \$75 per book is discounted and will be paid out of the PLSC Education Fund

7. Colorado Coordinator Activities: No report

a. GPS on Benchmarks – still have benchmarks to observe for transformation tools

b. State Plane Coordinates – sent letter from Colorado

8. NGS Update: no report

9. WCCC Requests/Update: Sylvester

a. Tom Sylvester will send student numbers to the Board. Need each Chapter to get one or two volunteers to support online students to perform labs to Becky Roland. Tom to send a list of equipment/software needed for support.

10. State Meeting – PLSC attendees relayed that the organization will not provide funding, due to the commitment to WCCC; no further action

11. Membership Renewal Status: Beers

a. Name change

12. Summit Update: Parker/Roland

a. Becky Roland will send registration numbers by end of week

b. Change of speaker – added legal presentation

c. Need volunteers to moderate and help on site

d. Planning call tomorrow

e. WCCC booth – no cost

f. Need Silent Auction volunteer

13. WFPS Update: Beers/Nelson/Guyton
  - a. Todd Beers will send October minutes to JB Guyton for Side Shots
  - b. Roger Nelson will look into attending February Meeting
  - c. Todd Beers will send in report from PLSC to WFPS
  - d. CFedS Management – Todd shared with WFPS
14. NSPS YPN: Dennis
  - a. Brian Dennis will send information for Becky Roland to post on website and email to members
15. QBS Update: Blair
  - a. May want to consider another PLSC representative due to Alan Blair's schedule. If interested, please email Alan for more information.
16. Reports
  - a. Scholarship: Sylvester
    - i. Tom Sylvester received permission from the Board to encourage students at WCCC to apply
  - b. Membership Committee: Smithson/Parker/Roland
    - i. Look at member benefits Voting vs. Affiliate – next meeting
  - c. Executive Director: Roland
  - d. Rocky Mountain Surveyors Summit: Parker/Roland
  - e. Lobbyist/Legislative Committee: Bacus
    - i. HB19-40 introduced, will keep everyone posted
    - ii. Have until 2022 to set new marker
  - f. Education Committee: Parker/Blair/Beers
    - i. 19 for Refresher Course with remote access
  - g. Ethics and Fair Practices Committee: Pettit
  - h. Trig Star Report: Lassner
    - i. Exams sent out to schools
    - ii. Asking participants for input on awards ceremony
  - i. GIS in the Rockies: Parker
    - i. Peggy Streicher has volunteered to serve on the Planning Board
    - ii. Adam Houston is also on the Planning Meeting
  - j. NSPS Delegate's Report: Guyton
    - i. Report in *Side Shots*
    - ii. NSPS was able to revise FIGS dues by 40% to save money
    - iii. NSPS Dues increase will be 2020
    - iv. NSPS Lobby Day April 10-12 in DC
  - k. WSPS Delegates' Report: See above agenda item
17. Elections – ballot due 1/17
18. Awards – need nominations by Wed/Thurs to Leif Joy
19. Chapter Reports
  - a. Southern: Hulsey
    - i. Building Sandbox
    - ii. Two high schools participating in Trigstar and Don Hulsey is contacting 12 other schools for interest
    - iii. Feb 12 Career Day
    - iv. Scholarships – trying to promote PLSC Scholarship with other corporations and resources
  - b. Central: Clarke
    - i. Building sandbox
    - ii. Railroad Museum presentation coming soon
    - iii. Inviting GIS professionals to Central Meeting
    - iv. Need a central location for files and school contacts – send to Becky Roland for posting on member website
    - v. Next Board meeting is 1/10 and next meeting is 1/24 in Golden
  - c. Northern: Lassner
    - i. Good turnout for hockey game
    - ii. Meeting on Wednesday on underground utility law
    - iii. Need to fill open director position
    - iv. Bacus book – Right of Ways and Easements dedicated to Dave Pehr
  - d. NW ¼: Kelly
    - i. No report
  - e. Western: Thomas
    - i. Meeting this Wednesday morning
  - f. Southwestern: Newby
    - i. No report
20. Next Meeting Date and Location
  - a. Chapter Summit/RMSS
  - b. April 22 4:30PM Conference Call
21. The Board thanked Todd for his service
22. Adjourned– 6PM



# Treasurer's Report

	A	B	C	D	E	F	G	H	I	J	K
1											
2					Actual as of 12/31/18	2018 Budget					
3				<b>Income</b>							
4				Scholarship	52,700.00	60,500.00					
5				Silent Auction	643.00	1,000.00					
6				Summit Income	115,835.00	95,000.00					
7				Publication (books)	140.00	100.00	Bacus Book, Supreme Court Book and Initial Points				
8				Refresher Course Income	11,025.00	11,550.00	24 students at \$425 each and 11 at \$75				
9				Refresher DVD	1,800.00	900.00	6 sets at \$300				
10				GIS in the Rockies	0.00	1,500.00					
11				Membership Dues							
12				NSPS Dues	9,000.00	8,440.00					
13				Membership Dues			FY2018 #	FY2017 #	FY2016#		
14				Voting	24,860.00	23,210.00	225	216	209		
15				Associate	7,950.00	5,550.00	106	106	80		
16				Sustaining	3,680.00	4,140.00	16	20	15		
17				Student	90.00	60.00	3	3	3		
18				Retired	300.00	240.00	5	7	5		
19				Membership Dues Subtotal	36,880.00	33,200.00	355	352	312		
20				Total Membership Dues	45,880.00	41,640.00					
21				Miscellaneous	0.00	50.00					
22				Side Shots Ads	4,081.21	4,000.00					
23				Total Income	241,104.21	224,680.00					
24				<b>Expense</b>							
25				BOD/Chapter Summit Meetings	1,404.27	1,800.00					
26				Side Shots	13,218.36	12,000.00					
27				Awards	752.43	1,000.00					
28				Scholarship	52,700.00	60,500.00					
29				TwIST	0.00	2,000.00	Goal of 2 teachers with matching from WFPS				
30				Endowment	50,000.00	50,000.00					
31				Other	0.00	500.00					
32				PLSC	1,500.00	1,500.00					
33				CFedS	0.00	1,500.00	1 CFedS				
34				Chapter/Matching	0.00	2,500.00					
35				Trigstar	1,200.00	2,500.00	To NSPS & schools				
36				Refresher Course							
37				Speaker honorariums/planni	2,257.70	1,500.00					
38				Online Course Development	167.64	1,500.00					
39				Copies/Printing	533.08	250.00					
40				DVD Sales	430.11	200.00	Consider thumb/external drive				
41				Supplies, Bus	219.58	750.00					
42				Storage	1,370.00	600.00					
43				Special Projects							
44				???	0.00	0.00					
45				Merchandise	0.00	250.00					
46				Publication (books)	0.00	0.00					
47				Outreach	2,158.29		Sandbox				
48				High School/Middle School	450.00	750.00	Colorado Guidance Counselor/County Career Fairs				
49				Scouting		750.00					
50				Legislative	281.32	0.00					
51				Trigstar Event	370.40	0.00					
52				Tax prep	500.00	1,200.00					
53				Web Site	833.98	4,000.00	Design/Web Tool work				
54				Web Site - Don Lambert	1,000.00	1,000.00					
55				Lobbyist	15,090.81	15,000.00					
56				Travel, Bus							
57				BOD Travel	0.00	2,000.00					
58				WFPS Travel	3,443.63	3,000.00					
59				NSPS State Directors	746.29	0.00					
60				NSPS Travel	5,473.65	4,000.00					
61				Credit card/Bank Expense	5,382.13	3,940.32					

*continued on next page*

	A	B	C	D	E	F	G	H	I	J	K
62				Insurance	511.00	600.00					
63				Miscellaneous, Bus	70.00	150.00					
64				Phoenix AMC	23,155.24	23,000.00					
65				Postage	41.93	500.00					
66				Membership Packets							
67				Books	2,443.21	3,000.00					
68				Decals	0.00	250.00					
69				Postage	424.78	500.00					
70				Dues	1,000.00						
71				NSPS Dues	9,000.00	8,440.00					
72				Chapter Disbursements	6,220.00	6,180.00					
73				RMSS Chapter Distribution							
74				NCPLSC	4,000.00	4,000.00					
75				SCPLSC	3,100.00	3,100.00					
76				CCPS	9,770.00	9,770.00					
77				RMSS Meeting Expense							
78				Promotion	0.00	2,500.00					
79				Supplies	626.24	1,500.00					
80				Copies/Printing	525.47	2,500.00					
81				Attendee Food/Beverage	19,940.15	25,000.00					
82				Speaker Travel/Expense	3,584.55	6,000.00					
83				PLSC Meeting Expense - Oth	1,484.23	500.00					
84				Total PLSC Meeting Expense	26,160.64	38,000.00					
85				Total Expense	194,680.47	213,480.32					
86				Net Income	46,423.74	11,199.68					

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# CHAPTER NEWS

## CCPS

Hello to all of our Members. I hope the everyone is well and that everyone survived March Madness. I would like to thank everyone that came out to the Surveyor Summit back in February. Our fundraising raffle was successful again this year. We raffled away a flat screen television that was graciously donated to the CCPS by Aztec Consultants. The winner of the television was Don Hulsey of the Southern Chapter. Much thanks to Matt Tenney, President of Aztec Consultants for the donation.

The CCPS held a happy hour on March 21<sup>st</sup> to celebrate Surveyors Week at New Terrain Brewing Company in Golden. We had a good representation of surveyors from across the metro area. Good conversation was had along with some excellent food and drink. I would like to thank all of our vendors and supporting companies that helped put on the event: Vectors, Frontier Precision, Manhard Consulting, and Bowman Consulting. The CCPS sponsored the food and drink while Aztec Consultants sponsored the room. Once again, thank you to all for the support.

As the summer approaches, the CCPS is planning our summer social again for August. The event is still to be determined but please watch for the announcements.

The CCPS is working with the Railroad Museum to assist with archiving of all their documents. For those who were not aware, the railroad museum in Golden is a very valuable source for any research that you might need to perform. This is going to be an ongoing project that we are kicking off next month. If you would like assist with this project, please reach out to anyone on the CCPS board.

On behalf of the CCPS board of directors, please be safe and enjoy what Colorado has to offer and we look forward to seeing you throughout the summer.

Shawn Clarke, PLS  
CCPS President

## NC-PLSC

We have had a great year so far, beginning with our January meeting and a fresh new look at the SUE utility locate laws, presented by Kelly and Ken Goff. They gave the northern chapter an in-depth discussion about the different levels of accuracy with the locates and what engineers might be looking for with our deliverables.

Then, of course, we attended the always engaging Summit Conference. We were happy to give away our grand prize tickets to the opening weekend Rockies game to the lucky Zach Horning! We hope he enjoys the seats!

Our upcoming meeting in April will be an open discussion at the Flatirons, Inc. Longmont branch. We plan on talking about issues that include gaps and overlaps to properly describing found and set monuments. Then for May we will have a summer

kickoff at a local northern Colorado brewery (TBD). We hope to see some new faces every month!

Tony Fendick, PLS  
President, Northern Chapter

## NW 1/4 PLSC

The NW1/4 had its first meeting of 2019 on February 27th at the Community Center in Steamboat Springs, Colorado. This was our best attended meeting in years and a heck of a start for our new President, William Whelan!

Our guest speaker was Randy Bloom, Chief Cadastral Surveyor for the BLM in Colorado. He presented a Power Point focusing on "Built to Last"- the mission of the Cadastral Survey. Randy mentioned several major companies that have survived a changing economic landscape over 100 years and how they all had a mission statement that they adhered to, such as Ford Motor Company, Johnson and Johnson, Boeing, etc. He made us all aware that what we are doing today could still be in the ground and still relevant 100 years from now. Perhaps this is a key element that attracts us all to surveying - the durability of what we do and how it can outlive us for many years. Unless the track hoe comes along...than at least our liability goes away!

The Second part of the meeting focused on an issue raised by Skidge Moon. That issue is what is being surveyed, Title line versus Monumentation in the field. Skidge had noted that title companies get stuck on the "record" bearings and distances of the original plat or legal description and these can vary from the monumented line. In some cases, local title companies can refuse to issue title insurance if the two different lines are not one and the same. Which is hardly ever, in our neck of the woods - differences between title and monumentation can vary by several feet in many of the subdivisions recorded in the early seventies. How should we show this difference? That was another item of discussion. Some believe that only one line should be shown, the results of the field dimensions with record dimensions also shown; others thought there should be two lines, one showing title, the other showing field.

And although Skidge said he was not being difficult; he did hit upon a major item of disagreement in the surveying profession and the main reason for the "pincushioning" we see at many corners. What is the correct answer?

Brian T. Kelly, PLS  
Vice President, NW 1/4

## SC- PLSC

Spring is finally here and the air is warming up! Our January Board of Directors meeting was held at the Doubletree Hilton Hotel in Colorado Springs. The new 2019 Southern Chapter Board Members were installed and our 2019 annual calendar was populated with the yearly meetings and events.



# CHAPTER NEWS

In February we attended the Colorado Springs, District 20 Career Day Event. Brian Dennis set up the AR sandbox for all the Teachers, Parents and Students to enjoy. Thanks to Steve Parker, Dennis Craig, Don Hulsey & Brian Dennis for volunteering. The students enjoyed the hands-on experience of creating contours in real time with the sandbox! Our booth was full of color pamphlets and swag from the NSPS - CST & Trig-Star programs to the Land Surveying & Geomatics courses offered at Western Colorado Community College in Grand Junction. We were prepared this time to answer the age old question many of the parents and students ask "Where do we get started with a Career in Surveying?"

Our March Members Meeting was held at Oasis Firearms in Colorado Springs. With a fantastic BBQ dinner from "Rudy's Bar-Be-Que". Afterwards we were entertained by Robert James (Owner) assembling new freshly cut AR & AK lowers from the C-n-C machine.

We also started the Trig-Star Competition in Colorado Springs this year. Pine Creek High School was a participant with 6 students completing the test.

Please visit us at [www.scpls.net](http://www.scpls.net) and enjoy yourself in the upcoming warm months and always put safety first in all your field work!

Don R. Hulsey, PLS  
President Southern Chapter



*Students at District 20 Career Day getting a hands-on experience with the augmented reality sandbox.*

## SWC - PLSC

All is well here in SW Colorado, with the birds chirping like crazy in the pounding snow storm outside my window here at 9300 ft. in Silverton. Here's the news:

At our January chapter meeting, Mike Boeckman, PLS presented "A Historical Perspective of a Bona Fide Right." This was a great presentation that follows the original surveys of the townships that make up the lower Animas Valley and the surrounding area that includes Durango. It is a study in the motivation behind fraudulent surveys, homesteaders' trials and tribulations, and the challenges that the early federal surveyors faced while upholding the legality of the transfer of public lands to the private citizens. Many thanks go out to Mike for sharing this with the chapter.

We will continue our local surveyor presentation series with our next meeting on April 16th at the Durango Rec Center with a presentation by chapter member Daryl Crites on select portions of the La Plata County boundary lines. Great historical research and content coupled with high tech modern tools promises to make for an entertaining evening.

The new CORS, COCO (Cortez) and COAL (Alamosa) in this part of the state are up and running and a part of the Mesa County RTVRN, thanks in large part to Frank Kochevar. A couple of precautions: As neither station has been completely adopted into the national NGS network, due to some final paperwork processing, make sure that you double check your solutions. The Alamosa station may be considered a little bit of an outlier as far as the Mesa County Network goes and so keep this in mind if you are using this base as part of your solutions.

Parker S. Newby, PLS  
President, SW Chapter PLSC

## WCLS

The January meeting was held at Main Street Bagels from 7-8:30 am on Wednesday January 9th with 11 members in attendance. A brief report was given by newly elected Mesa County surveyor Scott Thompson, new office hours are posted on the mesa county website. CDOT surveyor Jon Kobylarz informed us that the department is looking into acquiring LIDAR data via UAV flights. Tom Sylvester gave us an update on the WCCC surveying program. Enrollment is consistent, and Tom is working with the PLSC on acquiring lab equipment. The WCLS would like to offer a scholarship in 2019 of \$1000 and is asking the PLSC to match with \$1000. Tom Sylvester has offered to head up a scholarship committee to advertise, review and award the scholarship at the 2019 spring seminar.

# CHAPTER NEWS

The WCLS would like to remind those interested that Richard Norejko will be our guest speaker for the 2019 Spring Seminar. The seminar will be held May 3rd at the Grand Vista Hotel from 8am to 4pm with a lunch provided from 12 to 12:30. We will also have a short presentation from our state geodetic coordinators John Hunter and Pamela Fromhertz, who will be speaking on the new geodetic definitions and parameters available in the near future. We will have a flyer for the seminar published and distributed sometime next month.

The March meeting was held at Main Street Bagels from 7-8:00 am on Wednesday March 13<sup>th</sup> with 12 members in attendance. County surveyor Scott Thompson addressed several upcoming changes to plat language regarding multi-purpose easement uses, changes to the county checklist and use of the county use block. The Mesa County Surveyor is also reviewing plats for Palisade and Fruita, with each municipality having unique requirements. Boundary line adjustments cannot be used as a way around the subdivision

process and clients should be advised appropriately. Permits will not be issued if boundary line adjustments are submitted where subdivision is required. There is serious concern regarding our local calibration base line in Fruita, as construction on an adjacent sewer line could compromise its integrity. NGS is no longer supporting more than one baseline per state and that one will likely be located on the front range. CDOT requires equipment base line verification on all projects so this poses a problem for western slope surveyors.

The Western Colorado Spring Seminar flyer will be published and distributed via email the first week of April. Long-time WCLS member and local surveyor/engineer Wayne Lizer passed away on March 21<sup>st</sup> 2019. Memorial services will be held on April 26<sup>th</sup> at 2:00 pm at Calahan Edfast Mortuary for those who wish to pay their respects.

Alec Thomas, PLS  
President, WCLS



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