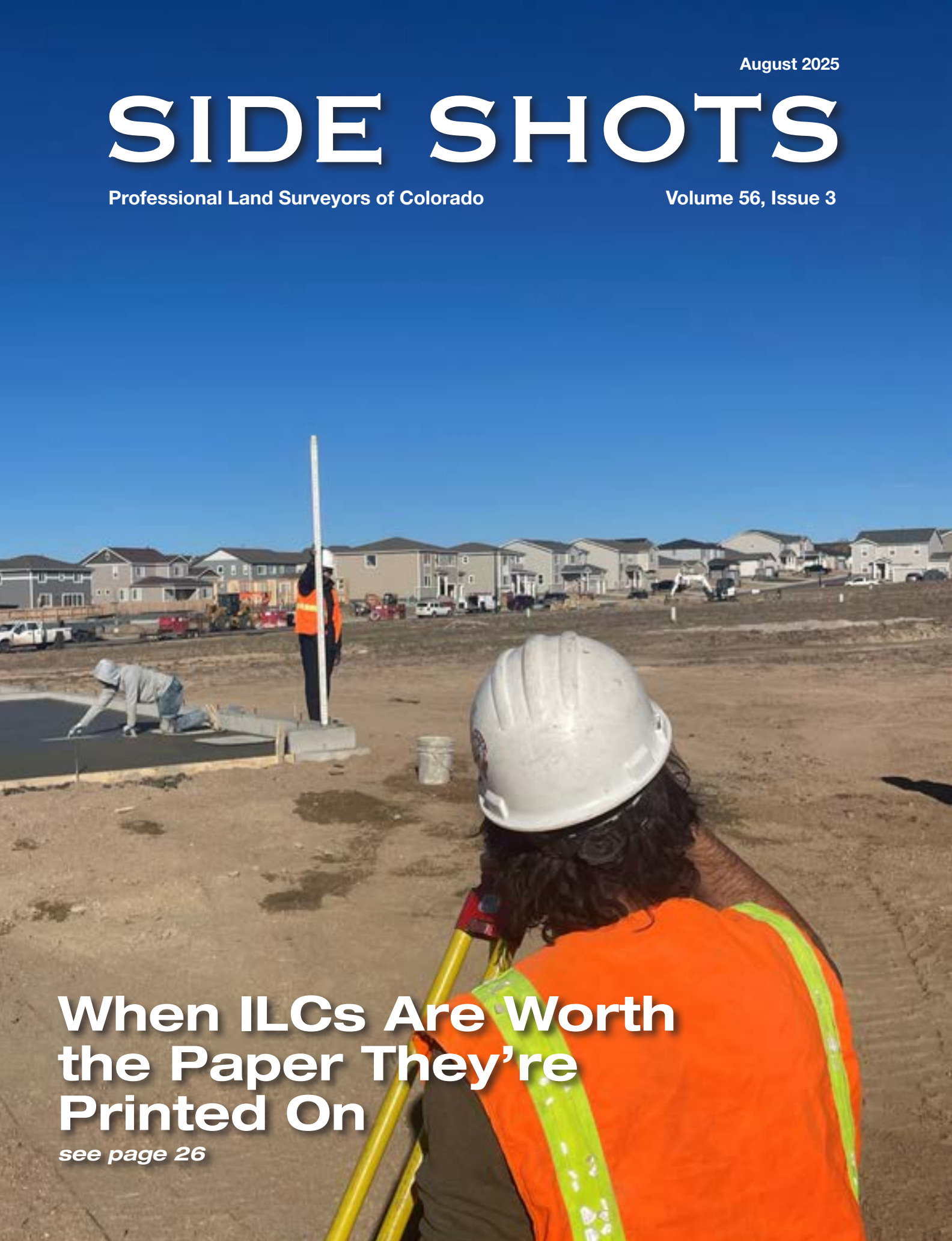
August 2025

# SIDE SHOTS

Professional Land Surveyors of Colorado

Volume 56, Issue 3



## When ILCs Are Worth the Paper They're Printed On

*see page 26*

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# SIDE SHOTS

**AUGUST JOURNAL 2025**
**VOLUME 56** **NUMBER 3**



***On the cover:*** *Shooting a foundation corner for an ILC.*
*Photo by David Schrunk of B&J Surveying*

*Side Shots is the official publication of the Professional Land Surveyors of Colorado, Inc. and is published quarterly for the betterment of the surveying profession.*
***Brian Dennis***
*President*

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***Laine Landau***
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***Deadlines for editorials, articles, pictures and advertising are January 1, April 1, July 1 and October 1. Publication is February, May, August, and November Material received after the current deadline will appear in the next issue of Side Shots.***

*We would like to invite anyone who is interested to advertise in Side Shots. Do you have something you want to sell, trade or buy? Why not use Side Shots for your next ad? We can also reproduce business cards for advertising. Ad space reservation must be arranged with Becky Roland, PO Box 441069, Aurora, CO 80044; 303-551-3266.*

***(Deadlines: January 1, April 1, July 1 and October 1).***

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Fellow Members

It is warming up and time for the Spring jackets/vest to go away for a few months. It is also time for the snake, bugs, critters, wildlife and in-town unpleasantries to come out. Be safe out there!

Along the Front Range I have heard mixed opinions from Surveyors, Engineers, General Contractors, trades and others. The mix is what single and multi-family markets going to do. I know many of you make a living in this market and others jump in and out of it. There is definitely a softening trend for many. What I have personally seen is also mixed. Some clients are struggling to move existing inventory. Others are full steam ahead for development. Where you stand seems to depend on where you are in the process. For our fellow surveyors who survive by this market, I hope it returns with more than you can do. Be patient. Nothing stays down. Many of us are getting to a point in our career that we have seen these market waves numerous times. Feast or famine. A surveyor's diet. Today it is single or multi-family, next maybe industrial or retail. We all take our turn. What has always been true is that surveyors find a way through. In my opinion, better than many others. This is due to our creativity and our …..need to eat. Surveyors have the ability to work and thrive in so many different markets. Obviously we survey the land but there are many other parts from ground terrestrial scanning, LIDAR, monitoring, traditional mapping, mobile mapping, and too many to list. Keeping in touch with your fellow surveyors is a great way to see the forest thru the trees. So many of us are in different elements and markets that with a simple conversation, you may get some insight into something coming. You may want to jump out of the way or jump on board but at least you saw it coming and had the opportunity to think versus react. Being a PLSC member has allowed me to associate with some great folks and some pretty smart ones too that have information that I don't have! They share, I share and then we move forward to make the best decisions we can. How cool! I get excited every time there is a general meeting with Chapters or Board members and especially the Rocky Mountain Summit. I speak with a lot of you throughout the year but only a few times a year do I get to put the face with the name. The friendships and acquaintanceships that have developed over the years, I would not give it up for anything. We all have friends and family we are close to but when surveyors get together it is a second family. It is the only family where everyone in the room understands what your day was like or the last 6 months.

Stay close! There are only so many of us.

Thank you
Brian Dennis, PLS
PLSC President

# FROM THE EDITORIAL COMMITTEE

From the Editorial Committee Chair

This edition has been in the works for what seems like years. Not just because it is months late, but because the two main articles bring me full circle back to the beginning of my career when I walked to work uphill both ways! Actually, I rode a bicycle.

I started my career doing ILCs and despite the common label of ILCs as "worthless", I learned many valuable lessons from them. Mainly I learned that they aren't a survey, but I also learned how to read a title commitment (6-8 per day), how to enter a deed into CAD, and how to trouble-shoot a bad legal description (often operator error). Maybe the discussion about ILCs, their uses, and misuses will be a pertinent topic and one worth revisiting as long as we have them. Please look for the thoughtful discussion by Hayley Young. (See page 26.)

Additionally, the articles about shooting Polaris, Celestial Observation and Spherical Trig (see pages 10, 12 and 15) and the math behind why it works is an article I first discussed with Tom Sylvester in 2023 when he announced that it would be part of the Young Surveyor's campout. My first year in surveying we had one surveyor, John Willey, who would perform a solar observation in order to properly align custom houses per the architect's specific design for solar or view optimization. It used to irritate me having to listen to the time from the National Bureau of Standards. I think I might have been more patient had I realized how important the correct time was to our final calculations. This article is part one of a four-part series.

Finally, since Colorado Professional Land Surveyors will be entering the new world of required continuing education, there is a brief update on how that will impact us.

Please send in articles or ideas for articles for future editions.

Thank you.

Laine Landau
Chair, *Side Shots* Editorial Committee.



## Lambert Family Education Fund 2026

The Lambert Family Education Fund 2026 has been generously established by Mr. John S. Lambert, PLS 13212, and Donald L. Lambert, PLS 30830 on behalf of themselves and Mr. Earl B. Lambert III, PLS 10734, to support the profession and provide funds to assist land surveying students pursuing licensure in Colorado.

John and Don Lambert want to help young surveyors in Northern Colorado embrace surveying and continue to licensure. He, his brother Earl "Bud" Lambert, and his nephew Don Lambert all grew up surveying and all established successful careers in land surveying. John recently retired from Lambert Land Consulting which he founded. "Bud" established and managed Alpha & Omega Consultants. And Don Lambert started Esi Land Surveying LLC but is probably most well-known throughout the state for developing and maintaining the CPDB monument record database. The Lambert family history displays a love of surveying and an entrepreneurial spirit that will continue through their scholarship fund.
Applications will be evaluated and up to five $1,000 scholarships are anticipated to be awarded in 2026. Please apply through the PLSC and note that you are applying for the Lambert Family Education Fund 2025 Scholarship.

Donors, please consider endowing a PLSC Fund in your name to support the future of PLSC. Please Contact Becky Roland at broland@plsc.net for details and to setup an appointment to establish your fund.

*"I am grateful to make this small contribution to a profession that has been my livelihood for the past 50 years. May our profession flourish in the years to come to foster those willing to express their desire to make land surveying their life's endeavor." — John Lambert*

# PLSC BOARD OF DIRECTORS MEETING MINUTES

## Meeting Agenda
## June 18, 2025 • 4:30 p.m.

1. Call to Order — Dennis

| Name | Position | Chapter | Attending? |
|---|---|---|---|
| Brian Dennis | President | Southern | x |
| Heather Lassner | Vice President | Northern | |
| Shaun Lee | Secretary/Treasurer | Central | x |
| Becky Roland | Executive Director | n/a | x |
| Rafael Bombacini | Director | Southern | x |
| Chase Corbridge | Director | Northern | x |
| Ryan Swingley | Director | At-Large | x |
| Rob Trudeaux | Director | Southwestern | x |
| Steve Parker | Director | Southern | x |
| Tom Sylvester | Director | Western | x |
| Scott Thompson | Director | Western, Legislative Co-Chair | x |
| Dennis Mouland | Director | Northern Chapter | |
| Ralph Pettit | Ex-Officio | Central | |
| Todd Beers | Non-Voting | NSPS/WFPS Delegate | x |
| Guests: | | | |
| John Hunter | | Geo-Coordinator | |
| Laine Landau | | Side Shots Co-Editor | |
| Jim Lynch | | Central Chapter | |
| Celine LeBeau | | Northern Chapter | |
| Brian Kelly | | NW ¼ Chapter | |

Determined Quorum (6 voting): Lee

### VOTING ITEMS

2. Approve April 16, 2025 and April 22, 2025 BOD Meeting Minutes
   a. No opposition to approve

3. Decide and approve response to NSPS on NCEES Questions: Dennis
   a. Member comments were not unanimous for or against
   b. Open discussions at Chapter meetings was a majority against
   c. Key points noted
      i. Does not protect public
      ii. ILC has created confusion within Colorado, and is a similar type of issue
      iii. Written responses received do not represent the verbal discussions at Chapter meetings
      iv. Even if NCEES makes the changes, State Boards would still be in charge of making changes
   d. Action – BR and BD to draft summary letter to NSPS for BOD/TB Review
      i. PLSC summary letter that points out written responses are not a complete representation of opinions received – written comments can be provided upon request
      ii. Use “Overwhelming Preponderance”
      iii. Note: input received as written, discussions at Chapter Meetings, and PLSC Board discussion
      iv. Board consensus is to not send the comments received – written comments can be provided upon request

v. BR to craft email to membership to thank for input and notify of PLSC actions to NSPS

4. Financial Report: Lee/Roland
   a. Review Financials/Treasurer's Report
      i. Checking: $97,126 Savings: $25,189 Investments: $129,412
      ii. SL sending out dues to Chapters and NSPS $19,270
      iii. Need to pay out to Chapters for Summit
      iv. Need to pay final tax/gratuity to Westin $54K
      v. Still need to pay back Investment Account ($75K)
         1. BR to provide summary of activity for vote at next meeting
         2. Summarize remaining income, expense, and amount due for 2025
   b. Vote to increase lobbyist fees by $1000 annually/$250 per quarter.
   c. RS offered to pay for a full page ad in *Side Shots* for one year.

MOTION: To accept advertising order from Ryan Swingley and increase lobbyist fee by $250/quarter through March 2026. TS/CC

**Approved unanimously**

d. TS asked that a discussion occur at the Chapter level for financial support of PLSC in this next year.
e. JS asked that data be provided on financials for last 2-3 years and available to Chapters and members. BR to provide to all Chapters.
f. BOD asked that quarterly financials be provided to Chapter Presidents and Treasurers. BR to provide.
g. BD asked that BOD/Chapters ask for volunteers to help move programs forward.
h. BR will send previous Minutes from meeting on revenue ideas with this meeting minutes.

5. Need a Treasurer

6. Next Meeting
   a. BOD Meeting - July 16
   b. Working Group – PLSC Continuing Education Programs – July 23

7. Adjourn: SL/SP

## CCPS

This year's CCPS Golf Tournament was a resounding success, bringing together 76 enthusiastic participants across 19 teams. Many were familiar faces from previous years, but we were thrilled to welcome several newcomers—including teams from engineering firms, construction companies, and even a planner who joined the fun.

The competition was fierce, culminating in a nail-biting scorecard playoff between Aztec and LJA. After several deep dives into the scorecard, Aztec emerged victorious and claimed First Place honors.

Prizes & Highlights:

- Cash prizes were awarded to the top three teams, with a special consolation prize for the team finishing last.
- Hole competitions offered additional cash rewards, with prizes awarded to both male and female participants. Notably, our sole female entrant performed impressively and walked away with a win!

Thanks to generous support through entry fees, hole sponsorships, mulligan purchases, and raffle sales, the tournament raised approximately $4,500 for the CCPS bank account.

Looking Ahead: We're excited to grow this event even more in the coming years. Next year's event will take place on Sunday, June 7, at The Homestead Golf Course in Lakewood. If you'd like to join us and haven't received any email updates, feel free to reach out to Tony Peall at tpeall@aztecconsultants.com.

With Continuing Education requirements starting in October, our Summer Seminar was postponed until January 2026, to take advantage of the continuing education hours earned by participants. John Stahl will be presenting, and the event will be held at Arapahoe Community College once again. Specific information will be available soon.

Jim Lynch, PLS
2025 CCPS President

## Northern Chapter

The Northern Chapter met September 3rd after our summer hiatus with a great turnout from Northern Colorado PLS's! We discussed the continuing education credit (CE) requirements and how we will provide opportunities to earn these credits to our members at our monthly meetings. We agreed to offer at least 6 CE's a year during our meeting presentations and are open to topic recommendations. Feel free to email presentation topic ideas to the email listed below or to get on our mailing list for meeting notifications. Some of our upcoming topics include City of Fort Collins Land Survey Catalog via GIS database, writing legal descriptions, and the NGS OPUS beta release. We will also be having our Eagles hockey 'holiday' party in December or January of 2026; watch your email for details (if you are on our Northern Chapter mailing list of course). Thank you to everyone who attended our meetings this year and we hope to see you at our upcoming meetings!

'Till then,
Celine Bromley, PLS
President-Elect, Northern Chapter PLSC
bromlecm@larimer.org
970-498-5706

## Northwest 1/4

Fall has arrived in the Northwestern part of the State with all the brilliant colors. The NW1/4 technically had its last meeting in late Summer at the now reopened Creekside Cafe in Hayden, Colorado. While meeting, we had another election of officers and they are as follows: Brian Kelly, President; AJ Summers VP and Treasurer;Walter Magill as Secretary and Gordon Dowling, Skidge Moon, Michael Fraher, Tom Effinger, Tom Kelly, Lloyd Powers, Dave Ginther and Bill Baker as Directors. I hope I didn't miss anyone and for that I apologize. The votes were unanimous.

There was considerable discussion regarding the Continuing Education Requirements that are now in place per State Statute and Regulations. Both the Rocky Mountain Summit and the annual Wyoming conference in Caspar are good options for CEH's(Wyoming is close for many of us). Ride sharing and probable dates

were included in these discussions. The importance of getting receipts and keeping record of the CEH's was discussed as well as other ways to get those hours.

We also discussed other changes to the statues, including the necessity of filing Plats with the County Surveyor when that individual surveyor is not the signatory to the Original Plat.

We are also hoping to have another meeting before winter sets in and makes even short travel at times interesting!

Respectfully submitted,
Brian T. Kelly, President
NW1/4 PLSC

## SWC-PLSC

The SWPLSC gathered on September 16th, 2025, for a lively chapter meeting! As fall brings cooler temperatures and a busy workload in the Southwest region, our group remained small but dedicated. A huge shout-out to everyone who made the journey from neighboring counties to join us!

With the postponement of the July meeting, our September gathering was bursting with engaging conversations and valuable updates. We enjoyed several productive discussions, highlighted by insights from La Plata County Surveyor Daryl Crites, who informed us about his efforts to tackle some deposit plat filing issues and tidy up the local county index. Rob Trudeaux, a member of our local chapter who has recently taken a position on the PLSC State Board of Directors, provided the group with essential information on continuing education requirements and answered many questions on the subject.

Dave Sieler also shared exciting updates on the current status of the local CORS station at the Durango-La Plata County Airport. It was a fantastic exchange of ideas and information for everyone who attended!

As we look ahead to our December meeting and wrap up 2025, the chapter is gearing up to elect new officers. Several preliminary nominations have been made, with enthusiastic members stepping up to support the chapter's future. Stay tuned for our December update, where we'll share more about the exciting conversations happening in the Southwest region and introduce our new officers!

Brian M. Boniface, PLS
President SW Chapter PLSC

## WCLS

The most recent chapter meeting took place on July 9 at Grand Junction City Hall. Reports were presented by representatives from Mesa County, the City of Grand Junction, CDOT, and CMU Tech. Members also engaged in productive discussions surrounding continuing education and proposed amendments to the chapter's Constitution and Bylaws. The chapter plans to vote on a simple amendment soon.

On August 22, WCLS hosted its annual Fall Seminar at the Grand Vista Hotel in Grand Junction. The event featured informative presentations on water boundaries by Dennis Mouland and a related case study led by Tom Sylvester. These timely and relevant topics drew approximately 50 attendees, including students and land surveyors from outside the region. Participants enjoyed a day of learning, networking, and a catered light breakfast and lunch.

Sincere thanks to our presenters, as well as David Holmes, James Combs, Brian Bowker, Trent Howell, Kurt Shepard, and Becky Roland for their contributions to the seminar's success. We also appreciate the support of Frontier Precision and Vectors Inc. for their participation.

In other news, Vice President David Holmes has recently relocated to Kalispell, Montana. His enthusiasm and dedication have been greatly appreciated, and we wish him all the best in this new chapter.

Our next chapter meeting is scheduled for November—details to follow soon.

Respectfully submitted
Sean Mullen, WCLS President

# Shooting Polaris

By Laine Landau

The Regina Maris, above, was a research vessel when I sailed on her in 1984, her last year of operation. One task I got to do while aboard was to use the ship's brass transit to shoot Polaris, an ephemeris table (a table that contained the location of the star at specific times), and a handheld calculator to establish our latitude. Once I calculated the latitude for the ship, we estimated the speed of the ship and time from port to estimate longitude. The answer we developed was checked with the LORAN and I was elated to find my calculation checked within an acceptable tolerance which I recall was bigger than a few football fields!

During the 1500s and for much of the Age of Exploration, navigators primarily relied on simple tools such as the cross-staff, backstaff, and astrolabe to measure the altitude of stars like Polaris above the horizon to determine latitude. This allowed them to determine their latitude and maintain a course across open seas, making Polaris an essential guide for early ocean navigation.

The "transit" as a specialized astronomical instrument—designed to precisely measure the time a star crosses the local meridian (the north-south line)—was developed for observatories in the late 17th century and became more widely used in navigation and geodetic surveying in the 18th and 19th centuries. These instruments allow for much more accurate determination of longitude and precise star positioning.

For centuries, navigators, surveyors, and engineers have relied on the night sky to establish true north. Polaris, commonly known as the North Star, remains a fundamental celestial reference for determining the north azimuth—an essential step in accurate site orientation, boundary surveys, and construction layout.

## Why Polaris?

Polaris is located nearly directly above Earth's rotational North Pole. Unlike other stars, it appears almost stationary in the night sky, making it a reliable indicator of true north. Its position is especially valuable in areas where magnetic compasses are unreliable due to local anomalies or interference.

## Basic Overview to Determine North Azimuth Using Polaris

1. Locate Polaris in the Night Sky
   - Polaris is the brightest star in the constellation Ursa Minor (the Little Dipper), marking the end of its "handle."
   - To find it, first locate the Big Dipper (Ursa Major). Draw an imaginary line through the two stars at the end of the Big Dipper's "bowl" (Dubhe and Merak). Extend this line about five times the distance between those stars, and you'll arrive at Polaris.

2. Set Up Your Instrument
   - Use a theodolite, total station, or transit on a stable tripod.
   - Level the instrument carefully to ensure accuracy.
   - Establish a baseline with a decent backsight.
   - Establish your exact time using the Atomic Clock in Boulder. Alternatively determine the difference between your timepiece and the Atomic Clock. The better synchronized your time is, the better your results will be.

3. Sight Polaris
   - Aim the instrument's telescope at Polaris and lock it in place.
   - Record the horizontal angle reading. This is your instrument's orientation relative to Polaris at that moment.


4. Apply Corrections for Polaris' Offset
   - Polaris is not exactly at the celestial North Pole; it is offset by less than 1 degree. The exact offset varies slightly over time due to precession.
   - Use published tables or software (such as the Nautical Almanac or US Naval Observatory data) to determine the current azimuth of Polaris at your location, date, and time.
   - Calculate the correction and apply it to your instrument's reading to obtain the true north azimuth.

5. Establish North Azimuth
   - With the corrected value, you now have the true north azimuth. You can use this reference to orient your site, establish property lines, or set out construction features with confidence.

Best Practices and Considerations
- Perform observations for navigation when Polaris is highest or lowest in the sky (upper or lower culmination) for maximum accuracy in determining latitude.
- Perform observations for surveying at the time when Polaris is at the Easterly or Westerly Elongation where there is rapid movement in altitude, but very little movement in the horizontal angle. Knowing the declination of Polaris and the approximate time (within a few minutes) of elongation, one can quickly calculate the bearing of Polaris and hence determine the bearing of the base line.
- Repeat the observation several times (direct and reverse) and average the results to minimize error.
- Bring two flashlights. A 2-person crew is warranted with one person serving as the observer and the other as the timekeeper and note-taker.
- Ensure your time and location data are precise, as small errors can affect the correction factor.
- In urban or light-polluted areas, use a star chart or mobile app to assist in locating Polaris.

Since the above information is rudimentary, I reached out to Tom Sylvester to provide instruction for those who are interested in diving deeper into the subject of Celestial Observation. Tom's course will be a 4-part series along with links to homework which will help reinforce the concepts and skills discussed.

# Celestial Observation Basics Part I

## An Abbreviated Series Regarding Celestial Observations

by Thomas W. Sylvester, P. E. & P. L. S. (970) 640-2590

tomsylvester@merrittls.com and tsylvester@coloradomesa.edu

This course was developed for the Young Surveyors Network presentation in the summer of 2023, I am not sure they all agreed with my sentiment of "Isn't this fun! Homework for a camping trip!" Aren't we a strange bunch?

Because of my age, I am one of the few surveyors left who had to use celestial observation in my work. Having a working knowledge of the processes and theories I am getting some invitations to present the basics of celestial observations used by surveyors and navigators of yore, one of the lost arts of the profession, to today's surveyors.

When I first learned how to shoot celestial observations to determine bearing by the Solar Method or the Polaris Method in college close to 60 years ago, the main emphasis was on the mechanical techniques and then plugging the data into given equations to arrive at the solution. The equations were somewhat lengthy, and we were limited to using log tables and logarithmic manipulations to calculate the results (slide rules did not give enough accuracy and affordable calculators were not available to students of the era). The process was rather laborious.

When the hand calculators started coming out in the mid-1970s, the calculations got much easier because we didn't need to use log tables. Yet we still used pre-set mechanical processes to measure the required angles and pre-established formulas to calculate the results. As total stations became more popular, the electronics inside the scope were too sensitive for shots on the sun and would burn out the distance meters. Therefore, except with special filters, the Solar observation became obsolete and most celestial observations were Polaris shots.

About 20 years ago, I took the Astronomy for Surveyors Course by Dr. Herbert Stoughton, the Land Surveying and Geomatics professor at Metro State College at the time. He gave a several week review (about half the semester) of spherical trig upon which the formulas were based and then proceeded into the theories of astronomy necessary to adapt our measurements to the spherical trig to solve the solutions we needed. He then gave us the details of the mechanics and pre-set forms to use to measure and record the data and calculate the results. Up to that time, K & E, Elgin, Sokkia and others provided the celestial ephemerides (star tables) to members of the profession for the respective year. I think I have one of the last ones handed out in 2006. These ephemerides gave quite a bit more information about the theory and methodology. However, many of us would still follow the mechanical process and then plug the data into the formulas without a truly good understanding of the theory. At about that time GPS was becoming the standard tool and the need for Solar, Polaris, or other celestial observations became outmoded.

My objective for this "Celestial Course Series" is to present you with enough of the theory that you understand the relationship between a rotating earth, the sun, the stars, and the fact you are determining a fixed bearing from shooting at a moving target. With the theoretical background, I hope you will be able to make sense of what is going on and successfully complete a Polaris (or other celestial body) observation. More so, I want this understanding to allow you to revisit the subject a few years from now and still be able to logically figure out what is going on. Who knows, we may lose the satellites someday and you will have to call up us old timers to survey the old-fashioned way. The first part is to get an understanding of spherical trigonometry because it is the basis of mathematics for calculations. To that end I am attaching a Spherical Trig Basics handout that I developed for our Advanced Surveying Calculations class. See attachment 1. This handout was to give students the idea of how math on the "round" earth works and how places on the earth are determined. Recognize that spherical trig is based on a sphere. Since all measurements are dependent on angles as explained in the handout, the

math is applicable whether we are referring to a desk top globe, the earth itself (if it was truly a sphere), or the heavens with an infinite radius. Also, the handout uses latitude and longitude. Picture this celestial sphere with our instrument setup being an extension to the outer shell, and each of the stars having a particular latitude and longitude at any given point in time. These spherical positions are referenced by other names such as declination (akin to latitude); and Right Ascension, Greenwich Hour Angle, Local Hour Angle, etc. (akin to longitude). These problems were designed for using the earth as the sphere and are laid out to emphasize the great circle routes for navigation, or the process whereby the GLO surveyors maintained a Township line on a constant latitude (a small cirle), etc. After you work through this handout and its problems, go back and pretend that the end of each line is actually on the sphere above the earth where the pole extends to the pole of the celestial sphere, our location is projected straight up to the celestial sphere, and our target (star or sun) is projected up to the celestial sphere. The concepts for the calculations are all the same. This visualization of course is up to the point I am asking for an actual distance in the handout. For the spherical trig class, we use the average radius of the earth in our calculations. With star shots, we don't worry about the linear distance to anything and treat the radius as infinite.

Later articles will explain how the moving parts work, the regularity of the earth's rotation, the irregularity of our prime timekeeper (the sun) and the more precise regularity of keeping time with the stars (sidereal time). From that understanding, we will then move to predicting or determining where any given star is located at any moment in time. Then from that we'll move on how to shoot that moving target and then how to calculate the bearing or azimuth to that star at that moment in time, then to convert that bearing to a fixed line on the earth's surface that will still be there tomorrow for us to start our survey.

# Rocky Mountain Surveyors Summit

## Save the Date -
## February 24-26, 2026

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ROCKY MOUNTAIN
Surveyors Summit
2026

Feature Speaker:

Richard Elgin

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# Spherical Trigonometry Basics

by Thomas W. Sylvester, P. E. & P. L. S.
(970) 640-2590
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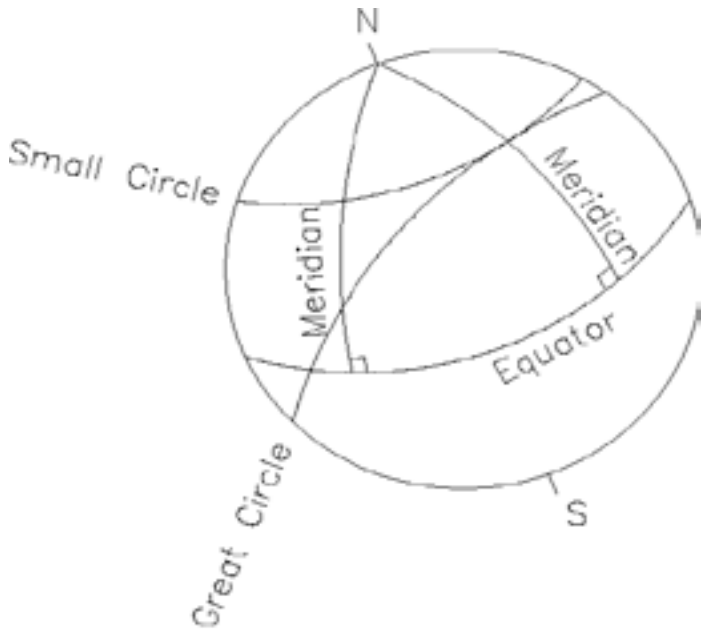
**Spherical Trig and Related Subjects:**

Although our earth is not an exact sphere, many of the concepts discussed in geodesy and map projections are better understood with a basic understanding of spherical trigonometry. Spherical trig is used in basic navigation, in solving astronomical shots to determine latitude, longitude, accurate bearing of lines, etc.

Spherical trig starts with the basic fact that all "straight" lines on the sphere's surface are great circles. A great circle is a line that goes around the sphere such that if you cut the sphere on that line, you would have two equal halves. The equator is an example of a great circle. Lines that run through both poles are also great circles. These are normally lines of longitude or meridian lines. On the earth these are measured east or west from the Greenwich Meridian located in London, England. The equator is a great circle that has a constant bearing of either East or West. All lines of longitude have a constant bearing of North or South. All other straight lines on the sphere will slice the sphere in half, but the bearing will be constantly changing. Latitude is an angle measured either north or south from the equator. A line joining points of equal latitude form a "small" circle. These latitudinal small circles have a constant bearing of either East or West, but on the sphere, they will NOT slice the sphere into two equal pieces and therefore are NOT great circles. As an example of a straight line that is a great circle (assuming the earth is a sphere), if we start at a given spot here in Colorado and establish a true north line, then turn 90°00'00" east from that meridional line, we will be pointing due East. If we prolong that line as a straight line using the survey techniques of back sighting a point and then flopping the instrument to set a point, then reversing the gun and repeating to set a second point. Splitting the distance between the two new points establishes a point on a straight line with the adjustment compensating for instrument error. As we prolong that line as a straight line, the line will slowly start turning southeast until eventually it will cross the equator 90° of longitude east of us, continuing in the southern hemisphere to the longitude on the opposite side of the earth from our longitude at the latitude as we are but as a south latitude where the line will be pointing due east, then slowly start turning back to the northeast crossing the equator again at a point 90° of longitude west of us, then continuing back to our point of beginning.

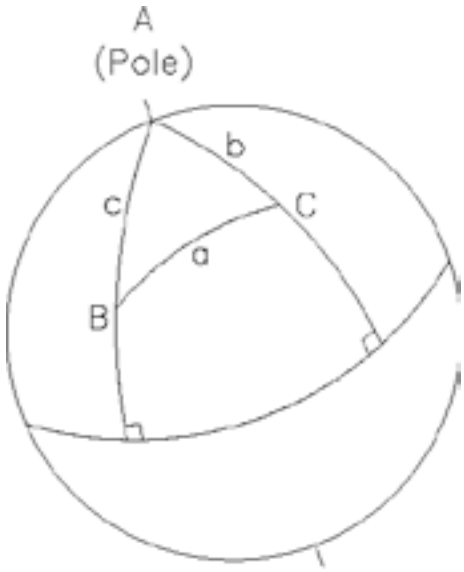
For those of you who want even more information on the topic, please refer to Charles Ghilani's textbook, Elementary Surveying .

See the diagram below for the basic sphere with an equator, meridians (lines of longitude), a small circle as a line of latitude, and a random great circle.




Spherical Lines

A spherical triangle is made from the intersection of any three great circles. The most common and useful are those in which two of the great circles are meridional lines (lines of longitude). See the diagram below for a basic spherical triangle. Note that there can be other configurations of spherical triangles.



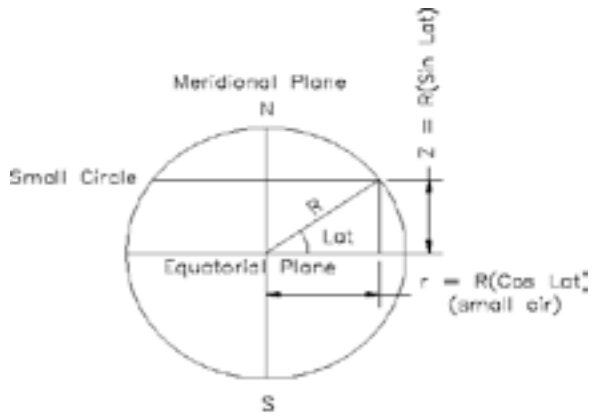

Spherical Triangle ABC

The vertices are typically labeled with capital letters such as A, B, and C in this diagram. The units are angular as you would expect. If the pole is one of the vertices, the angle at the pole is the difference in longitude between the two meridians. In our drawing, if Point C has a longitude of 100° W and Point B has a longitude of 130° W longitude, angle A is 30°. Note that in a plane (normal trig), the sum of the angles at the vertices = 180°. However, in spherical triangles, the sum of the angles at the vertices can vary from 180° to 540°. We lose one of our tools for finding the third vertex angle when the other two are known.

The sides are labeled with a lower-case letter opposite the vertex such as a, b, and c. This is another place where spherical trig starts to differ from trig. these “lengths” also have angular units of the angle subtended by the ends of the great arc as measured from the center of the sphere. Think of the horizontal curves. It is the angle of the segment of the circle represented by such horizontal curve. The spherical sides represent a similar arc. In the drawing above, length b is the co-latitude of point C. The definition of a co-latitude is 90° - the latitude and is the angular distance in the meridian from the pole to the point, where latitude is the angular distance in the meridian measured from the equator to the point. If point C has a latitude of 50° N, side b is its co-latitude of 40°. Likewise, if point B has a latitude of 40°, side c is its co-latitude of 50°. The advantage of using angular measures

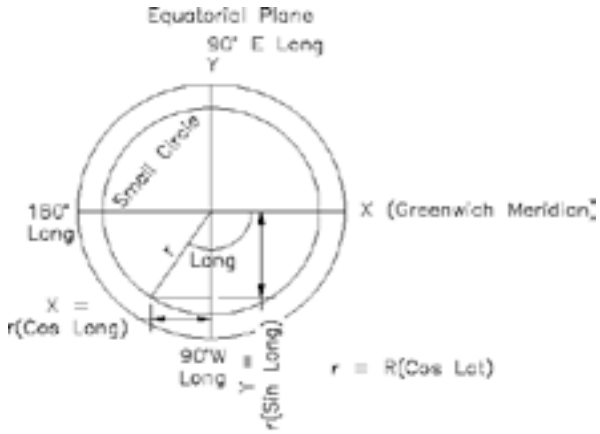
to measure the sides is that spherical trig can be applied to any sphere regardless of its size. Once you have the angle and you know the radius of the sphere you are dealing with, you can calculate the distances in normal distances such as miles, kilometers, feet, or meters. Side a is a little harder to comprehend, but it is an angle from the center of the sphere subtended by the arc from B to C.

I'll need to introduce another concept of the XYZ coordinate system to help explain how a is derived. This system is similar to the Earth Centered Earth Fixed XYZ coordinate system used in GPS and geodesy. See the diagrams below to help you follow my explanation of the XYZ coordinate system.




Meridional Plane
Z = R(Sin Lat)
r = radius of small circle
r = R(Cos Lat)

Approximate 35° N Lat Shown




Equatorial Plane:
X = R(Cos Lat)(Cos Long)
Y = R(Cos Lat)(Sin Long)

Maridional Plane:
Z = R(Sin Lat)

Approx 35° N Lat Shown
Appox 125° W Long Shown

The top diagram is the Meridional Plane. When you slice the sphere in a meridional plane, the angle subtended from the equator to a point on the arc of the meridian is the latitude. The great circle has a radius of R. Z is the direction measured toward the pole with the North Pole being Z. Z = R x Sin Latitude.

A latitudinal line is a small circle connecting all of the points with that latitude. That small circle's radius r = R x Cos Latitude.

The lower diagram represents the Equatorial Plane or the great circle passing through the equator. When looking down on the Equatorial Plane from the North Pole, you will find the latitudinal small circle with radius r as a concentric circle inside the equator. The X axis in the Equatorial Plane passes through the Greenwich Meridian and has longitude of 0°. The Y axis is 90° from the X axis and has a longitude of 90° E longitude.

The diagram shows a point with a latitude of 35° N falling on the small latitudinal circle and a longitude of 125° W longitude. Its X coordinate is r(cos longitude). Its Y coordinate is r(sin longitude). Since r = R(cos latitude):

X = R(cos latitude)(cos longitude)
Y = R(cos latitude)(sin longitude)
Z = R(sin latitude) as shown in the top diagram.

Now let's pick two points on the spherical triangle as:

C:
40° N Latitude
105° W Longitude (Note: W longitude is designated as a negative i.e. -105°)
This is somewhere near Lafayette, Colorado.

B:
35° N Latitude
120° W Longitude
This is somewhere near Santa Maria, California.

In XYZ:
C:
X = R(cos 40)(cos (-105)) = R(-0.198267)
Y = R(cos 40)(sin (-105)) = R(-0.739942)
Z = R(sin 40) = R(0.642788)

B:
X = R(cos 35)(cos (-120)) = R(-0.409576)
Y = R(cos 35)(sin (-120)) = R(-0.709406)
Z = R(sin 35) = R(0.573576)

Then C to B:
$\Delta$ X = R(-0.211309)
$\Delta$ E = R(0.030536)
$\Delta$ Z = R(-0.069211)

The distance in the XY Plane (Equatorial Plane) = $R(-0.211309^2 + 0.030536^2)^{1/2} = R(0.213504)$

Then slope distance = $R(0.213504^2 + (-.069215)^2)^{1/2} = R(0.224442)$

R(0.224442) represents the chord of an arch from the center of the sphere with radius R.

From our horizontal curve theory, Chord = 2RSin (1/2 angle),
Then angle = $2(\sin^{-1})$Chord/2R = $2(\sin^{-1})$R(0.224442/2R = $2(\sin^{-1}(0.224442/2)) = 12.88672°$ = side a.

To figure out the linear distance, refer to the horizontal curve problems in calculating the curve length with a known radius and a known interior angle.

The average radius of the earth is approximately 3959 miles. In our problem, side a of 12.88672° represents the interior angle of the arc.

Hence:

$\frac{\text{Dist}}{2\pi R} = \frac{I°}{360°}$ or Dist = 2πR(I°)/360°. In our case Dist = 2π3959 mi (12.88672°)/360° = 890.44 miles.

Now let's move to some spherical trig formulas. As in regular trig, we can have a myriad of formulas but we tend to concentrate on our "magic 8" formulas of Pythagorean formula, sine of an angle, cosine of an angle, tangent of an angle, Law of Sines, Law of Cosines, circumference of a circle, and area of a circle. Since right triangles are a special case of triangles, we can eliminate the first four. We also don't typically deal with area, so we can eliminate the area of a circle too. That leaves us with Law of Sines and Law of Cosines (written three separate ways).

Spherical triangles are somewhat the same in that there are a lot of formulas, many of them dealing with right triangles in which one of the vertices has an angle of 90°. There are also numerous other formulas for 1/2 angles and other configurations as there are in regular trig. For our brief review of spherical trig, we are going to limit the formulas to the Spherical Law of Sines and the two types of Spherical Law of Cosines. One of the Laws of Cosines is for sides; the other is for angles. The Laws of Cosines are also written in three different ways similar to the plane trig law of cosines. We won't have time to go into the derivations of these formulas in this course. However, because they deal with some of the similar concepts of plane trig, I believe you will be able to apply them to spherical trig problems to get a little understanding of spherical trig.

These formulas are:

Spherical Law of Sines:

$$\frac{\sin A}{\sin a} = \frac{\sin B}{\sin b} = \frac{\sin C}{\sin c} \quad \text{or} \quad \frac{\sin a}{\sin A} = \frac{\sin b}{\sin B} = \frac{\sin c}{\sin C}$$

As in plane trig, you have to be careful in using the Law of Sines. The sine of an angle less than 90° is the same as the sine of the supplement of that angle, i.e. the sine 80° = sine 100°. Unless it is blatantly obvious, whenever you use the Law of Sines, you need to check it with one of the Laws of Cosines to be sure which angle is correct, the one less than 90° or its supplement. It is even harder to determine the blatantly obvious ones in spherical trig.

Spherical Laws of Cosines for Side:

cos a = cos b cos c + sin b sin c cos A. Then for different permutations:
cos b = cos a cos c + sin a sin c cos B. And:
cos c = cos a cos b + sin a sin b cos C.

Spherical Laws of Cosines of Angles (all three permutations).

cos A = -cos B cos C + sin B sin C cos a.
cos B = -cos A cos C + sin A sin C cos b.
cos C = -cos A cos B + sin A sin B cosc.

As with plane trig, if you know three elements of a triangle, you can derive the other three elements.

Occasionally, you will have a right triangle where one of the angles is 90°. Rather than giving you another slew of formulas, you can use those above. Where the 90° is located, its sine = 1 and its cosine = 0. As an example, if you have a right triangle with the 90° at B and you have sides b and angle C, you can still solve the problem as follows:

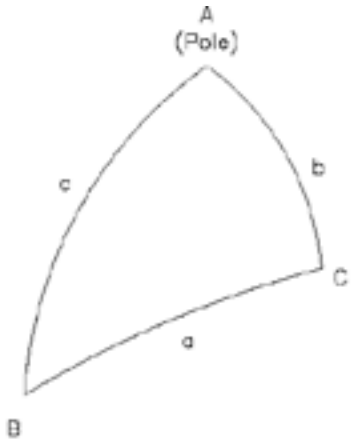
Using Law of Sines:
sin c = sin C sin b/sin B. Then since B = 90°, then c = $\sin^{-1}$ (sin C sin b/1)

Then use Law of Cosines of Sides:
cos b = cos a cos c + sin a sin c cos B.

Since cos B = 0, the formula can be re-written as cos b = cos a cos c.
Using c from the Law of Sines above, you can then solve for a, as $\cos^{-1}$ (cos b/cos c).

You will use this concept on our last problem.

On the following page, spherical trig will be used to solve the same problem given earlier using the XYZ coordinate system to solve for a.




B is at:
35° N Lat
120° W Long

C is at:
40° N Lat
105° W Long

R = 3959 Miles

Solve:
a. _____
B. _____
C. _____

Use Law of Cosines for Sides:

cos a = cos b cos c + sin b sin c cos A.

The angle at A is the difference in longitude between B and C = 120° - 105° = 15°.
b = co-latitude of C or 50°
c = co-latitude of B or 55°

Then:
a = $\cos^{-1}$ (cos 50° cos 55° + sin 50° sin 55° cos 15°) = 12.88672° which is the same as our XYZ problem.

The distance is the same as:

$\frac{\text{Dist}}{2\pi R} = \frac{I°}{360°}$ or Dist = 2πR(I°)/360°. In our case, Dist = 2π3959 mi (12.88672°)/360° = 890.44 miles.

Using Law of Sines:

sin B = sin A sin b/sin a and $B = \sin^{-1}(\sin 15° \sin 50°/\sin 12.88672°) = 62.746970°$ or does it?

sin C = sin A sin c/sin a and $C = \sin^{-1}(\sin 15° \sin 55°/\sin 12.88672°) = 71.920012°$ or does it?

Check using the Law of Cosines of sides:

cos b = cos a cos c + sin a sin c cos B

$b = \cos^{-1}(\cos 12.88672° \cos 55° + \sin 12.886718° \sin 55° \cos 62.746970°) = 50°$ Check.

cos c = cos a cos b + sin a sin b cos C

$c = \cos^{-1}(\cos 12.88672° \cos 50° + \sin 12.88672° \sin 50° \cos 71.920012°) = 47.186131°$ **Error!** It should be 55°.

Try with the supplement of 71.920012° or 108.079988°.

$c = \cos^{-1}(\cos 12.88672° \cos 50° + \sin 12.88672° \sin 50° \cos 108.079988°) = 55°$ Check.

C must be 108.079988° instead of its supplement of 71.920012°

Double check back to Law of Sines:

Does sin 15°/ sin 12.88672° = sin 108.079988°/sin 55°?

sin 15°/ sin 12.88672° = 1.160498 and sin 108.079988°/sin 55° = 1.160498 Check.

Rather than going through this long process to check the results from the Law of Sines, you could have solved for C by the Law of Cosines for Sides:

cos c = cos a cos b + sin a sin b cos C. Then rearrange to get:

$$\frac{\cos c - (\cos a \cos b)}{(\sin a \sin b)} = \cos C \text{ or } \cos^{-1}\left(\frac{\cos 55° - (\cos 12.88672° \cos 50°))}{(\sin 12.88672° \sin 50°)}\right) = 108.079988°$$ Check

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If you'd like some practice which will illustrate the theory, try using spherical trig to solve these other problems attached in this link:

Spherical Trig Basics Homework - https://www.plsc.net/docs/Spherical_Trig_Basics_Homework.docx

Spherical Trig Hints - https://www.plsc.net/docs/Spherical_Trig_Hints.pdf

Homework Answers 1-4 - https://www.plsc.net/docs/Homework_Answers_1-4.pdf


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# When ILCs are Worth the Paper They're Printed On

By Hayley Young, PE & PLS (CO), LEED AP ND

First, I'd like to thank the PLSC community for working diligently to create solidarity around ILCs, for engaging in such a rich conversation with me, and for enlightening me over what is clearly a much more heated topic than I realized. My question arose in response to Erie, Colorado's change in requirements from requiring an ILC to an ISP based on the recent update to Code of Colorado Regulations (4 CCR 730-1, Section 1.6F, Item #4), which reads:

> Misuse of Improvement Location Certificates. It is the interpretation of the Board that section 38-51-108, C.R.S., limits the use of Improvement Location Certificates to real estate transactions only. As ILCs are legally deficient in the determination of property boundaries, they shall not be "...relied upon for the establishment of fence (s), building (s), or other future …" improvements.

This change in the code was actively championed by PLSC, along with the many other changes that have been ratified this year in an effort to improve the profession of land surveying in Colorado. After receiving invaluable insight from Tom Sylvester, Laine Landau, Warren Ward, and Scott Thompson, I agree with my peers that this is a positive shift that will protect the public and applaud the Town of Erie for making this change. I also thank Tony Peall, as he was the first to reply to my inquiry, and whose declaration that ILCs are "not worth the paper they are printed on," inspired the title of this article. My purpose in writing this piece is three-fold. First, I will provide both legal and anecdotal evidence of the potential danger of ILCs to explain why this change in the statute was necessary. I will then provide the counterargument to reveal when ILCs ARE worth the paper they're printed on. Finally, I will present my proposed solution to this dichotomy, which invites ongoing discussion.

Before we discuss what ILCs are NOT, it is important to define what they are. In C.R.S. § 3851102, an "improvement location certificate" is defined as:

> "a representation of the boundaries of a parcel of land and the improvements thereon, prepared pursuant to section 38-51-108."

Colorado Revised Statute § 38-51-108 (2024) gives further detail, but without making this article mostly code, essentially, An ILC is not a boundary survey; it is a representation prepared under § 38-51-108 based on a surveyor's general knowledge of boundaries and monuments. Statute calls for a surveyor's "general knowledge of land boundaries and monuments" to prepare this certificate showing the location of improvements relative to "apparent" property lines. By definition, an ILC:

- Does not establish, reestablish, or guarantee boundary lines
- Cannot resolve encroachments or legal disputes
- Explicitly carries disclaimers prohibiting reliance for construction of fences, buildings, or future improvements

By contrast, an Improvement Survey Plat (ISP) or Land Survey Plat (LSP) is a true boundary survey, supported by monuments, record research, and defensible evidence. These are the instruments appropriate for establishing rights, meeting setback verification, or supporting development applications.

## The Misuse Problem

Tom Sylvester shared his personal experience of requesting a survey on a property he was purchasing. He ordered an ILC without knowing that it was not a survey while he was pursuing his PLS. His point was that if he could be fooled at that point in his career, the bulk of the public will not understand the purpose of an ILC. As both Tom and Warren expressed, whenever we explain the difference between an ILC and an ISP, we are met with disbelief at the cost. This puts pressure on surveyors to find cheaper alternatives, and all too often, the ILC is misused to fill that void. The thought that "ILCs are not worth the paper they are printed on" is a statement that underscores the depth of misunderstanding and misuse in both professional and public spheres.

Warren Ward illuminated a systemic issue for those of us in the email chain. He shared the experience of working under a PE who consistently undermined his professional judgment by steering clients toward ILCs solely based on cost. The president of the company would field calls from landowners, automatically recommending ILCs because "they cost less." That left

Warren, and many others in similar positions, forced to defend their decision not to set corners on what the client was led to believe was a survey. He notes how exhausting it became, explaining to both frustrated landowners and company leadership that an ILC is not a boundary survey. Too often:

- Planning departments have required ILCs for permitting, despite their statutory limitations.
- Builders and lenders have leaned on ILCs as "budget surveys" rather than recognizing their narrow purpose.
- Clients have been confused by the limitations of the ILC, thinking they have ordered a survey that they can build with when the document is in fact not a survey, and they cannot ever legally use it for building.

However, I counter Tom's purchase of an ILC with my own, fully informed, intentional purchase of an ILC for my own property. I was more than happy to pay the Routt County surveyor $500 for an ILC with the understanding that I was also receiving his CAD linework and control. This was helpful information to be able to prepare future surveys myself. No one needed to print it, so we don't have to worry about the precious paper, but this was a very reasonable cost for the data and that surveyor's knowledge of the property.

## The Legitimate Role of ILCs

As Laine Landau eloquently stated, "ILCs are a valuable tool for closing a loan. That is all they are intended to do—to indicate that the improvements being loaned on are located on the property being liened." While it is important that we acknowledge that the ILC is an inappropriate means of verification that construction meets setbacks, I believe we should also be clear about what ILCs can legitimately do so that we do not abandon their lawful utility in real estate transactions.

While supporting this movement toward boundary-defining documents for the sake of public understanding and meaningful survey documents, I believe that the ILC's original, limited, and lawful purpose to be appropriate for real estate transactions. In subdivisions, where the plat itself already defines the lot boundaries, an ILC can still serve a narrow role: providing reference to visible improvements relative to platted lines for transactional purposes. It is not a replacement for a survey, but it can remain a cost-effective instrument for certain builder transactions, provided everyone understands its limits.

## Clarifying the Legitimate Role of ILCs in New Subdivisions

At B&J Surveying, we work almost exclusively in new subdivisions where monumentation is freshly set by the surveyor of record, and our control ties directly to the platted boundary. In that setting, it would be impractical to generate a separate improvement survey plat for every lot the moment a foundation is formed—particularly when rear pins may be disturbed by later utility work. In practice, construction proceeds with the recorded subdivision plat as the controlling document. The ILCs we deliver are real-estate instruments used to help close and transfer ownership; nothing is constructed from them. They depict visible improvements against the apparent platted lines for transactional purposes, consistent with C.R.S. § 38-51-108.

That said, clarity matters. We often perform field measurements to verify control and to understand how visible improvements relate to the recorded plat. Those measurements do not convert an ILC into a boundary survey. Colorado statute does not forbid showing measurements on an ILC, but form must follow function. If ties are known and accurately measured to accepted monuments that agree with the plat, that context can be noted; if the representation rests on apparent lines and general knowledge without boundary resolution, then do not show ties—this more accurately communicates the limited knowledge represented and reduces the risk that others treat the document as a survey.

Bottom line: in a platted subdivision, an ILC can legitimately support a real-estate closing by depicting visible improvements with respect to recorded lines. Once the task becomes boundary determination, the deliverable must become a survey (ISP/LSP). This is less about policing labels and more about aligning intended reliance with the correct instrument so the public is not misled. I clarify the purpose and use of ILCs recognizing that passionate, experienced surveyors have worked for decades to educate realtors, planners, and officials on these distinctions. Unfortunately, the language and expectations for ILCs have become entrenched in legal considerations and municipal requirements, so I think it is important to be able to communicate the limitations of ILCs without being dismissive so that we can create common ground.

## Moving Forward: A Call for Clarity

Warren informed us that the original ILC statute was born in 1983 at the behest of the powerful banking lobby, seeking a way to certify whether a house was

inside a lot without the expense of a boundary survey. Surveyors at the time, including PLSC leaders, fought to include protective language. Since then, the statute has been improved, but the fundamental misunderstanding remains: ILCs look like surveys, so they get treated like surveys—until someone is held accountable.

The fact is, while home builders will always demand the cheapest option possible, they also care very much about limiting liability. Major builders' legal teams are typically fully aware of ILC limitations and have no intention of using one as a basis for construction (by the company or by buyers). Frankly, I don't blame them. I routinely see warranty claims where homeowners hired a landscape crew and built patios over drainage swales shown on the plans, relying only on the builder's closing documents. They sign acknowledgments assuming responsibility—and still sometimes win disputes—even when their own work caused the problem.

This wouldn't be solved by handing every buyer an ISP. If anything, an ISP at closing can embolden DIY work by giving a false sense of permission. An ISP documents boundaries; it doesn't greenlight construction. Most improvements still require a project-specific boundary and topographic survey followed by construction staking. Unfortunately, that does make homeowner projects more expensive—which, again, tends to benefit builders. Therefore, the move to ISPs over ILCs needs to be led by jurisdictions, not builders. What do we want to provide to the public? Do jurisdictions want this legal surety in the documents they require? It is certainly more of an asset to jurisdictions and individuals to require builders to provide ISPs. In the circumstance of B&J Surveying's work for new home builders in suburbia, our process for both is very similar, but in rural areas, the process and time distinction will be significantly more. ISPs will always be a more expensive document because the legal implications are significantly more.

As a profession, I believe we can unite around two principles:

- Be unequivocal about what an ILC is not. It is not a boundary survey. It cannot establish boundaries or be relied upon for design, construction, or permitting. Misrepresentation only undermines our credibility.
- Acknowledge the limited but lawful space where ILCs apply. Rather than defending their misuse, we can help builders, lenders, and jurisdictions understand the areas of appropriate application. This helps prevent confusion while maintaining a valuable transactional tool.

## Conclusion

The profession is right to call out the misuse of ILCs, and I stand in solidarity with colleagues who have long fought that battle. At the same time, we should carefully preserve their rightful place under Colorado law, while urging jurisdictions to standardize ISPs and LSPs for boundary-defining needs. I know this is far from the first attempt at clarifying ILCs, as there have been presentations on the topic before at the Rocky Mountain Surveyor's Summit and I'm sure it will not be the last. In a google search I found a helpful presentation on the PLSC website, though I couldn't find how to navigate to it or who to give credit to, I thought it was a very helpful presentation: https://www.plsc.net/docs/ILC_vs_ISP.pdf.

Tom Sylvester recommends always asking the question, "What do you need, and what do you need it for?" instead of simply complying with a request for a specific document from an individual that is unlikely to know the exact legal implications or even the proper name of the document they are requesting. Our obligation to safeguard the public while keeping the trust of builders, lenders, and clients who rely on our clarity and integrity, never ends. Reporting peers for suspected ILC misuse rarely addresses the root cause. Penal justice focuses on punishing individual actors; transformative justice focuses on fixing systems, so the harm doesn't recur. Converting each misuse into a documented case study changes code language, checklists, and expectations across jurisdictions and professions.

As Warren points out, the public, including realtors, architects, and even engineers, can't be expected to grasp the nuance between plotted depictions and legally defensible boundaries on the fly. It takes years of experience to understand how field measurements translate into legal interpretation. "Why," he asks, "would we expect others to understand this in a phone call?" This is why the work of PLSC matters. If surveyors don't define the boundaries of our own profession, others will—often without our input or expertise. ILCs serve a valid, narrow purpose, but if we fail to enforce that boundary, we risk damaging not just our credibility, but the very communities we aim to serve.

# PLSC and Continuing Education

The new Rules for continuing education to renew professional license for surveyors goes into effect for the renewal cycle of October 2027. Licensees will need to have completed a minimum of 30 hours between November 1, 2025, and October 2027.
PLSC is developing multiple opportunities to earn continuing education.

**Rocky Mountain Surveyors Summit** will be February 24-26, 2026, and provide an opportunity for up to 22.5 hours of continuing education.

**Virtual Summit Presentations** are being developed along with the in-person Summit program. An additional 16 hours are planned. These presentations will also be recorded and available to view online for credit.

**Gary Kent Presentation on new ALTA Standards** has been moved to November 7, 2025 and will be a virtual presentation. This will be recorded and will provide 4 hours of continuing education credit either by viewing the live broadcast or the recording.

**PLSC Chapter Meetings and Seminars** are being developed and will offer additional opportunities to receive credit at local meetings.

**Publish a *Side Shots* Article** and receive 5 credit hours for the initial publication upon placement in *Side Shots*.
**Do you have a presentation to give?** Licensees can earn 2 credit hours per presentation contact hour presenting at lectures, seminars, and/or workshops.

For a full list of the new Rules, including what continuing education is accepted and the documentation required, click here.

If you would like to present, write an article, or suggest a topic for PLSC to develop into a presentation, please email us at plsc@plsc.net.

# Legislative Committee Report – September 30, 2025

The 2026 Colorado legislative session, also known as the Second Regular Session of the Seventy-fifth General Assembly, is scheduled to convene on Wednesday, January 14, 2026. The session is set to conclude on May 13, 2026.

The PLSC proposed 3 items for consideration during this session, being:

1. Revise §38-50-103. Public Records – Require that monument records be submitted to DORA in an electronic format.

2. Revise §38-51-104 (3) (a) and §38-51-105 to allow setting of reference monuments or witness corners for corners in travelled roadways in public rights of way.

3. Revise §18-4-508 adding a clause establishing a significant fine ($2500) and penalty (replacement cost) for removal of a survey monument.

Of these three proposals legislative sponsors have been found for Items 1 and 2. No legislators could be found willing to sponsor Item 3. Requiring enforcement, Item 3 requires a fiscal note, which the current mood in the legislature is not supportive of pursuing. This issue may be better addressed by an effort to educate those entities which without malice regularly destroy monuments with construction activities.

Items 1 and 2 are currently in drafting, where the proposed language will be “cleaned up” and made presentable for a bill. A bill title has been entered and co-sponsors in the Senate from both major parties are signed on. They are:

Senator Rich, Janice, Republican, 303-866-3077, janicerichsd7@gmail.com
Senator Snyder, Marc, Democrat, 303-866-4880, marc.snyder.senate@coleg.gov

– Scott Thompson, P.L.S.
Mesa County Surveyor
970-244-1821

## WFPS REPORT

# Highlights from the Western States

## May 10, 2025

WFPS Board of Directors meeting was held on May 10, 2025 at Casino Del Sol in Tucson, Arizona. Eleven of the thirteen western states were represented. Below are highlights from the meeting.

### HOT TOPICS

The 2026 Western Regional Conference has been set with the following states participating: Alaska, Arizona, California, New Mexico, Nevada, Utah, Wyoming, and Westfed. The Conference will be held at the Horseshoe Las Vegas (formerly Bally's) on March 18 – 21, 2026. More information will be posted to PLSeducaiton.org

The Board discussed NCEES's exploration of tiered licensure, which would include a non-boundary license. Several attendees expressed strong concerns about the implications of this model, especially as it could:
Undermine the clarity and value of the Professional Land Surveyor title
Create public confusion about qualifications and responsibilities
Impact reciprocity and license mobility between states, since not all jurisdictions may adopt the same structure
Add complexity and cost to the licensure path, potentially deterring new entrants to the profession

It was noted that NSPS had circulated a draft letter with questions for NCEES, but some at the meeting felt the letter didn't go far enough and should instead oppose tiered licensure outright.

The Board members will bring this information back to their state associations and recommend a more active stance against the proposed changes to preserve consistency and protect professional standards.

### HIGHLIGHTS FROM THE WESTERN STATES

#### Alaska

ASPLS reported a 30% reduction in the number of licensed land surveyors over the last two years. To address this, they are considering adding alternate paths to licensure instead of a required four year degree.

#### Arizona

The APLS-NMPS Conference was a great success. The AZ-YSN remains active and engaged, participating in outreach efforts and hosting quarterly events. Minimum Standards are in the process of being updated. APLS is looking forward to participating in the 2026 Western Regional Survey Conference.

#### California

The CLSA-NALS Conference was a great success. CLSA is looking forward to participating in the 2026 Western Regional Survey Conference. California continues to develop resources for monument preservation after disasters, particularly wildfires.

#### Colorado

PLSC was successful in passing legislation to address the 2022 datum. The legislative committee is also considering proposals for increased fines for removal of monuments, allowing setting of reference monuments or witness corners in intersections and/or roadways, limiting a surveyors liability for dames caused by a monument box, and modifying the monument record form and providing for digital submission.

#### Idaho

ISPLS Conference will be held February 1-4, 2026, at the Riverside Hotel in Boise. The Gem State Surveyor magazine is available on the ISPLS website. The Governor has not yet appointment the LS member to the licensing board. ISPLS endorsed a candidate over a year ago. This is concerning as additional positions on the board are close to completing their term.

#### Montana

Flathead Valley Community College program currently has 15 students enrolled in the survey program. Most of the counties in Montana are currently updating their subdivision regulations.

## Nevada

The CLSA-NALS Conference was a great success. NALS is looking forward to participating in the 2026 Western Regional Survey Conference. NALS along with a coalition of other associations and licensing boards were successful in thwarting SB 78 which would have consolidated over 300 licensing boards under one umbrella. It is likely this effort will resurface next year and NALS is already preparing to continue to advocate for the continuation of the Nevada Board of Professional Engineers and Land Surveyors.

## Utah

The UCLS Conference held in St. George was a great success. UCLS is looking forward to participating in the 2026 Western Regional Survey Conference. Unfortunately, the land surveying program at Utah Valley has made the decision to discontinue the bachelor program. The associate degree program will remain in place. UCLS is collaborating with Mountainland Technical College to explore development of a program.

## Washington

LSAW membership continues to climb. LSAW's Conference in Tulalip was a great success. The 2026 Conference will be held in Spokane. LSAW is excited to launch the Northwest Surveyor outreach program. More info can be found at NWSurveyor.com and watch TikTok, Instagram, and Facebook for social media outreach campaign. LSAW continues to increase outreach efforts including hosting a booth at the Washington Career Technical Education (CTE) Conference. LSAW endorsed two candidates for Land Surveyor member of BRPELS and are awaiting the Governors appointment.

## Wyoming

The issue of corner crossing regarding drone flights over private property and foreign ownership of property near missile sites continues. PLSW is looking forward to participating in the 2026 Western Regional Survey Conference

## WFPS FUNDAMENTAL OF SURVEYING (FS) EXAM STUDY COURSE

WFPS online Fundamentals of Surveying (FS) Study Course includes approximately 16 hours of videos and a manual. The program not only helps to bring affordable study resources to future Surveyors but also generates revenue for our state association members. To date, WFPS shared over $4000 in profits with our state association members. Information on the program can be found at WFPS.org

## STEVE PARRISH CONTINUING EDUCATION LIBRARY

WFPS has captured over 18 hours of webinars with respected speaker Steve Parrish. The webinars are available to purchase as a full library or as individual modules. For those that require certificate of completion for continuing education, exams are available. Please check with your state licensing board to confirm that continuing education credit for self-study webinars. Information on the program can be found at WFPS.org
WESTFED EDITOR'S FORUM

WFPS continues to host an Editors Forum to share information and exchange ideas for building better magazines. For information, please email the WFPS Executive Office at admin@wfps.org

Respectfully Submitted,
Todd Beers, PLS
Colorado WFPS Director

# United States Department of the Interior
BUREAU OF LAND MANAGEMENT

Colorado State Office
Denver Federal Center, Building 40
Lakewood, Colorado 80225
www.blm.gov/colorado

In Reply Refer To:
9600 (CO-956)
Colorado

September 25, 2025

Laine Landau, Side Shots Editorial Chair
PO Box 441069
Aurora, Colorado 80044

Dear Ms. Landau:

This letter informs you of official BLM cadastral surveys in Colorado that have been accepted from March 7, 2025, through June 25, 2025, officially filed, and are now available in the Public Room, Bureau of Land Management, Colorado State Office, Denver Federal Center, Building 40, Lakewood, Colorado 80225. The surveys will also be available at https://glorecords.blm.gov.

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

| Township | Range | Meridian | Group No. | Type | Accepted | Plats |
|---|---|---|---|---|---|---|
| T. 4 N. | R. 61 W. | Sixth | 1809 | Plat & Notes | 03/07/25 | 1 |
| T. 34 S. | R. 64 W. | Sixth | 1734 | Plat & Notes | 05/05/25 | 1 |
| T. 4 S. | R. 64 W. | Sixth | 1810 | Plat & Notes | 05/20/25 | 1 |
| T. 2 S. | R. 75 W. | Sixth | 1779 | Plat & Notes | 06/09/25 | 1 |
| T. 39 N. | R. 12 E. | NMPM | 1783 | Plat & Notes | 06/25/25 | 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,

Digitally signed by DAVID GINTHER
Date: 2025.09.25 05:45:46 -06'00'

David W. Ginther
Chief Cadastral Surveyor for Colorado

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