

November 2017

SIDE SHOTS

Professional Land Surveyors of Colorado

Volume 48, Issue 4



PLSC provides initial funding of endowment for new surveying education programs.

Page 4.

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SIDE SHOTS

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ON THE COVER Officers of the PLSC presents a check to Colorado Mesa University/Western Colorado Community College for the establishment of new degree program. From left, Tom Sylvester, Instructor; Alan Blair, PLSC Secretary/Treasurer; Todd Beers, PLSC President; Teresa Smithson, PLSC Director; Patrick Green, Mesa County Surveyor; Betty Bechtel, CMU Board of Trustees; Dennis Bailey-Fournier, VP of Community College Affairs, WCCC; and Dan Robinson, CMU Board of Trustees

*Side Shots is the official publication of the Professional Land Surveyors of Colorado, Inc.
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**Deadlines for editorials, articles, pictures and advertising are January 1, April 1,
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Dear Fellow Members of PLSC:

Fall has arrived and there is already snow in the mountains—I hope all are prepared for the change of weather so be sure to check your vehicles for critical items such as functioning wipers, tread on the tires, radiator and battery, etc. Getting stranded in cold weather is not something to take lightly so please take the time now to appropriately prepare for the winter months.

Over the past few months the PLSC has been very busy performing outreach and education tasks that I would like to summarize below:

- In July, 2017 the PLSC provided the funding of an endowment to Colorado Mesa University/Western Colorado Community College in order to support the development of a 2-year program in surveying starting in the Fall of 2017 (see the photo of the check on the cover). We have been successful in this endeavor and our own Mr. Tom Sylvester (you can call him Professor Sylvester) was selected as the instructor for the program and to date three students have enrolled in the program. Pretty good, considering Tom was hired five days prior to the first class being held! Please spread the word about the new surveying program in Colorado—we would like to fill up the classroom for Tom and provide a quality program to educate and train new surveyors in our profession. This was a goal that was met through the hard work of multiple PLSC members—thanks to all who assisted in this success story!
- The Front Range Community College reached out to the PLSC for a loan of some surveying equipment to be used in their GIS/Surveying class this fall. The PLSC has a number of surveying instruments & equipment available for appropriate uses around the state. Please contact the website at PLSC.net if interested.
- In our quest to interest youth in the land surveying profession, several members of the PLSC and NSPS attended the national guidance counselors meeting held in August at the Denver convention center. NSPS President Elect Mr. Kim Leavitt and Mr. Darren Leavitt (instructor at Idaho State University) were on hand to discuss the surveying profession with the counselors and also brought with them a “virtual sandbox” that proved to be a great attraction to entice attendees to the booth. PLSC members Brian Dennis, Becky Roland, JB Guyton, Teresa Smithson and myself also participated at the booth, communicating with many counselors from Colorado and around the nation. There were thousands of attendees from elementary, middle and high schools and hundreds stopped by the booth to learn about the land surveying profession. A lot of the counselors who stopped by were interested in having someone come to the school during career days—exactly what we were hoping for. Depending on the location of the request, you may be contacted to attend such an event. The PLSC is compiling marketing materials from the NSPS and other locations to provide resources for those who desire to attend outreach events. Some chapters have been attending career days in past years and we wish to assist them with additional material.



continued on next page

FROM THE EDITOR



This issue has a great deal of news and interesting topics. As Todd mentioned, the startup of the new degree program at Colorado Mesa University/Western Colorado Community College is a major event in PLSC history. It would not have been possible without the leadership and drive of a lot of

people, and a generous provision of startup funding from the PLSC. Our younger surveyors aspiring to licensure now have an in state place to go for the education and credentials they need to sit for the exam. See Professor Tom Sylvester's article about being up and running, and help spread the word to potential students so that they can check this out.

There is an announcement of next year's Rocky Mountain Surveyor's Summit, which will be held March 7-9, 2018 at the Arvada Center. Mark your calendars.

Also, please direct anyone interested in exam preparation to the notice for the 2018 Refresher Courses, which begin in Golden on January 10 and run through March 28.

We also have some great articles for you in this issue. Gaby Neunzert wrote a very interesting history of numbers, from the Hindu-Arabic period, through Roman numerals, logarithms, slide rules, calculators and computers.

Warren Andrews, after contributing 38 of his popular "Control Points" articles, has informed me that this one will be his last. After so many, coming up with new topics has been a challenge, and he wants to move on. I am very grateful for his consistent, high quality contributions to *Side Shots*, and his long involvement with the PLSC.

As Todd also mentioned, several of us attended the American School Counselors Convention, an event in Denver that drew high school counselors from across the nation. I have assembled some photos of the event for this issue, and directions for watching the augmented reality sandbox on YouTube.

This issue also features Earl Henderson's column about signed certifications, and we have a complete transcript of the Chapter Summit, and minutes of the board meeting, from Grand Junction in August. After an absence in the last issue, there is a longer than usual list in the BLM cadastral survey letter. There is a report from the NSPS, highlighting some of the things they are working on. Dean Glorso provided us with a great poem. And, all of the chapters have provided their latest news.

There is much going on in the PLSC these days. Feel free to share this issue with any non-member surveyors you know, and suggest that they consider joining.

JB Guyton, PLS
Editor

President's Letter from page 4

- In October the PLSC will have a booth at the Colorado State High School Counselors conference in Keystone, CO. Once again we will have an opportunity to reach out to the high schools in Colorado to introduce them to the profession of land surveying.
- In November, the PLSC will have a booth at the Adams County Counselors conference.
- The PLSC is acquiring a "virtual sandbox" for use at outreach events. Mr. Brian Dennis (Southern Chapter) is constructing the sandbox and we are looking for donations of the electronic equipment required to operate the display. Please contact us at PLSC.net if you have a desire to donate equipment for the sandbox.
- In September, the PLSC chaired a track at the GIS in the Rockies conference at the Hilton Denver Inverness Hotel. Over 500 attendees were present and the PLSC booth had a good level of people stop by to inquire about the profession. Many thanks to Steve Parker—

GIS BOD Vice Chairman, Peggy Streicher—GIS Poster Session Chair, Pam Fromhertz—PLSC Track Chair and Becky Roland—PLSC booth. The volunteers' effort in the event contributed to the overall success of the conference.

- The NSPS has informed the various states of potential funds or resources for land surveying workforce development programs. The PLSC has contacted the various groups in Colorado who may be able to assist us with reaching individuals to get them interested in the profession of land surveying—we will keep the membership posted on this important program.

Please enjoy the various articles included in this edition of *Side Shots*, and I hope all members have a safe Fall/Winter.

Sincerely,
Todd Beers
PLS-PLSC President

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We Are Up and Running!

Land Surveying and Geomatics Degree Program at Colorado Mesa University and Western Colorado College, Grand Junction, Colorado

By Thomas W. Sylvester, P.E. and P.L.S.

In the August 2017 issue of *Side Shots*, I gave an update of the approval of the Land Surveying and Geomatics Degree Program at Western Colorado Community College, a division of Colorado Mesa University. I mentioned that since it was approved there would be a lot of hard work to make it a viable and successful program. At that time, CMU's Human Resources had just advertised for the Technical Instructor of Land Surveying and Geomatics.

Because of my involvement in helping get the program approved, I threw my hat in the ring for the Technical Instructor position. Interviews were held in early August and low and behold, I was offered the position two days before I was to start work, which was one week before classes began! I didn't realize that the "hard work" I mentioned in the last issue would fall mainly on my shoulders. Needless to say, that with putting the flesh on the skeleton of the approved program, prepping for and teaching classes, and winding down my business, it has been a hectic two months. I am honored and humbled by the opportunity to serve our profession in this capacity, but OH MY GOLLY, WHAT DID I GET MYSELF INTO?! I know I have the support of and will get all of the help I need from our Professional Land Surveyors throughout the state.

This semester we are teaching SURV 100 Introduction to Surveying and Field Work Lab, SURV 102 Surveying Calculations I, and SURV 203 Legal Aspects of Surveying. All three are being taught on campus with the Legal Aspects of Surveying also being taught on line. Next semester we are listing SURV 200 Advanced Surveying and Field Work Lab, SURV 204 Real Property Descriptions, and SURV 205 Advanced Survey Calculations all on campus. We are also listing our web classes of SURV 100 Introduction to Surveying and Field Work Lab, SURV 102 Survey Calculation I, SURV 203 Legal Aspects of Surveying, and SURV 204 Real Property Descriptions. That should keep me busy.

Once we have all of the courses up and running, we will likely settle into a more definitive schedule throughout the year to more evenly spread out my work load.

Those taking the web courses that have an associated lab will have to make arrangements with a local surveying company to allow them use of their equipment for the lab work and some hands-on mentoring to get them started. I will need to reach out to the PLSC to help find those willing companies and



individuals to help those signing up for the web classes with labs.

There are two programs consisting of a 2 year Associates in Applied Science Degree in Land Surveying and Geomatics for those seeking the AAS route, and a post-baccalaureate Technical Certificate for those with a minimum of a Bachelor of Science of Bachelor of Arts degree who need the required surveying curriculum in order to meet the education requirements to sit for the PLS exams. The Technical Certificate program is designed to be completed in one year.

For more information, please go on line to the CMU website, at:

<http://www.coloradomesa.edu/wccc/programs/land-surveying-geomatics.html>

ARE YOU INTERESTED?

Then the first step is to contact Stephanie Parson, the Recruitment Specialist/Western Colorado Community College, a Division of Colorado Mesa University at:

Sparsons@coloradomesa.edu
(970) 255-2673 (office)

Stephanie can answer your questions regarding timing for registration, costs, available loans, scholarships, and/or work study programs. This program is evolving and such details change frequently, so she can provide the very latest information.

Since I am also the advisor for the program, please don't hesitate to contact me directly if you have questions or need advice, at:

tsylvester@coloradomesa.edu
(970) 255-2600 (office)
(970) 640-2590 (cell)

My cell will be the best to contact me in the next few weeks as I am just getting an office set up on campus this week (week of October 9, 2017)

Rocky Mountain Surveyors Summit

March 7-9, 2018 ~ Arvada Center

PLSC is pleased to announce Steve Parrish as our Headline Speaker



Steve Parrish began surveying with the U.S. Forest Service in 1963, Utah PLS in 1973 and worked as a land surveyor with the USFS through 1984. Began working for the U.S. Bureau of Land Management in 1985 and eventually served as the BLM Nevada Cadastral Chief. Steve left the government in 1995 to further his surveying experience in the private sector. He is now licensed in 10 states, a Nevada water rights surveyor and was the county surveyor for Inyo, Modoc and Mono Counties in California. Steve is a contributor to "The Surveying Handbook" edited by Brinker and Minnick, has presented workshops in 27 States, Canada and Australia and was an instructor for the BLM/FS Advanced Cadastral Survey Courses during its initial 12 years.

With 53+ years of land surveying knowledge and experience Steve offers land surveying workshops, consulting, and expert witness testimony. He worked for Tri State Surveying (NV) for 13 years, is an adjunct professor for Great Basin College (NV) since 2004, became a Certified Federal Surveyor (CFedS) in 2007 and Bachelor of Applied Science degree in 2009. Presently serves as the CFedS Panel Chairperson/Training Coordinator and is the Alpine and Mono County Surveyor (CA). Active in state and national surveying organizations and enjoys travel with family, photography and fishing.



Here are just some of the reasons you should attend the 2018 Rocky Mountain Surveyors Summit

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STUDENT:	\$ 75	\$125	\$200
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PLSC Voting Member Dues are only \$150/year and include NSPS membership.

There are many sponsorship opportunities available, in addition to exhibiting. Contact us for more information (plsc@plsc.net) or go to www.plsc.net for complete Summit information and to sign up online.

Save money when you register by February 15, 2018. Catered breakfasts & lunches will be provided on all days. Online registration is available at the PLSC web site (www.plsc.net).

SILENT AUCTION/EXHIBITS:

We will be holding a silent auction during the conference. If your equipment room is cluttered up by equipment you are no longer using, please consider donating an item or two to the PLSC silent auction.

In keeping with our traditional practice, our Sustaining Members have been invited to display their latest products and services. Exhibits will be in the Arvada Center entrance hall adjacent to the classrooms. Please visit their displays and show our appreciation for their continued support.

HOTEL:

The Doubletree Hotel at 8773 Yates Dr., Westminster, CO, will once again be our host hotel. There will be a shuttle bus to and from the conference hotel each day. Pick up and drop off times will be announced prior to and at the conference. For reservations, call 303-427-4000 and mention PLSC for discounted rates.



Additional Presentations Include:

- CFedS Credit Course—Steve Parrish
- A Historical Perspective of a Bona Fide Right
- GSVS17 Completion and 2022 Datums and Reference Frame
- DORA Board Activities
- Plans Review: Minimum Standards and What Should be Included
- Symposium on UAVs
- Railroad Safety and Trespass Issues
- Railroad Right of Way
- OPUS Projects
- Surveyor as an Officer of the Court
- Retracement and the Cooley Doctrine
- Point Cloud Processing
- Floodplain

PLSC welcomes David Pfeiffer for the National Archives to the speaker lineup. For a full list of speakers and topics, go to www.plsc.net.

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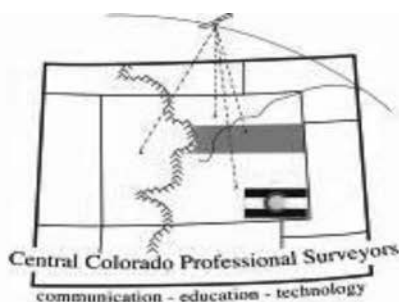
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2018 Colorado Land Surveying Refresher Course

The Professional Land Surveyors of Colorado are offering a comprehensive Land Surveying Refresher Course beginning January 10, 2018. This course offers a review and self-study plan for those taking the National Council of Examiners for Engineering and Surveying (NCEES) **Fundamentals of Surveying (FS)** and **Principles and Practice of Surveying (PS)** examinations. The course is designed to aid candidates in developing and expanding exam-taking proficiencies. The Wednesday evening classes will be 3 hours in length, starting promptly at 6:00 PM.

Fundamentals of Surveying

<u>Session</u>	<u>Date</u>	<u>Topic</u>
1	Wed., Jan. 10	Overview of NCEES FS and PS Examination Use of calculators and formulas
2	Wed., Jan. 17	Survey Computations I
3	Wed., Jan. 24	Survey Computations II
4	Wed., Jan. 31	GIS, State Plane, Geodesy, Photogrammetry
5	Wed., Feb. 7	Legal Terms and Definitions
	Wed., Feb. 14	No Class

Principles and Practice of Surveying and Colorado Specific

6	Wed., Feb. 21	Public Land Survey System - Concepts and Computations
7	Wed., Feb. 28	Colorado Survey Law I
	Wed., Mar. 7	Rocky Mountain Surveyors Summit, Arvada Center
8	Wed., Mar. 14	Colorado Survey Law II
9	Wed., Mar. 21	Boundary Law/Ethics/Principles and Practice Topics
10	Wed. Mar. 28	Mock PS and FS Examinations

Registration, Fee, Location

The fee for the entire course is \$425 or \$75 per individual class. Registration is open beginning November 1, 2017. See <http://www.plsc.net/> for registration information. Classes will be held in one of the conference rooms at the Jefferson County Courts and Administration Building (Taj Mahal), 100 Jefferson County Parkway, Golden, CO. Use the parking lot and main door on the east side of the building. Signage will lead you to the classroom. For questions, contact Becky Roland, Executive Director, PLSC, 303-551-3266, broland@plsc.net. Visit the NCEES site at <http://ncees.org/exams/> to learn more about the FS and PS examinations.

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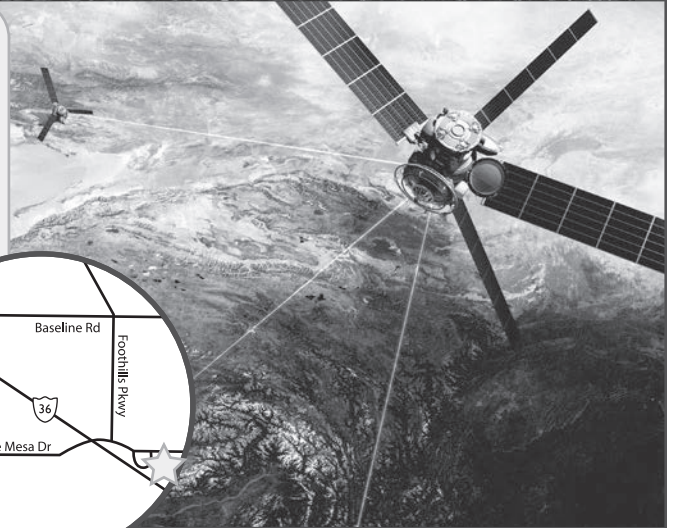
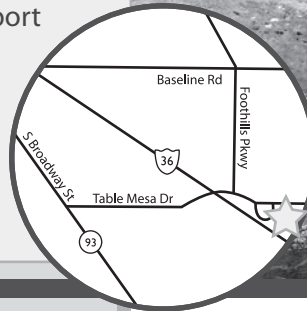
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AND the NUMBER IS!

By Gaby Neunzert, PLS

Modern life without numbers and especially electronic numbers would be absolutely unthinkable. Additionally, life without a zero, both as a number and as a place keeper would most probably stop all modern activity. Undoubtedly many millennia ago in a market square a group of sheep herders traded for some sheep but rather than move the animals, used pebbles on the dusty ground to affect the deal. After the traditional handshake signifying the completion of the transaction, the pebbles were picked up, the indentations in dust were smoothed out and all records were lost. The preceding illustrates that it is possible to represent items (animals) with abstract tokens, that there would be a need to quantify the concept of "many" with a specific number and only in case of a dispute may require a written record.

It is not often realized that surveying with reading and recording numbers would not be possible without a very long legacy. For example, until very recently chaining pins picked up by the rear chain person were the physical evidence to keep track of chains used in a field measurement. Thus a direct descendant of the tally sticks first used by cave dweller many millennia ago.

Hindu-Arabic numerals: (Our modern numbers)

The name Hindu-Arabic, as given to our nearly global graphical numerals reflect their roots. Starting in the 800-900 AD period, Arabic scholars in the learning centers of Damascus and Baghdad wrote books on mathematics and astronomy with the number symbols based on Hindu characters. These books and their knowledge were brought, via North Africa, to Spain, where in turn monks translated then from Arabic into Latin. Leonardo (Fibonacci) of Pisa (c.1170 – c. 1250) introduced the Hindu-Arabic numbers, including the zero, to Europe.

He was one of the most talented mathematicians of the early Middle Ages. Written in Latin, his "Liber abaci" was a primer for arithmetic, algebra and geometry for the following 500 years. (See chart below.)

Initially the numerals reflected the scribes personal style, however the visual images became much more uniform with the invention of the printing press by Johannes Gutenberg (c.1398 – 1468) around 1440.

Roman numerals: Mercifully our present day surveyors do not have to work with Roman Numerals other than look at a solar clock on a medieval church to tell local time or try to decipher the year a movie was made when the date is given in Roman Numerals. A critical obstacle is that there is no zero, there are no negative numbers and arithmetic (addition and subtraction) is best performed on an abacus. In a modern context, there are no decimal fractions and large numbers above several thousand are not available.

Binary numerals: In 1946, when the first electronic computer was built, nobody would have predicted that binary numbers would control our lives and outnumber in sheer volume our "conventional" numbers in use every day. For a surveyor, everything going in and out of a computer, with a cell phone at the office, in a Total Station, from GPS and with many other wonderful "electronic toys", the bottom number is a binary represented as a binary on-off signal. The only remaining argument is: "my number cruncher is faster than yours".

Tally Marks: "Tally marks" made the GLO survey of the US and Canada, and subsequent surveys, with the chain possible. For example: with a half chain, each mile required 160 setups which is at best difficult to keep track of without making a tally.

Hindu-Arabic	0	1	2	3	4	5	6	7	8	9
Roman	No Zero	I	II	III	IV	V	VI	VII	VIII	IX
Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001
Tally Marks	No Zero									
Log (base 10)	Not def.	0.000	0.301	0.477	0.602	0.699	0.778	0.845	0.903	0.954
Ln (base e)	Not def.	0.000	0.693	1.099	1.386	1.609	1.792	1.946	2.079	2.197
West Arabic	•	٦	٢	٣	٤	٥	٦	٧	٨	٩
Mayan	(Zero)	•	••	•••	••••	—	—	—	—	—
Greek (numbers)	No Zero	α	β	γ	δ	ε	ζ	η	θ	ι

GMN'16

Logarithms (base 10 and base e): Admittedly logarithms, either base 10 or base e, are not a different number system, but a different way to express numbers. Logarithms were introduced as an arithmetic aid, since logarithms reduce multiplication, division, exponentiation and trig functions of a calculation to an addition or subtraction, which it is easier to perform. Prior to the electronic calculator introduced in the 1970's, logarithms were used in science, engineering (surveying) and navigation for at least 300 years. Logarithmic scales are the basics for the slide rule. Henry Briggs (1561-1630) invented log base 10 or common logarithms and logarithmic trig tables and John Napier (1550 – 1617) invented logs base e for mathematical work.

West Arabic, Mayan and Greek numerals:

The 3 sets of number were included for illustration only.

The “modern” set of West Arabic numbers is intended to show that visual number images have changed over an about 1200 year time period. Most dramatic is the change of the zero, as an ellipse, to a dot and the five has changed to a circle. These evolutionary changes are especially noticeable when both types of numbers are displayed simultaneously, for example in the Middle East, at airport or road signs.

The Mayan numbers are included to illustrate that a culture with an apparently unsophisticated set of numbers, can develop a very sophisticated calendar based on astronomical observation and calculations. The Mayans used the zero as a place keeper but not as a number.

Finally, the Greeks used alphabetical characters for numbers and a reader had to interpret the text for the intent. An indirect carryover of this tradition is the use of $\pi = 3.1416..$

A suggestion for an applied hobbyist: The table for log base 10 above contains the data to fabricate a crude slide rule. On any available paper lay out 2 lines about 10 inches long and on each mark a “1” randomly near the left end. Multiply the tabulated log numbers above by a scale factor of 6 or 7 and with a decimal inch scale mark off the calculated values on each of the lines. On one line label the corresponding integer values, 1,2,3, etc. above the line; on the other line label the integer values below the line. Cut the paper just below the line with the numbers above and the opposite cut the paper right above line with the numbers below. For the first cycle, from 1 to 9, the slide rule is now complete.

With logarithms multiplications are additions; thus, graphically align the 1 of the top scale with the 2 of the bottom other scale and then for example read the result of $2 \times 3 = 6$ across the 3. Division would be the reverse procedure, for example: align the 8 of the bottom scale with the 4 of the top scale and read the result as 2 at the 1 of the top scale for $8/4 = 2$. A commercial slide rule had a minimum of 2 cycles and at least the wider intervals were subdivided; it also required some thinking, since the user also had to determine the decimal point for every calculation by estimating the magnitude of the answer. An old timer probably will nod his head and mentioned, that a slide rule or an abacus can run forever without a battery and neither will ever need charging. But then again, for just the trig functions alone an electronic calculator is indispensable.

Last word: In our instant globalization of concepts, it is easy to assume that all writing is from left to right. On the other hand, many other languages are written from right to left and old Phoenician texts were even written boustrophedonically.

Who Are Those Guys!

By Dean Glorso, PLS

The public roads are not really public to them
An old surveyor might use stealth
To conceal themselves working
Yet a target they wear on their backs
Permits, rules, safety, all part of the job
As a single soul
One attempts to make a living
Technology allows them to do many jobs solo
Under the cover of darkness like a criminal
They measure the land and the things man built
Fitting puzzles together using math from afar
In the footsteps of men like Lewis and Clark

They venture alone with the wild
Searching for clues on every turn
They smell them
Digging for stones with hash marks
Like a drug fiend needing a fix
The tools of their trade are complex
Expensive beyond imagination
Obsolete the day of purchase
They often make due with only their wit
If you see them tread with caution
For their focus and mystery is keen



Control Points – Number 38

The Three Point Problem, or Screwed Up Triangles

By Warren Andrews, PLS

One tricky little survey problem plus its solution is the old Three Point Problem. The set of Lefax Data Sheets, No. 623, "Surveying Theory and Practice" dating from 1956 gives four different solutions; one plane table solution and three computational solutions.

The Three Point Problem was principally used in the past to pinpoint the position of an artillery observer near the front lines in battle to direct fire, but has also been used in land surveying. The principle is having the coordinate positions of three known points, occupying an unknown point, turning angles to the three known points from the unknown point, and from that angle data determining the position of the unknown point.

All four solutions; the common chord solution, the analytic solution, the Italian relevement solution (also called the plane table or Bessel's Solution), and the trigonometric solution; are each given with an example in the Lefax data sheets.

The example I will show is the trigonometric solution, see Fig. 1. Points A, B and C are the known coordinate positions and point P is the unknown. Angle X and Y at point P are turned in the field. (The solution is a real exercise in a surveyor's knowledge and use of trigonometry).

1. Plot points A, B and C and estimate the position of point P.
2. Draw a circle through A, B and P.
3. Then draw the lines PA, PB and PC plus the extension of line PC until it cuts the circle at Point D.
4. Finish the graphic illustration by drawing lines AB, AC and CB plus lines DB and DA. (The illustration is used to keep things straight!).
5. Compute triangle ABC for lengths of sides from the known coordinates. Also compute angle BAC (angle n) from the Cosine Law.

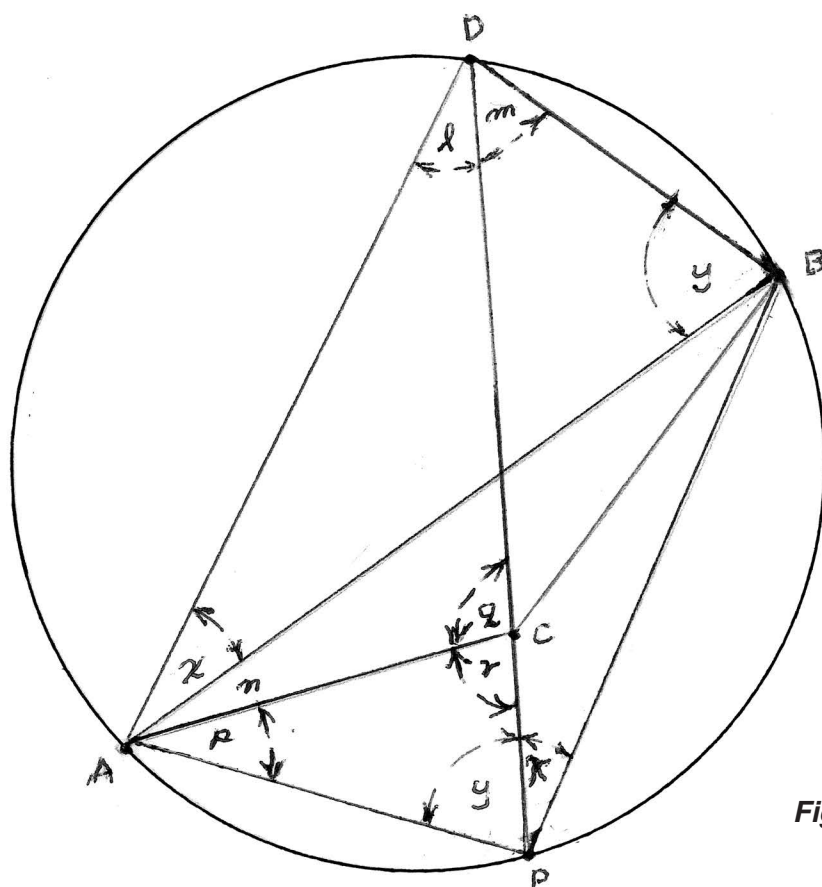


Fig. 1

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\text{Where } \cos n = \frac{(AB)^2 + (AC)^2 - (CB)^2}{2(AB)(AC)}$$

Then angle $n = \arccos n$.

6. Then (this is real neat) based on the geometric principle that angles having their vertices in the circumference of a circle and subtending the same arc or chord, the angles are therefore equal. On Fig. 1 angle DAB and angle DPB are equal because they both subtend chord DB. Also angle DBA and angle DPA both subtend chord AD and are therefore equal. So angle $x = \text{angle } x$ and angle $y = \text{angle } y$. Neat, huh?

7. Then solve triangle ADB by the Law of Sines with side AB known from #5, angles x and y are known and the third angle ADB (or $l+m = 180^\circ - (x+y)$) can be calculated.

$$\frac{AD}{\sin y} = \frac{DB}{\sin x} = \frac{AB}{\sin(l+m)}$$

$$AD = \frac{AB \sin y}{\sin(l+m)}$$

8. Then having AD from #7 above, angle x , and angle n from #5 above, solve triangle ACD by the Tangent Law.

$$\frac{AD + AC}{AD - AC} = \frac{\tan \frac{1}{2}(\text{angle } q + \text{angle } l)}{\tan \frac{1}{2}(\text{angle } q - \text{angle } l)}$$

[Warning – Keep difference of AD and AC positive and the difference in the corresponding angles q and l also positive]

Replace (angle $q + \text{angle } l$) by the substitute ($180^\circ - (\text{angle } x + \text{angle } n)$).

Therefore transposing the formula by cross multiplying and dividing to get a final result of angle $q - \text{angle } l$, the formula becomes:

$$\tan \frac{1}{2}(\text{angle } q - \text{angle } l) = \frac{(AD-AC) \tan \frac{1}{2}(180^\circ - (\text{angle } x + \text{angle } n))}{AD + AC}$$

then the result of the above; namely, $\tan \frac{1}{2}(\text{angle } q - \text{angle } l) = a \text{ number}$ and the arc tan is found from that number in degrees, which I call Z .

By a neat trick of using both equations,

$$\begin{aligned} \text{angle } q + \text{angle } l &= 180^\circ - (\text{angle } x + \text{angle } m) \\ \text{angle } q - \text{angle } l &= Z \end{aligned}$$

and adding vertically on both sides of the $=$ sign,

$$\begin{aligned} 2 \text{ angle } q + 0 &= 180^\circ - (\text{angle } x + \text{angle } m) + Z \\ \text{Divide by 2 and you finally have angle } q. &\text{ Whew!} \end{aligned}$$

9. Given angle q , then its supplement of $180^\circ - \text{angle } q$ or angle r , side AC from #5 and angle y , the triangle ACP is then solvable by the Sine Law.

$$\frac{AC}{\sin y} = \frac{AP}{\sin r} \text{ and then } AP = \frac{AC \sin r}{\sin y}$$

Then angle $p = 180^\circ - (\text{angle } r + \text{angle } y)$. With angle p and side AP known, the coordinates of the unknown point P can be calculated.

Now you know why surveyors rarely use this trigonometric solution to the Three Point Problem. It's much easier on a plane table.

I hope the few readers of this column of Control Points might have picked up a few bits of history and other odds and ends along the way because it's time to call quits and let the new generation of surveyors take over now.

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Surveyors Represented at the American School Counselor Association Meeting

By John B. Guyton

Members of the PLSC and NSPS volunteered to staff a booth at this year's annual conference of the American School Counselor Association (ASCA). The meeting was held from July 7-10 in the giant Exhibit Hall A of the Colorado Convention Center. Months of preparation preceded the event, with the collection of handout materials, a Powerpoint slide show, reservations of booths and entry badges, and the main attraction – an augmented reality sandbox. This box featured an overhead projector and sensor, with piles of white sand below. When the sand was moved into peaks and valleys, topographic elevation lines were recalculated and displayed. The lowest areas even filled with bright blue “water.” Counselors were invited to pick up a scoop and move the sand around at will, and watch as the lines reformed.

The NSPS was represented by two brothers from Idaho, Kim Leavitt (the NSPS President Elect) and Darren Leavitt (an Instructor at Idaho State University) who brought in the sandbox, which they crafted themselves. Becky Roland, Todd Beers, Teresa Smithson, Brian Dennis and I collectively met with hundreds of meeting participants from across the country over several days. The sandbox was the visual magnet that drew people, and the

message about career opportunities as a land surveyor was communicated well. Todd Beers and I also presented a formal slide presentation in one of the meeting rooms. We are hoping that as counselors encounter students who are attracted to mathematics and the love of the outdoors, they will send them in our direction.



For full color videos of the sandbox in action, visit YouTube.com and search for “Augmented Reality Sandbox NSPS.” There are three clips of the event, posted by the NSPS.



The sandbox, constructed at Idaho State University, showing topo lines, a toy truck and a blue “lake.”

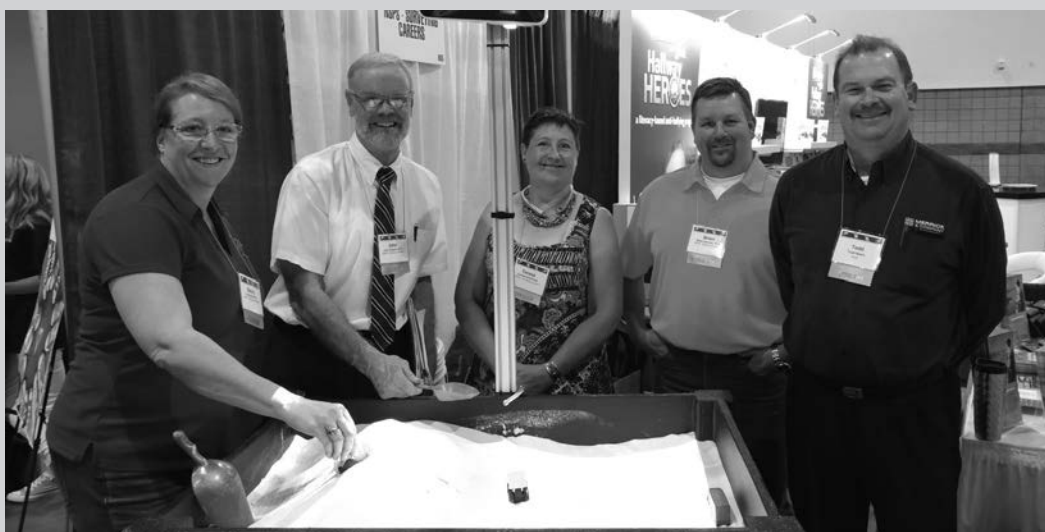
All photos by Chris Power and Becky Roland.



Todd Beers with the fully assembled booth, ready for the crowds.



Kim Leavitt demonstrates the sandbox to some school counselors as Darren makes some final adjustments.



Trying out the augmented reality sandbox are, from left, Becky Roland, JB Guyton, Teresa Smithson, Brian Dennis and Todd Beers.



JB Guyton gives his brief Power Point slide presentation in the classroom portion of the event.



Todd Beers makes a point during the final moments of the presentation.

Rule of the Month - Board Rule 6.2.1 and 6.2.2.

By Earl Henderson, PLS

Here I go again, out on that proverbial old dead cracked limb, but I'm going to say it anyway. I think most PLS's in Colorado are familiar with the concepts outlined in Board Rule 6.2.1 even if they've never read it. The first part describes three circumstances that should red flag anyone. In summary they say that if you are asked to sign a certification about matters that are (a) beyond your competence, training, or education; (b) beyond the services you actually provided; or (c) not prepared under your responsible charge, then (and here's the second half) (a) modify the certification to limit the scope to those matters that you can take responsibility for or (b) decline to sign it. That doesn't sound too tough or unreasonable, does it? And yet here I am writing about it. Why would that be? Well of course it's because common sense isn't all that common. And in some cases neither is integrity.

The PLS's that get into trouble over this rule seem to fall into three categories, at least as I see it. The first just aren't paying enough attention. Why would a PLS sign something that you (a) didn't know, (b) didn't do, or (c) weren't involved in? The second possibility is because the PLS is being pressured to sign something, possibly by a municipal worker determined to require a signature for a project, the client for possibly a similar reason, or the PLS's supervisor, again likely in order to further a project. In each of these cases the pressure is really money. If the PLS doesn't sign, it's going to cost someone more, or too much, money. But I can assure you that the laws that govern the practice of land surveying in Colorado don't mention money. And the entity that's going to be held responsible isn't the municipality, client, supervisor, or even the survey company. It's the licensee that's responsible for their own signature. And it's the licensee that's going to be attempting to explain their signature to the AES Board and/or the judge. So be careful about what you sign and what it says.

The third situation when a PLS gets into trouble over this rule is the most heinous in my opinion. Those

are the PLS's who are selling their signatures with no attempt at all at being involved in a project, doing anything toward that project, nor acting in any way in responsible charge. I love that term "responsible charge" because it is quite clear. I don't like the term "rubber stamping" though because it's not harsh enough. It almost sounds like a copying of a stamp and not the misuse of your stamp. I prefer something more like "fraudulent stamping" or possibly "irresponsible discharge". In fact, I'm going to start a contest right here and now. I want submissions on the new term for this deplorable action. The winner will get no public recognition or reward other than to know that their terminology is going to pervade the PLS community for generations to come. But this criminal action deserves no more waste of time, space or print, so I'm moving on.

I find myself concerned with Board Rule 6.2.2 much more often. And I'm puzzled by this. BR 6.2.2 is a definition of what a certification is. Why would you not copy and paste the appropriate phrases from these four lines directly into your template for your Surveyor's Certification? You can include additional sentences of course in your certification, but if your certification statement does not include these four phrases, then it can't be considered to follow the Board Rules can it? It's like a check list, and you all know how fond I am of those.

What you sign as a PLS is important. What it says is important. And what it says about you as a professional is also very important. If you want to know how detailed this issue can get, just check out the differences between the latest ALTA/NSPS certification and the former ALTA/ACSM certification. There are those who (rightly so) get down to the definition of "is" in writing these, and it's those minute details that we, as PLS's, are going to be held to when we're on the stand. Or possibly that old limb. Does anyone hear a cracking sound?

PLSC Chapter Summit

Grand Junction, August 18, 2017



Todd (Beers): Welcome to the Chapter Summit. Thanks to Tom Sylvester for getting the arrangements made. There is dynamic news to share: Tom is going to be the instructor for the CMU courses; congratulations to Tom. (applause)

Tom (Sylvester): It is a bit overwhelming right now. I want to introduce Cody Van Winkle. He started out in Wyoming, got into the CMU business program in Grand Junction, and found out about the new surveying program and was interested. Based on his recommendations, Cody is being awarded the Lee Styles Memorial Scholarship award this evening. Lee was a former county surveyor who put in a lot of time with the PLSC. (Proclamation read, check presented to Cody). Good luck on your development as a professional surveyor.

Todd: To continue, welcome to those here in Grand Junction and those participating on line. We have been doing chapter summits for several years now; this is our second one out here on the western slope. We want to have a free flow exchange of ideas from the chapter representatives, not just officers, of how to improve our statewide society. JB Guyton will be the facilitator; Chris Power will be taking the minutes. I would like to go around the room now for everyone to identify themselves. (Names recited). I will now turn it over to JB.

JB (Guyton): Does everyone have an agenda? As Todd said, we want to reach out to different geographic areas and not just be perceived as the Front Range.

The first topic is the Colorado Mesa University/Western Colorado Community College program. I worked on the problem for 20 years, since Dr. Stoughton left, so we are now so very pleased.

Tom: We started a committee a year and a half ago to try to get a survey program over here on the western slope. Peter Krick suggested it first to President Foster at CMU, and Patrick Green, our County Surveyor, reached out to the county commissioners. All of the sudden, they wanted to talk about it. We began to work with the university, a battle all of the way through, to get all of their procedures and recommendations together. It got approved at the end of May by the CMU Board of Trustees, and a search for an instructor began in June. I threw my hat in, was interviewed two weeks ago, and just got the call. It was a lot of work and effort by a lot of people to make this a reality.

Alan (Blair): I might mention the endowment. The PLSC has committed to an endowment of a quarter million dollars to this program. For financial support, we are going to be there for you.

JB: First agenda item. Todd, would you like to speak about continuing education?

Todd: The Board of Directors just voted to move forward on CE, the next step is to meet with DORA to make sure they are comfortable with the legislation. This is one of the main initiatives of the PLSC for the year.

JB: Next agenda item, what could we add or get rid of on the PLSC website to improve it? Any input?

Brian (Dennis): On the homepage there are the

topics that are what's current, but instead of having to click on the calendar, it might be helpful for meetings to come up right away.

Todd: So we could highlight an upcoming meeting a week before it happens.

Shawn (Lee): I have been looking at other state websites. I stumbled on one in California that has a lot of what we have, but a lot of extra resources, including records, manuals. I am still working on a summary for the Central Chapter. But we might be able to communicate and share these kinds of resources and share them on Facebook. I went to Penn State, and they had their own page with many resources, calendars, etc. The sky is wide open for useful things or solutions to share as a group. Uploading and downloading to a Google drive is another possibility.

Becky: If you give us the information, we can make it member only access.

Todd: We are committed to improving our website, and have a current budget of \$4,000 for this effort. But how do we get it to become reality? By getting someone who is in the business of building websites. It should be easy for chapters to do meeting minutes, for example. If somebody knows of somebody who designs websites, the chair of the website committee, Brian, should be informed. Once we find someone, we can meet for a couple of hours, flesh out our needs, and they are tasked with putting together a proposal, and we can get it moving. We have the money, just needs to be executed.

Brian: Yes, we went through this large effort just a few years ago to get it where it is, but we just haven't had enough people giving us information to improve the site. It has kind of gone stale, it needs to be a community effort.

Alan: We do need to hire somebody, needs to be revamped.

Todd: We do have a method to do this, unless someone has another idea.

Tom: One of the things I would like to see is a guide to why someone should join PLSC.

Todd: A member's only portion of the website would be the next thing, to get people to understand the value. Oklahoma has a fantastic site, easy to find answers.

Alan: Needs to have resources that are easy to find, such as answers about the state specific exam. We already have good content, but for some reason, I think people are not finding it.

Brian: That concerns me. If people are saying they are not finding things, that needs to get back to me.

Todd: These are questions coming in via the general email address, not website criticisms.

Brian: Our original vision of the website was done 4 or more years ago; what do people want it to be now?

Shawn: Facebook is another option. In an advertising scenario, answers provided as to what a surveyor can do for you.

Becky: We do get the analytics, and we are #1 for "surveyor" for Colorado. But we get calls once or twice a

week from people just looking for a surveyor.

Shawn: We have about 35 people here, I have 165 people on LinkedIn right now. You can do a contact list, and invite everyone on the list to go to our page.

Brian: Google Docs has been used.

Shawn: There is also the possibility of student projects, such as college students interviewing surveyors as a project.

Todd: For any communication to the public, we are talking about outreach.

Leif: How many hits does the website receive?

Becky: I only get the Google ranking of when people search, here's how you ranked. We are always near the top for searches of land surveyors in Colorado. But many are just looking for surveyors. They also sometimes think we are the state regulatory board. We were going to do a member directory, but members pushed back on that, not wanting their information published. Now we direct them to DORA to search for a licensed surveyor. But it's a disservice, because we are sending them to many surveyors who are not PLSC members.

JB: I agree, it's throwing them in the wrong direction, and is detrimental.

Todd: If we do it right, members could opt out of being listed, such as at renewal.

Brian: Participation could be the default choice. Other states do directories.

Todd: If you are a licensed surveyor, it is public information, you don't have a choice. But if you are a PLSC member, you can be listed or opt out.

JB: We have been talking about this, but we have the continuing struggle of having more members.

Leif: Could you take the next step and provide links to the member websites?

Becky: Currently we only show links to sustaining members.

JB: Moving on to the next topic, it concerns membership. We peaked at around 600 or so, has declined. Some history, the Central Chapter complained that CDOT was not using licensed surveyors. Controversy leads to banning together as a group. It is one way to get the numbers up. Shawn, the website can be a vehicle to help in that regard, which would help.

Paul (Bacus): I was looking for feedback on my book. There have been changes since last year's version, such as storage of documents, etc.

Leif: I like it.

Paul: Next one will be paperback. Spiral bindings are cheapest for up to 200 copies, paperback books are the next step.

Todd: For background, since 2011 Paul has completed a book and we have included a copy with a voting membership of the PLSC. Otherwise, they are \$20. It's an incentive to upgrade to a voting membership.

JB: I'm wondering if we are sufficiently communicating these tangible, value added membership benefits.

Todd: It needs to be on the application form, on line, and in the newsletters.

Shawn: Is it only when you are signing up, or is it splashed on the webpage? We could start networking with other state websites, promote the book.

Tom: Can I get back issues?

Paul: No, must be renewed every year. Boundary law undergoes changes. I do the research, provide historical context.

Todd: So we need to do a better job of describing the book and what's in it, perhaps increase the non-member price to make membership more attractive.

Paul: In our first example in the book, you will notice that each page references the PLSC at the bottom. If you Xerox it and send it off to a lawyer or a county official, it shows the source.

JB: It is now 7:30 and we intend to finish on time.

Tom: How much is the reduction for attending the Rocky Mountain Surveyor Summit?

Becky: Varies depending on number of days. It can be anywhere from \$100 to \$150 difference. We have also done a good job of having the book at the conference, non members can see members getting the book for free, and helps with sign ups.

Todd: I've been asked about putting it all on line, but once it gets out, it's gone. So we won't be doing that unless someone can convince me of a way to lock it down.

JB: Proportion of licensed surveyors who are PLSC members is declining. That's why we are discussing ways to turn that around. Things like the Assurance Risk Managers discount is a value added. Why would people allow their memberships to lapse?

Brian: ARM comes to chapter meetings, so they know about them.

Tom: If continuing education goes through, conference attendance would increase.

Todd: We will not bring that to the table, it's not the reason we are doing that, to increase conference attendance.

Brian: Lisa Isom of ARM, doesn't bring in anyone new. Why don't we have title company sponsors? It's the one thing that ties every surveyor in the state. The title companies would then know where to send people for surveys. I'm going to pursue this.

JB: Another item to discuss is *Side Shots*. It is not as versatile as a website, but good for articles like the ones from Gaby Neunzert and others. Online only has been looked at as an option, but the hard copy is still popular.

Tom: It may be a generational thing, I still like getting the hard copy.

Todd: We are putting them online after publication, so they are online.

Becky: Some other organizations embed video content in their online newsletters, like Snow Sports. I can pursue that.

Todd: Moving on, a benefit would be a "look up a

surveyor" feature, by area.

Brian: We would want to make the point that you can't pay to move up on the list of results.

Todd: And not alphabetical, someone would change their name to "AAAAAA Surveying..."

JB: Moving on to the refresher course.

Leif: This is another value added, for younger members.

JB: Chapter outreach. This is critical, to figure out not just those who have lapsed but the younger folks. We obviously aren't succeeding very well.

Sean (Mullen): At the school I went to in Oregon, they really stressed joining the local chapter, that's how I got involved.

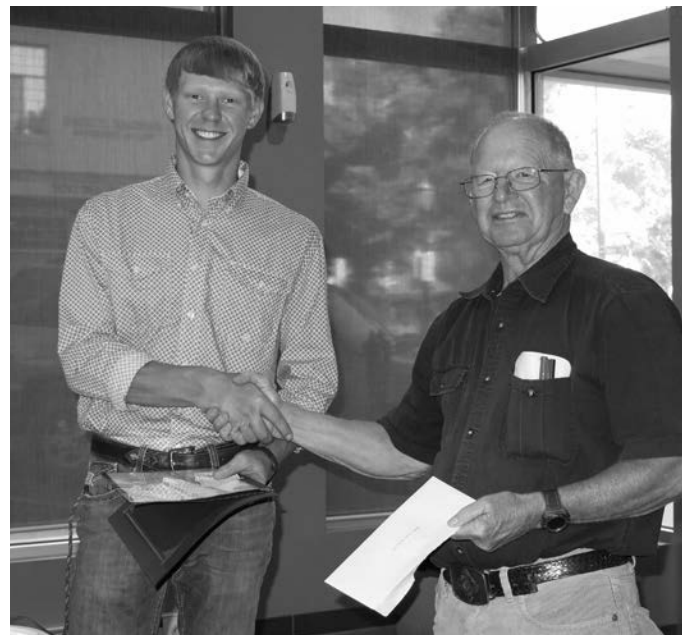
Tom: It's a little early, but the school could eventually form a chapter.

Cody (Van Winkle): I look at it from a student aspect. It could be a study group, would bring in more people.

Todd: When I was in school, they would bring in a surveyor from a company, to discuss what they were doing. Vendors too. Chapter meetings usually attract the same people each time, must make sure the speaker is interesting to the other folks in the surveying community. UAVs are the hot topic right now, tends to get a bigger crowd. Or difficult surveying problems. Chapters need to take it up a notch.

JB: The Southwest Chapter used to be so robust when they had Fort Lewis, and the Central Chapter less so. Then Kayce got involved in Central and the situation turned around. I don't know why they go up and down, but we need to find ways to engage across the state.

Tom: At the chapter level, you have your local group



New Colorado Mesa University surveying student Cody Van Winkle accepting a check from the Lee Styles Memorial Scholarship fund from Professor Tom Sylvester, PLS.

and when you have a good bunch, they start doing things and it grows. Later, it's harder to get people to be officers. It makes a difference.

JB: One of the things has to be networking with colleagues in your area. Now, moving on to long term goals. We are living through a lot of change, particularly in technology, which has produced some jaw dropping changes in my time. We need to reach out to younger people, as we have discussed.

Todd: We already have achieved some goals, such as having a surveying program in Colorado. That box is checked. Another is being an advocate for the public, or for other surveyors.

Brian: It's important to go into schools, show the diversity of the PLSC, show being part of a group is great for networking. We can show them how to move into the profession.

Tom: One of my charges is to find summer jobs or internships for students. I will reach out to you guys to find openings.

Leif: When I grew up, we were chasing rocks, in downtown Denver it's all monumented.

JB: My business partner says every surveyor needs a Juris Doctorate. We have increasing exposure to litigation and licensing board censure. Risk assessment and limiting exposure to lawsuits and licensing board problems is another topic. I also wanted to mention that the email newsletter "News and Views" with a topic list

and a "read more" link is very useful. People need to tell me how the NSPS can do better.

Todd: NSPS needs to be more responsive. I wrote to Curt Sumner for a letter of support and got back nothing. I sent a letter to Kim also. They need to be more accountable to their members. Support for continuing education should be their top priority.

Leif: And where is the NSPS on UAV regulation?

JB: Todd and I are on the UAV Committee. They are very active on that, I get like two emails a day.

Todd: Peter Krick sent an email, about trespass and UAVs.

Paul: Under Colorado statutes, we have the right to gain access to PLSS monuments. Not roads, not pipelines, just monuments. It has been argued that any monument tied to the PLSS system is an accessory to the monument, but you still have a problem with trespass.

Leif: I would like to see the NSPS focus more on the UAV collection of topographic data, hugely important to our profession.

Todd: The committee is at the beginning stages, and there is a lot going on. People still don't know all of what the NSPS does and offers, must go to their website.


Tom: There is food left, don't let it go to waste. Thank you Todd and JB for everything, and thanks to everyone for participating.

Todd: We are adjourned.

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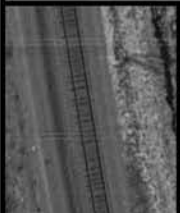
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Report from the National Society of Professional Surveyors – September 10, 2017

NSPS Foundation Disaster Relief

The country has recently been hit by two (2) major hurricanes within a few weeks of each other, and the West has been stricken with major fires, affecting the lives and businesses of many of our fellow Surveyors. Not unexpectedly, individuals and state surveying societies have answered the call for donations to the fund making possible for the Foundation to help those who request assistance.

Boy Scouts Jamboree 2017 Successful for NSPS, and Volunteer

Many thanks to the group of volunteers who represented NSPS during the 2017 Boy Scouts Jamboree. The group included Joe Elwell, Steve Okuley, Will Clark, and Kyle Schultze. From among the estimated 25,000 youth in attendance at the Jamboree, several hundred visited the NSPS booth. Some were Surveyors who were participating as Troop Leaders, and some were just interested in Land Surveying. 90 Scouts from all over the United States complete the Merit Badge. They ranged in age from 12-17, and all of them seemed to enjoy their time spent participating in our badge. Parkland College in Champaign, IL provided all of the equipment and miscellaneous survey supplies that were required to teach the badge. NSPS provided the giveaway items, which the boys really liked, plus other supplies and financial help for the team of instructors for the badge. There were a great deal of brochures handed out to people, and the role of NSPS was discussed many times. There were several participants who showed great promise in becoming Surveyors. They were skilled at the work that we completed during the badge, asked all of the right questions, and were interested in our field or a related one. One student in particular, from the Northeast, was so interested in Surveying that the instructors walked him to another booth where a college from New York was set up so he could discuss their surveying program. The team says, "We were truly grateful to NSPS for their support and hope that we will be able to continue providing the Surveying Merit Badge at many more Jamboree's to come".

Regional Licensing and Hydrographer Licensing

During the recent NCEES Annual Meeting, representatives of the respective state licensing boards approved a motion to investigate regional licensing for Professional Surveyors. Such an arrangement would affect all Public Lands States, but not the Colonial States.

During the Surveyors Forum, two representatives of the Hydrographers Certification Board presented a proposal to develop a state licensing structure within the

respective licensing boards. The proposal included a provision that such license would be portable among the states.

Forum on the Future of Surveying Continues its Work

Formerly known as the Future of Surveying Task Force when initiated by NCEES, the Forum's name was changed to avoid confusion when NSPS took the lead role. Since its last meeting in June, the Forum has continued to develop strategies that have been agreed upon by the Task Force members. The Task Force continues to have broad participation from a variety of organizations within the geospatial community. Information about the activities of the Forum can be found on the NSPS website under the Future of Surveying tab.

Certified Floodplain Surveyor Program Revived

Fifteen years ago, NSPS began teamed with FEMA to create a certification program through which Surveyors who attained certification would receive "fast track" review of Letters of Map Amendment (LOMA). With Hurricane Floyd having created a disaster in the state, the North Carolina Society of Surveyors (NCSS) agreed to take on a "pilot" CFS program, with the concept that NSPS would work with FEMA to spread the program nationwide. With the introduction of the eLOMA shortly after the project began, and the FEMA contractor being changed, the program lost momentum.

Earlier this year, the Tennessee Association of Surveyors (TAPS) and the Tennessee office of Emergency Services agreed to initiate the program there, with assistance from the North Carolina program for training. This action has led to a recent training session in North Carolina for which interested participants from other states were invited. Participants from Alabama, Florida, Georgia, Kentucky, Mississippi, Rhode Island and Virginia joined participants from Tennessee for the training. It is hoped that this event will encourage other states to also begin the program.

American Pipeline Surveyors Association (APSA)

A representative of the APSA recently made a presentation to the West Virginia Society of Professional Land Surveyors (WVSPLS), outlining a program recently developed to certify individuals who provide surveying services for pipeline projects. The program is open to both Licensed Professional Surveyors and Survey Technicians for the stated intent to improve the knowledge and performance of services on pipeline projects. NSPS plans to contact APSA to discuss its intentions and program.

PLSC Board of Directors

August 18, 2017

Spring Hill Suites, Grand Junction

Meeting Minutes

1. Call to Order, 4:34 p.m.

Present: Todd Beers, Alan Blair, Becky Roland, Paul Bacus, Brian Dennis, Leif Joy, Ralph Pettit, Tom Sylvester, J.B. Guyton. Guests: Shaun Lee, Chris Power

2. Determination of Quorum (6 voting), confirmed

3. Approval of Minutes from previous Meeting

MOTION: To approve the minutes from the April 13, 2017 meeting as presented. (Bacus/Dennis)

Approved unanimously

4. Items

a. 2017 Budget to Actual Review

a.i. Board asked that the membership numbers for 2016 and 2017 be added to the account description

a.ii. Becky Roland will check the DVD expense line, which seems high and may include expenses that were for the Refresher Course.

b. Update on Investments

b.i. Todd Beers, Alan Blair and Becky Roland met with two additional investment firms and selected Key Bank to manage PLSC investments. Key Bank will save 1.5% in fees and has a competent plan for earning income and meeting PLSC's investment goals.

b.ii. Alan Blair will email the Board when the transfer to Key Bank is complete.

5. Update on CMU Program and Endowment

a. AES Board Approved the program

b. Tom Sylvester has been hired as the first instructor

c. PLSC will continue support of the program through the current ad-hoc committee

d. PLSC Board will need to have a meeting to discuss the miscommunication on the instructor salary and the endowment agreement. Becky will get this scheduled.

e. Link on NSPS website

e.i. JB Guyton will follow up with NSPS

f. Becky Roland will add a link to the program to the PLSC website and send an email announcement to the database

6. Status of Membership Drive Calls by Chapters

a. Southern Chapter – calls were made but it is a slow process

b. Northern Chapter – no update

c. Western Chapter – no update

d. NW ¼ Chapter – no update

e. Central Chapter – no progress

f. Todd Beers challenged the Board to aggressively make calls starting in October

g. Becky Roland to send a survey to PLS in the State to promote PLSC and ask what programs/services potential members want

7. Policies and Procedures

a. Becky Roland and Alan Blair will review this document prior to the next Board Meeting.

b. Board will vote on the final document at the next Board Meeting

8. K-12 and Scouting Outreach

a. School Counselors Show Follow-up

a.i. Career Day requests

a.ii. Board approved participating in the Colorado School Counselors Show (October 18-20)

a.iii. Board approved participating in the Adams County Schools Career Fair (November 14). Becky Roland is approved to invite other engineering organizations to share the exhibit space with PSLC.

a.iv. Board approved participating in the Denver Public Schools Career Fair (November 7). Ralph Pettit will check on the details and see if there is a way to share space with Denver Water.

b. Becky Roland to request more NSPS brochures and send a supply to Brian Dennis

c. Sandbox construction and purchase

c.i. Board approved for Brian Dennis to construct the sandbox.

c.ii. Becky Roland will solicit other hardware donations from members.

c.ii. Becky Roland will ask vendors/Sustaining Members to make donations and participate.

c.iv. Becky Roland will email members for volunteers and provide a summary to members after each event.

d. E-newsletter

d.i. Brian Dennis volunteered to gather submissions and write material for a monthly e-newsletter. Material should include information on Chapter meetings and projects. Sean Lee and JB Guyton offered to assist. Becky Roland will send it through the web communication program.

e. Elevator Speech/NSPS Website/Videos

- e.i. JB Guyton will work on providing this information through NSPS for the PSLC website.
 - 9. QBS Update
 - a. Alan Blair has attended two meetings focused on the Mainstreet webinar development.
 - 10. Update on Colorado Coordinator
 - a. Appointments with agencies
 - b. Job Opening Announcement to be posted on the website when finalized
 - 11. Surveyors week
 - a. Consider a display at the Capitol promoting the value land surveyors provide
 - 12. Logo vote results
 - a. The Board approved moving forward with the top selection from the vote. Becky Roland will work with the graphic artist to finalize.
 - 13. Videos for website/Facebook
 - 1. Chapters are asked to assist with developing video for the website and Facebook on
 - a.i. What is Surveying
 - a.ii. How I got into Surveying
 - a.iii. Most Interesting Project
 - 14. Reports
 - a. NGS, no report
 - b. Scholarship
 - b.i. The first scholarship for the WCCC program was given at this meeting to Cody VanWinkle.
 - b.ii. Need to promote the program and availability of scholarships
 - c. Membership Committee, no report
 - d. Rocky Mountain Surveyors Summit
 - d.i. Todd Beers reviewed the current program draft
 - e. Lobbyist/Legislative Committee
 - e.i. Continuing Education

MOTION: To approve moving forward with changing the statute language to require continuing education and work with DORA to implement. (Joy/Bacus)

Approved unanimously

 - f. Education Committee
 - f.i. CMU/WCCC Program Review
 - f.ii. Vectors Equipment
 - f.iii. Survey Equipment Inventory – Tom Sylvester may request any of the equipment for use at WCCC
 - g. Ethics and Fair Practices Committee, no report
 - h. Trig Star Report
 - h.i. This year's winner will be in the next Side Shots issue
 - h.ii. Heather Lassner to replace Jan Sterling (retiring) – Todd Beers to confirm with Heather
 - i. GIS in the Rockies
 - i.i. Surveyor Track development is ongoing
 - i.ii. Event is September 20-21
 - j. NSPS Delegate's Report
 - j.ii. Becky Roland and JB Guyton will be attending the next meeting October 4-6 in Frisco, TX
 - j.ii. JB Guyton will discuss trespass laws related to UAV's with the NSPS Committee.
 - k. WSPS Delegates' Report, no report
 - i. Website Committee
 - ii.i. Todd Beers requested the Committee create a RFP for updating the website. - 15. Chapter Reports
 - a. Southern, nothing additional to report
 - b. Central
 - b.i. Working on speakers for Summit
 - c. Northern, nothing additional to report
 - d. NW ¼, nothing additional to report
 - e. Western
 - e.i. Tom Sylvester thanked everyone for coming to Grand Junction for the meeting
 - f. Southwestern, nothing additional to report - 16. Next Meeting Date and Location
 - a. Endowment – September 13 4:30PM Conference Call
 - b. BOD – October 18 4:30-6:30PM Conference Call
- Adjourn (Dennis/Pettit)

Treasurer's Report

This summer, the PLSC Board of Directors decided to move all of the PLSC assets to Key Bank. All of the funds have been transferred and the balances are shown below. These balances are the remainders after a \$100,000 check was presented to Western Colorado Community College.

Key Bank Checking: \$10,066.14

Key Savings: \$116,486.29

Key Investment: \$244,468.47

—Alan Blair, PLS

CCPS

The CCPS August Surveyor Social was held at TopGolf in Centennial. Thank you to all who were able to attend. A fun time was had by all. Please let us know if you have any ideas for next year's social event.

The CCPS elections are right around the corner and we would love to have some volunteers for new directors. The ballot will be sent out by October 15th and the newly elected officers and directors will take office in January. We are always looking for fresh faces and new blood to be involved. Please contact a current director or board member for more details. Also, don't forget to vote and return your ballot!

Thursday, October 26th is our next General Membership meeting at the Table Mountain Inn in Golden, CO. The festivities start at 6:00 PM with a cash bar, 6:30 dinner, followed by a short general meeting at 7:00. We hope to have a nice attendance and show of support from the CCPS community.

The CCPS would like to update our chapter member email address list prior to the upcoming election. If there are some of you out there who have not been getting the General Membership meeting requests please email me at colocentralsurveyors@gmail.com and I will make sure you are added to the contact list.

We hope to see all of you at the next General Meeting!

Kevin J Kucharczyk, PLS
CCPS President

NC-PLSC

The Northern Chapter was pretty quiet this summer as it seems everyone was busy with work and life (I guess there is a separation for some people). We planned on having a picnic along the Kelim Baseline but decided to postpone to better adhere to our agenda for this coming year.

September's meeting was held at Farnsworth Group in Fort Collins and was utilized as a brainstorming session for upcoming meeting topics. Our direction this year is to try to bring more fieldwork related presentations to the chapter meetings. Equipment maintenance, techniques and safety will all be on our radar this year. Additionally, one of our most requested topics was for presentations about boundary problems. If you have a boundary story you would like to share, please contact me or come to the next meeting.

Steven Parks, PLS
President NC-PLSC

NW 1/4 PLSC

The Future of Surveying

Pretty bold title for a quarterly article for the smallest chapter of the PLSC in the State of Colorado, but we here in Northwestern Colorado think big, since we host the second and third largest counties in the State!

The members of our chapter who are approaching the ends of our surveying career - not counting Cadastral Heaven - have been reflecting back on the changes in our career over the years and what a surveying career may look like in the future. Could any of us in the late sixties or seventies have envisioned GPS, scanners or robotics? Or GIS, 3D modeling, OPUS and the programming tools well beyond CAD that are available to us today? I think not...we were all out in the woods with three to five person crews hacking the world to get a line of sight through for a chain, and then years after that, a line of sight big enough to shoot that magic infrared beam into a prismatic retroreflector which magically told us the distance! But then, if it was an HP 3805, you'd better switch to meters and multiply by 3.28083333 or you might be off ten meters!

Our local County Surveyor, Tom Effinger, is determined to survey the world from his office, golf course and perhaps a wheelchair late in life. With a GIS more powerful than available on the County website, we can pinpoint manholes, fence corners and other large objects close enough for many purposes - without ever visiting the site. I had a client insist to me he was told (which he was) that I could survey a 1923 GLO Tract Corner with a drone, instead of having to walk five miles round trip on the other side of the Colorado River. I asked him where that drone was, could it dig holes if necessary?

So, how long will it be until we have remote sensing in drones capable of detecting rebar or GLO caps? We already have reasonably accurate GPS capability in them, which with refinement will be accurate enough for land surveying shortly, especially in completely open areas. By golly, if we attach some cutting blades to it, perhaps it can even cut its way down to the ground thru limbs and brush and scare the heck out of any poor critter in the way.

And when will Artificial Intelligence (AI) be able to discern the difference between a rebar, Fram Oil Filter and a true monument? At the rate we are progressing all of the items mentioned above are not too far in the distant future. Look at what the last forty or fifty years have brought us. Chains, transits and T-16's to robotics, scanners and GPS.

The only thing really missing here is economy of scale. The technology I have mentioned above is

CHAPTER NEWS

probably already available. It hasn't been packaged up into a Remote Surveyor because of the cost, not because of the technological feasibility of it. We have already reduced the three or four person crew to one or two in almost every application in the real world. The hardest application is professional judgement - what constitutes a property corner? Does that pipeline or road profile look correct, not just because the printout says it is? Yet in almost all cases, we as a profession will typically default to technology over legal or judgement issues. Perhaps we need to think a little more about that.

Brian T. Kelly
President, NW 1/4

SC-PLS

Steve Parker and Brian Dennis have a continuing project with the Boy Scouts of America at Peaceful Valley Scout Ranch. The camp, built in the 1960s by the Army Corps of Engineers, was a replacement to the original camp, Camp Tahosa. The camp is located just outside Elbert, Colorado at an elevation of 7000 feet.

This project includes setting many control points using Static GPS methods, and searching for section corners and property corners over the entire facility which is over 3,300 acres. The survey caps have the BSA logo imprinted on the face for a personalized touch that the scouts will be proud of. Several scouts are using this opportunity to achieve their BSA "Surveying" merit badge.

Joe Alessi is heading up the Christmas party/dinner this year, which will be held at the Miramont Castle Queen's Parlour Tea Room, located in Manitou Springs on Friday, December 8th.

The castle is also home to the "Sawyer & Garstin Map Collection" Still being archived is our priceless collection of original antique maps depicting El Paso and Teller counties from the mid-1800's. This unique collection includes correspondence, survey books, packing lists, and other fascinating materials that together tell the unparalleled history of the Pikes Peak region, and will eventually be available for research.

We continue to have discussions about the proposed statute (12-25-215.5) of Land Surveyors for continuing education rules in Colorado. This will be required to renew a license on or after July 1, 2020. No later than December 31, 2019, the board will adopt these rules establishing the requirements.

Join us every third Tuesday at our board meetings or member meetings, and keep an eye on our website for details at www.scpls.net.

Don R. Hulsey, PLS
President, Southern Chapter

SWC-PLSC

It has been a busy summer season for surveyors across the Southwest corner of the state. Now that color is on the leaves and there's snow on the peaks perhaps we can all take a break and attend the next SW Chapter meeting! It will be held at 6:00 PM on Tuesday, November 7th at the Durango Rec Center in the Sunlight Room.

The Chapter has also been assisting CDOT with finding a location for another CORS station here in this corner of the state. This future site will be incorporated into the Mesa County RTVRN system and should help round out coverage for all surveyors along the western slope. We will keep you updated as we get closer to finalizing a location and confirming the equipment installation.

Parker S. Newby, P.L.S.
President – SW Chapter PLSC

WCLS

The September meeting was held at the Grand Junction city hall meeting room Wednesday the 13th and was lightly attended. Since a quorum of officers and directors was not present, there were no business decisions voted upon at this meeting. We discussed the upcoming Spring Seminar and possible topics and guest speakers. Tom Sylvester discussed the new survey program that is up and going at the Mesa Community College Engineering Department. Elections for the upcoming year of 2018 will be held in the next couple of months. There was also a general discussion regarding the situation of our aging current members and the need for an infusion of younger members to become actively involved.

Peter Krick, PLS
President, WCLS

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