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October, 2021



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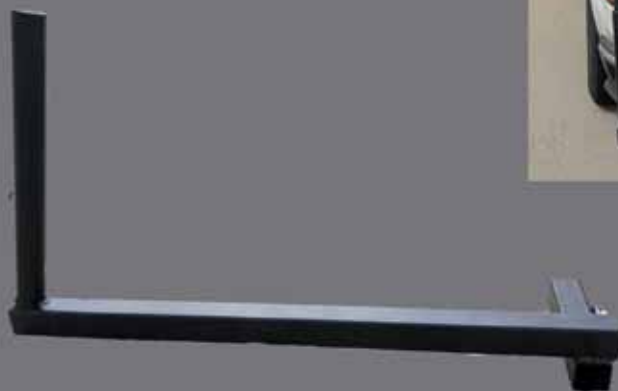
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On The Cover

A Corner Stone

photo by Brad Neumiller

CONTENTS

Page 3 • PRESIDENT'S MESSAGE

Page 4 • ANNOUNCEMENTS

Page 6 • NOAA'S NATIONAL GEODETIC
SURVEY UPDATE
by: Brian Shaw

Page 10 • A SURVEYOR'S RESPONSIBILITY
AND POSSESSION BOUNDARIES
by: Knud E. Hermansen, P.L.S., P.E., Ph.D., Esq.

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PLSW (Professional Land Surveyors of Wyoming; PO Box 8, Cheyenne, WY 82003) is a statewide organization of Land Surveyors registered to practice in the Equality State of Wyoming. PLSW is dedicated to improving the technical, legal, and business aspects of surveying in the State of Wyoming. PLSW is affiliated with the National Society of Professional Surveyors (NSPS) and the Western Federation of Professional Land Surveyors (WestFed).

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Digital-ready, full-color advertising with payment should be mailed to Lines & Points, P.O. Box 8, Cheyenne, WY 82003.

Advertising rates are as follows:	Year	Issue
Full Page	\$810	\$210
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Special Rates apply for PLSW Chapters and cover placements.

For more information please contact Jack Studley.

PRESIDENT'S MESSAGE

Hello everyone,

As this is my last President message I would like to thank everyone for the help and support over the last couple of years. It has been a great honor to serve as the president of this organization. We have made several changes over my term and I hope they are for the better and help move the profession forward. The yearly meetings will now be at the fall tech session and we should be able to continue to hire a presenter for the WESS (Wyoming Engineering and Surveying Society) in February! I hope that everyone takes advantage of using the online payments for fall tech and hopefully we can use it to collect dues as well.

I hope that as things move forward we continue to get out in front of the public, help educate people on what we do and encourage young surveyors to pursue licensure. We have been slowed down in this area over the last year and a half due to COVID but I have faith that Matt will bring that momentum back in his term. The things we can do is pitch in and help out with the Trigstar program, reach out to schools for surveyor week to give presentations and continue to support the scholarship fund.

Thank you all for this wonderful opportunity and I look forward to seeing you all soon!

Sincerely

Brad Neumiller, PLS

President - Professional Land Surveyors of Wyoming



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ANNOUNCEMENTS

P.L.S.W. TECHNICAL SESSION

November 4TH & 5TH, 2021 • CLARION INN • CASPER, WYOMING

GENERAL INFORMATION

PRE-REGISTRATION:

FEE: \$125 PLSW Members
\$75 PLSW Affiliate Members
\$200 Non-Members

A \$20 late registration fee will be added to all registrations received after October 12, 2021.

AGENDA

November 4 TH	7:00 a.m. - 8:00 a.m.	Registration
	8:00 a.m. - 12:00 p.m.	Seminar
	12:00 p.m. - 1:00 p.m.	Luncheon
	1:00 p.m. - 5:00 p.m.	Seminar
	5:00 p.m. - 9:00 p.m.	Social Hour
November 5 TH	7:00 a.m. - 7:45 a.m.	Breakfast Buffet
	8:00 a.m. - 12:00 p.m.	Seminar

Ethics and the Learned Professions

One of the most important distinctions to get clear about initially in ethics is the descriptive vs. normative distinction. Descriptive statements are statements about what is. Normative statements are statements about what ought to be. Two people can behave radically differently, enact radically different policies, and make radically different claims about right and wrong, all while sharing the same fundamental moral beliefs.

A profession is a disciplined group of individuals who adhere to ethical standards and hold themselves out as and are accepted by the public as possessing special knowledge and skills in a widely recognized body of learning derived from research, education, and training at a high level, and who are prepared to apply this knowledge and exercise these skills in the interest of others.

Five Little Pigs or The Surveyor and Marketing

Do you know the importance of marketing your surveying firm or do you sit in the office waiting for someone to find you on the Internet? Learn some basic techniques to make your business more successful.

There is a demonstrable need for surveyors, as professionals, to better present themselves to the market. By use of (hopefully) clever metaphor and a little tongue-in-cheek humor, you will learn why marketing is inevitable, necessary for success, and then so obvious as to wonder why it was ever considered otherwise.

LOCATION AND LODGING

A block of rooms has been reserved at the **Clarion Inn, 123 West E Street**, Casper, Wyoming until October 21st. Rate: \$88 per night. Telephone: 307-439-2074.

PROFESSIONAL DEVELOPMENT HOURS

12 Professional Development Hours will be awarded for the entire seminar.

FOR MORE INFORMATION, CONTACT:

Paul Svenson 307-266-2524
Bill Fehringer 307-995-2620

Determining Boundaries

What is a boundary? boundary (n.) "that which indicates the limits of anything." 1620s, from bound (n.1) + -ary, a dividing line, a bound being the limit or furthest point of extension of any one thing.

Understanding the position of the boundary is of vital importance to an individual in his relationship with his community, and local government. It has economic significance in defining common rights. The position of a boundary can determine the value of a property and be of great significance.

J. Anthony Cavell, P.L.S.

J. Anthony Cavell is licensed as a Professional Land Surveyor in Louisiana since 1990, one of the original group of Certified Federal Surveyors and a Board Approved Continuing Professional Development Provider. He has been speaking on surveying topics since the late 1980s, was awarded the Earle J. Fennell award by the ACSM and was in the first class of Trimble Certified Trainers. He has a particular interest in promoting and elevating the practice and the perception of the ancient practice of surveying. He is serving as Louisiana NSPS Governor and Secretary to the Board of Governors. His expert consultation has been sought by attorneys, legislators, other surveyors and individuals, most often for advice understanding maps, datums, historical surveys and the technologies of surveying. Tony's experience is wide ranging and includes construction, boundary, offshore positioning, hydrographical and topographical surveying, technical sales and training, business administration and university research.



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ANNOUNCEMENTS

National Geodetic Survey

Test New Features in BETA OPUS Projects 5.0

Users can now upload GNSS vectors into OPUS projects, including vectors derived from either a single-base real-time kinematic (RTK) setup or from a real-time network (RTN), for evaluation, quality assessment, and inclusion in a GNSS survey network for least squares adjustment. Use the new GNSS Vector Exchange (GVX) file format to transfer data from various manufacturer hardware to OPUS Projects 5.0.



Getting started:

- Use [sample data](#) that are available online and in the GVX file format.
- Talk to your vendor about converting your own GNSS vector data to the GVX file format.

Learn More about OPUS Projects 5.0

For an overview of the new features check out the recent [NGS webinar from May 20, 2021](#).



[View Recorded Webinar](#)

OPUS-Projects for RTK/RTN Vectors

NGS is developing OPUS-Projects so that GNSS vectors, including those from real-time kinematic (RTK) surveys, can be uploaded to a survey network for least-squares adjustment and submittal to NGS for publication. This has required developing a standardized GNSS vector exchange format known as GVX.

*Technical Content Rating: Advanced - Prior knowledge of this topic is suggested.

NGS Welcomes Your Feedback

NGS continually works to improve our services and releases beta versions of new or improved products for external testing and feedback. Please look for the new [Feedback Icon](#) that appears on the right side of our OPUS pages. Click the icon to answer a short survey with your feedback, which will be used to make future improvements to OPUS. Or try uploading and working with GVX files in Beta OPUS Projects 5.0 and email your feedback to ngs.feedback@noaa.gov.

Send feedback on Beta OPUS Projects 5.0 at any time, by emailing ngs.feedback@noaa.gov.

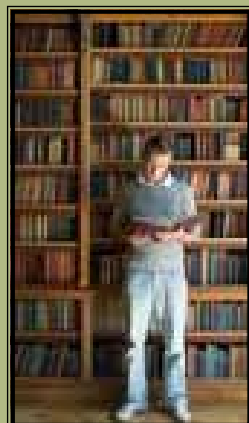
Feedback

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NOAA's National Geodetic Survey Update

By Brian Shaw, brian.shaw@noaa.gov

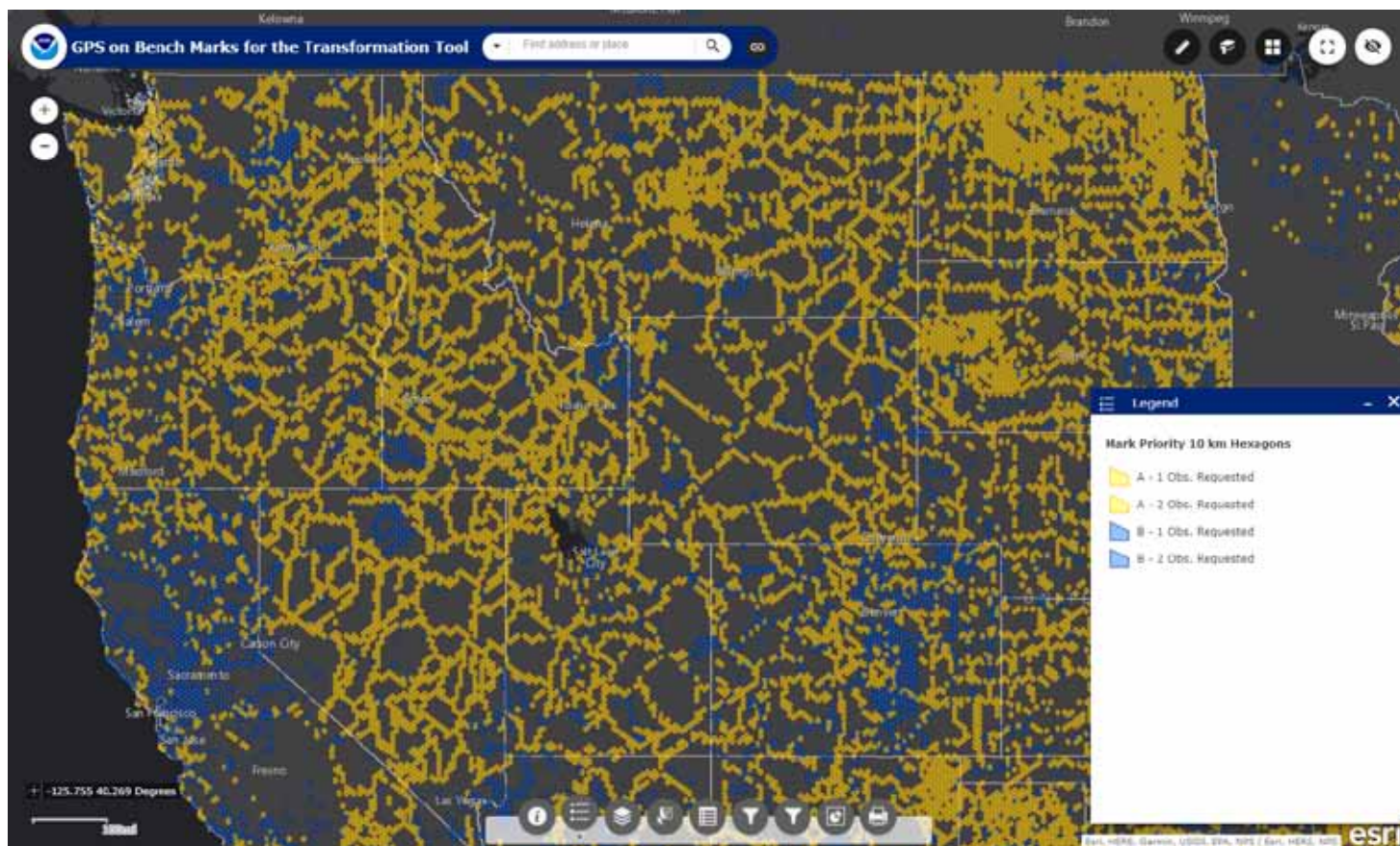
GPS on Benchmarks

Thank you to everyone that has participated in this important effort over the last 7 years! GNSS data submitted to NGS is how the Modernized NSRS will be realized, so any data you can collect and submit will be greatly appreciated. This year has been a big year for GPS on Benchmarks across the country, breaking last year's records through the great efforts of many surveyors across the nation. The cut-off date to submit GPS on Benchmarks and guarantee that it is available to build the NAVD88-NAPGD2022 transformation tool and national adjustments is December 31, 2021. While some data submitted after this date is likely to be used to develop the transformation tool and to determine the initial Reference Epoch Coordinates (REC), only data submitted before the cut-off date is assured to be used. NGS will develop a transformation with all of the data we have, so the more data provided, the better the transformation. All of

the data available will also be used to determine RECs which will provide adjusted coordinates at epoch 2020.00, similar to how the 2011 National Adjustment provided coordinates at epoch 2010.00. These RECs will provide authoritative coordinates for surveyors to use as control and you can learn more about them and other NSRS Modernization by reviewing the NGS publication Blueprint for 2022, Part 3: Working in the Modernized NSRS¹.

GPS on Benchmarks Web Mapping Application Updates

There have been a couple recent updates to help users perform analysis and plan their GPS on Benchmarks field work and you can access the application from the GPS on Benchmarks Home page². A number of users asked to have a map layer for the secondary marks that can be used for GPS on Benchmarks when a priority



Map 1 - Original Mark Priority Hexagons for Northwestern Conterminous US



Map 2 - New Population Priority Hexagons for Northwestern Conterminous US

mark is unavailable. Many users would report the primary priority list mark was no longer there or not GPSable and would use the hexagon secondary PID list to look up marks using the NGS Data Explorer. To keep people from having to go between multiple mapping applications NGS added a layer of all the secondary marks that met the criteria for the GPS on Benchmarks campaign, helping make reconnaissance and field work more efficient.

In the West there are large areas where no people live so NGS thought it would be ideal to have a mark priority based on population, in addition to the current priority based on the type, setting and type of data collected on the mark. Using Census data, NGS performed analysis to determine all of the hexagons that fell within 20 km of areas with a population of 2500 people or more. Any hexagons, and marks falling within the hexagon, that met this criterion were given priority A (lighter color) and all of the rest were given priority B (darker color). This will allow states, counties and local governments

to prioritize marks based on where there are larger populations. Above is a map showing the original prioritized hexagons based on the mark metadata for the Western US as well as another map showing the prioritized hexagons based on population.

Beta NGS Data Explorer

Over the last few years NGS has been working to make more authoritative data available via web services. Recently NGS has been developing Esri ArcGIS Online (AGOL) web services to be used by constituents and other organizations. This enabled NGS to develop the OPUS Share and GPS on Benchmarks web maps, dashboards and web services that many states and organizations have used and added these services to their own maps and dashboards. For the Beta NGS Data Explorer, NGS added services for the NOAA Continuously Operating Reference Station (CORS) Network (NCN) as well as services for the NGS Datasheets. This

(CONTINUED ON PAGE 15)



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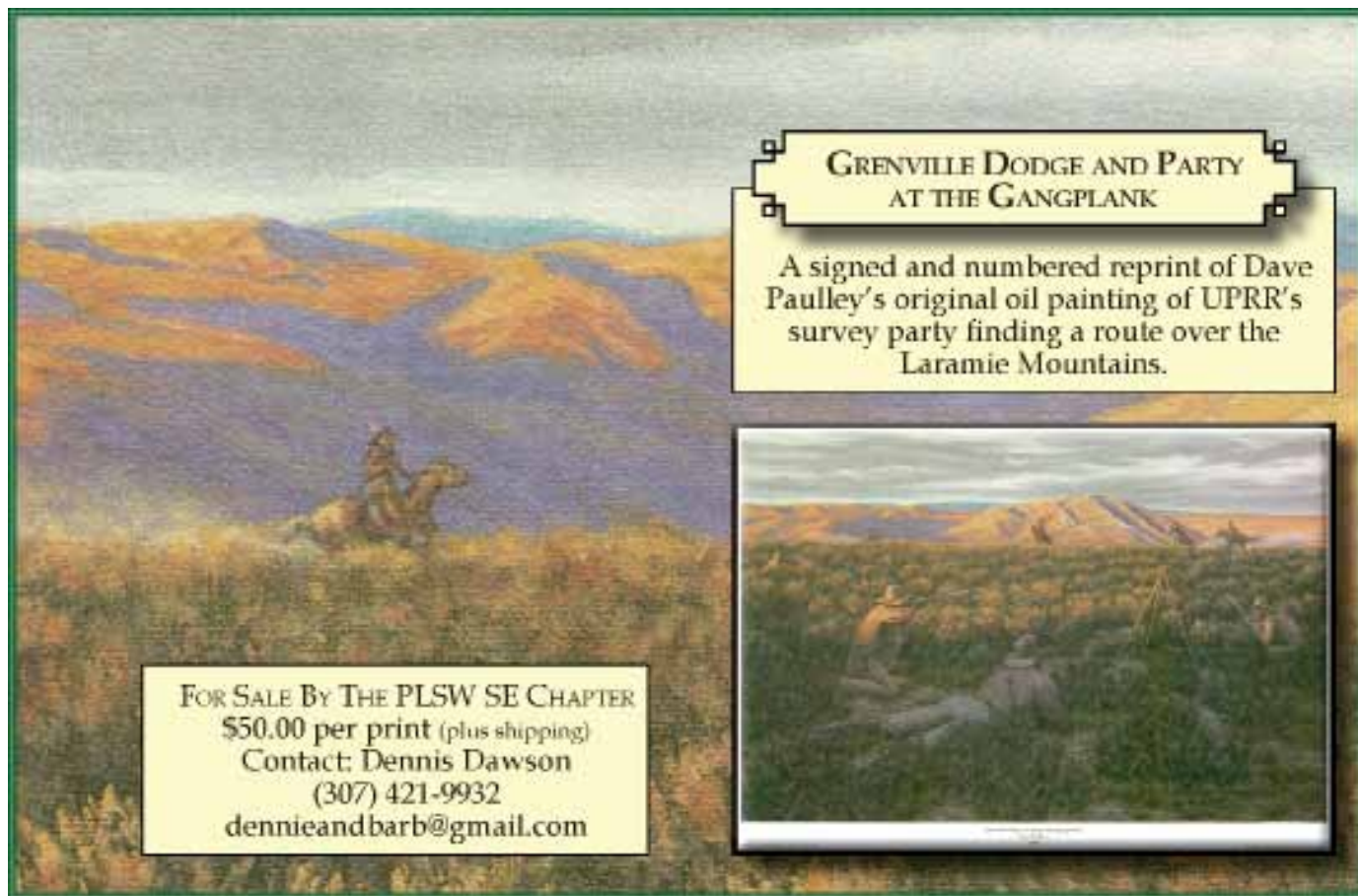
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HINTS TO AUTHORS

Dear Readers:

The editors of Lines & Points wish to convey our gratitude to the numerous authors who have contributed photographs, technical and professional articles, and other information to be incorporated into the quarterly journal. In recent years, the assembly and redaction of the submitted materials has taken on considerable technical application of the various English language compilers, office suites, and "publishing suites". This means that the communication and transfer of information and materials arrive at the editors' desktops in a multitude of formats and styles, which sometimes are not compatible with the PLSW personal computers.

We, the editors, are setting forth some simple rules for submitting materials which, hopefully will simplify your efforts and make the transition to the published version simpler and less time consuming.

1. If you have any questions or comments, please contact Dennis Dawson, Publications Comm. Chm., (dennieandbarb@gmail.com) or Mike Flaim, Designer (mike.flaim@bresnan.net).

2. If an article contains any illustrations, photographs, graphs, or other graphics, please transmit them as separate individual files. You may also include the illustrations within your manuscript, but the image integrity/quality is degraded seriously when attempting to extract them from the manuscript to create a published digital image. The Editor-in-Chief states that a much better digital resolution is obtained from the separate, individual illustrations submitted.

3. All submissions (electronic and snail mail) should be sent to S. Dennis Dawson (4005 Snyder Avenue; Cheyenne 82001). It is recommended a second copy be sent to Mike Flaim (1212 Southwest Drive; Cheyenne 82007).

4. It is strongly recommended that all submissions be transmitted six weeks prior to the publication deadline. The publication deadlines are: 1 January; 1 April; 1 July; and 1 October, annually.

5. Lines & Points is the official publication for the Professional Land Surveyors of Wyoming. Therefore, hence forth there will be incorporated in the publication all formal announcements pertaining to official business of the organization and other announcements. This includes announcements for the Annual Meeting; state-wide membership meetings; seminars; and the Fall Technical Session. These announcements are to be submitted to the PLSW Secretary/Treasurer John J. Studley (PLSW; Attn.: Mr. Jack Studley; P.O. Box No. 8; Cheyenne 82003) (jklz0318@gmail.com), at least four weeks prior to the publication deadline in which the announcement will appear. The PLSW Secretary/Treasurer will circulate the announcements to the Publication Comm. Chm.; the Editor-in-Chief; and the PLSW Board of Directors.

6. Advertisers and prospective advertisers should communicate directly with PLSW Secretary/Treasurer Studley about any advertisements and modifications.

LINES AND POINTS ARTICLE ROTATION SUBMISSION SCHEDULE BY CHAPTER

Responsible Chapter	First Call Date	Last Call Date	Publication Date
Southwest Chapter	THANK YOU!! (SEE "A SURVEYOR'S RESPONSIBILITY..." IN THIS ISSUE)		
Northeast Chapter	December 1	December 15, 2021	January 1, 2022
West Chapter	March 1	March 15	April 1, 2022
Central Chapter	June 1	June 15	July 1, 2022
South Central Chapter	September 1	September 15	October 1, 2022
Southeast Chapter	December 1	December 15, 2022	January 1, 2023

A Surveyor's Responsibility and Possession Boundaries

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

A professional land surveyor's responsibilities in regard to performing a boundary retracement survey are composed of two dependent parts. First, the surveyor is required 'to follow in the footsteps of the original surveyor.'¹ To be accurate, the original surveyor's footsteps, recognizable in the form of marks and monuments, are not by themselves determinative unless given recognition in the description found in the operative² muniments of title. Accordingly, the surveyor's duty may be described as locating the boundaries that are described in the operative description(s). The second part of the surveyor's responsibility is to provide their client with a defensible professional opinion on the location of the boundary (i.e., original footsteps) communicated in a useful and understandable manner.

Reality often clouds this definition where lines of possession or occupation differ in location from the record lines. The situation that often confronts a surveyor is where the record line, as established by monuments or measurements obtained from the operative descriptions, does not coincide with the occupation lines (fences, walls, cultivation line, etc.). Where the lines of occupation differ from the record boundary, the doctrines of adverse possession, estoppel, practical location, acquiescence, or unwritten agreement could cause the title or ownership to coincide with the lines of occupation. Consequently, a few surveyors take upon themselves the task of analyzing the extent, nature, and history of possession to determine if ownership should conform to the lines of occupation rather than the record lines. If satisfied, these surveyors monument the lines of occupation as the ownership boundary. In defense of monumenting the lines of possession, there are countless stories of surveyors who have devoted considerable time and resources in an attempt to locate the boundary described in the records only to see the courts seemingly ignore their opinion and adopt the lines of occupation

or possession as the boundary. The question then is whether a surveyor should take on the responsibility of showing lines of possession as the ownership boundary when the surveyor is fairly convinced such is the case.

There are several arguments offered for the position that the surveyor should take it upon themselves to recognize the lines of occupation as the boundaries to the property. First, such actions are relatively easy, inexpensive, and straightforward. Monumenting long standing lines of occupation generally follows recognized equitable principles without forcing the client to resort to costly litigation. In many cases, people have assumed the lines of occupation to be their boundaries. As a result, there is often less controversy where lines of occupation are monumented as the boundaries. The client often wants the bottom line, the end result. After paying the surveyor several thousand dollars, the client does not want to face the prospect of seeing an attorney and commencing litigation. Without question, lines of occupation are often held to be the boundaries where circumstances dictate.

It follows that in addition to some surveyors, many members of the Bar and other real estate oriented professions feel that surveyors could and should avoid disputes by expanding their services (or at least their communications) to a determination of where the ownership boundary exists. A great deal of confusion, delay, and disharmony can often be avoided if the surveyor makes the ultimate determination that the occupation line is the ownership line and shows the occupation line as the boundary. In other words, the surveyor avoids confusion and problems by not publishing as yet undisclosed and unobtrusive problems that arise when there is a difference between the location of the record boundary and the location of the lines of occupation.

Given these reasons and others, it is often hard for some surveyors to accept that a surveyor is

without authority and may be liable for failing to disclose where the lines of occupation differ from the location of the boundary as established by the operative records. The surveyor must understand that in these cases the procedure and who applies the law is just as important as the facts and circumstances used in establishing the boundary. Courts often quote “where the boundaries are is a question of fact, what are the boundaries is a question of law.” It is the distinction between fact and law that requires lines of occupation be litigated in order to be recognized as the boundaries.³ The surveyor, as a fact finder, ought not to and can not decide questions of law. Stated in other words, a surveyor is well within their purview in sifting the facts and applying rules of construction to opine the record boundary is at a certain location and the occupation line at another location — but the surveyor should avoid deciding the ownership boundary is at the occupation boundary or that certain improvements across the building set-back line or boundary are there

by parol license or may be maintained by some equitable doctrine.⁴ (It should be made clear that an attorney, well versed in the law, is in no better a position to decide on their own motion when the occupation lines are to be treated as the boundary.)

By way of explanation, consider a related example of a police officer who has just witnessed a person commit a heinous felony which the officer knows without question deserves the death penalty and will probably result in the death penalty. Would the police officer be justified in shooting the person without provocation on the basis of saving the State considerable time, expense, trouble, and resources only to have the same result (death by execution) occur at some later time? The police officer is trained in criminal law, deals with it on a daily basis, and is licensed to carry a firearm — surely the officer is prepared to carry out the eventual court decision. Nevertheless, the obvious answer if justice is to be preserved is that the police officer may not shoot the person without provocation. Furthermore, the prosecuting attorney, after examining all the facts, is in no better position than the police

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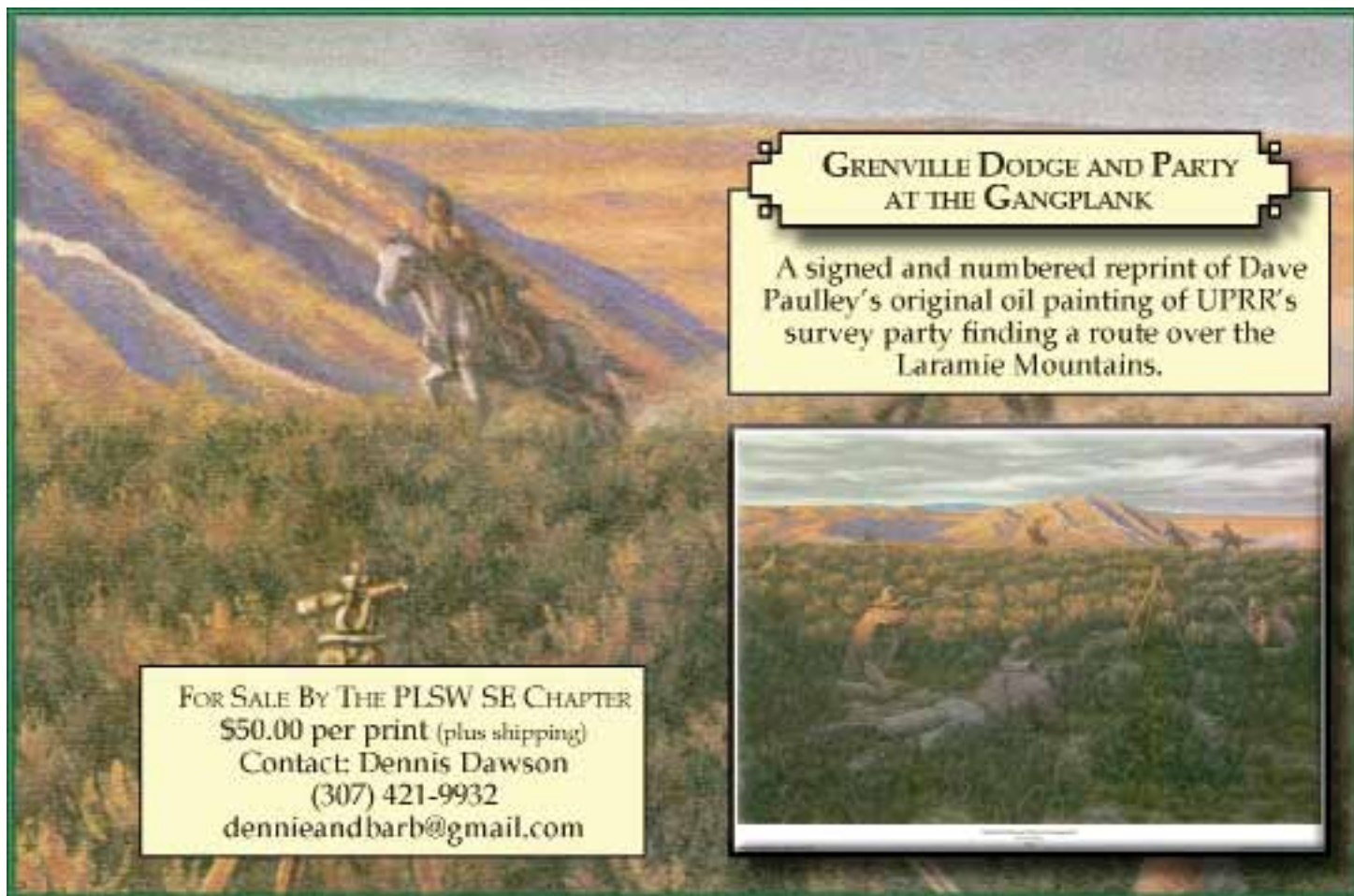


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officer in executing a death sentence. Regardless of the overwhelming evidence and certainty of punishment, the procedure of trial must be followed and the law applied by the court.

What must be realized is that where the lines of occupation differ from the boundary as located by the record, the marketability of the title is brought into question. Marketable title is defined as title free and clear from reasonable doubt as to matters of law and fact and is not one clouded by an outstanding contract, covenant, interest, lien, claim

client has a right to be informed where there is a difference between the record boundary and other potential claims evidenced by fences or the boundary location described in the neighbor's deed. The practitioner's portrayal of line of occupation as the boundary may prevent concern and worry but the simplistic portrayal does not cure a problem simply by non-disclosure of the problem. Because there are conflicting boundaries and improvements, ownership is questionable, subject to dispute, and the marketability of the



of possession, or mortgage sufficient to form basis of litigation.⁵ Consequently, title which exposes a person to litigation is not "good and merchantable" or marketable if the danger of litigation is apparent and real, not merely imaginary or illusory, which may be apprehended upon the basis of some fact or truth which can be ascertained with reasonable certainty.⁶ Consequently marketable title is title that is reasonable free from claim by another.⁷ Where the occupation lines differ from the record lines the title is not marketable.⁸

The surveyor has a responsibility and the

title is put into doubt. The surveyor has a duty to prepare opinions and communications that are objective and truthful for the client and reasonably foreseeable third parties.⁹

To summarize the surveyor's responsibility, the surveyor should not take it upon themselves to apply equitable doctrines and determine when the lines of occupation are the lines of ownership and show the occupation lines as the boundary.

¹ Rivers v. Lozeau, 539 So.2d 1147, 1151 (Fl. App. 5 Dist.1989); Tyson v. Edwards, 433 So.2d 549 (Fla.App. 5 Dist. 1983); McKinley v. Hilliard,

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248 Ark. 627, 454 S.W.2d 67 (1970).

² The term 'operative' is used to differentiate between those documents that do not have any authority by themselves to establish the boundaries. It would be improper to say the boundaries are those defined by the recorded deeds because many recorded deeds are written by persons without title to the land they purport to convey. In other cases, surveyors prepare inaccurate or erroneous plans that are recorded. Certainly these documents should not be determinative of the boundary location by the fact they are recorded. Consequently, the term 'operative' refers to those documents that emit from a grantor or other authority that had both the title and power to fix a boundary at a particular location and therefore operate to create an authoritative boundary.

³ Another method that is also recognized and preferred is where all the parties in interest join together in deeds that recognize the occupation lines as the common boundary. In such cases the occupation lines become the record lines by operative records.

⁴ The following quotation has probably been

used in the vast majority of recent Maine Law Court cases but often denies explanation from laypersons. Hence the reason for this statement.

⁵ West, Inc. v. Meadowgreen Trails, Inc., 913 S.W.2d 858 (Mo.App. E.D., 1995); First American Title Co. of El Paso v. Prata, 783 S.W.2d 697 (Tex. App.-El Paso, 1989); Lieb v. Roman Development Co., 716 S.W.2d 653 (Tex.App.-Corpus Christi, 1986); Marshall v. Hollywood, Inc., 224 So.2d 743 (Fla.App. 1969);

⁶ Stafford v. Bryan County Bd. of Educ., 466 S.E.2d 637 (Ga.App., 1995)

⁷ Vandervort v. Higginbotham, 634 N.Y.S.2d 800 (N.Y.A.D. 3 Dept., 1995)

⁸ There is a "reasonableness" standard that must be applied. A fence one foot off from the record boundary surrounding a 500 acre farm will not make the title to the farm unmarketable. However the same difference between the fence and record boundary around a one-quarter acre residential lot will likely make the title unmarketable.

⁹ Codified in the Rules by the Maine Board of Licensure for Professional Land Surveyors, Chapter 5, § 2.A.2.c.

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(CONTINUED FROM PAGE 7)

allowed NGS to create a Web Map Application including the CORS, OPUS Shared Solutions and Datasheets all on one map to explore the different data NGS analyzes, archives, and provides to the public. Creating these services allows constituents and organizations to add these data services to their Desktop GIS or web maps without having to download the data. There are many different tools for exploring, selecting, exporting, printing, and sharing the data and maps with others and it is a great tool for survey planning. Below is a screen shot of the Beta NGS Data Explorer zoomed in to Cheyenne.

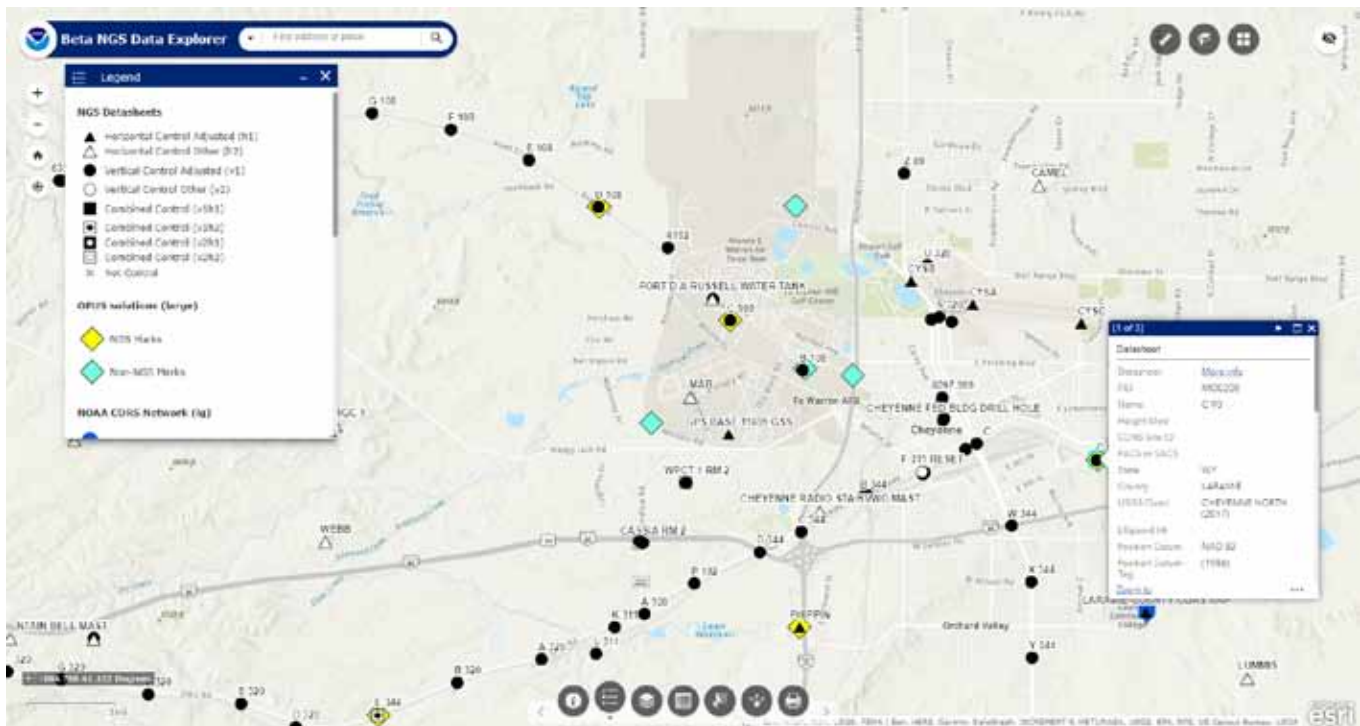
OPUS Projects

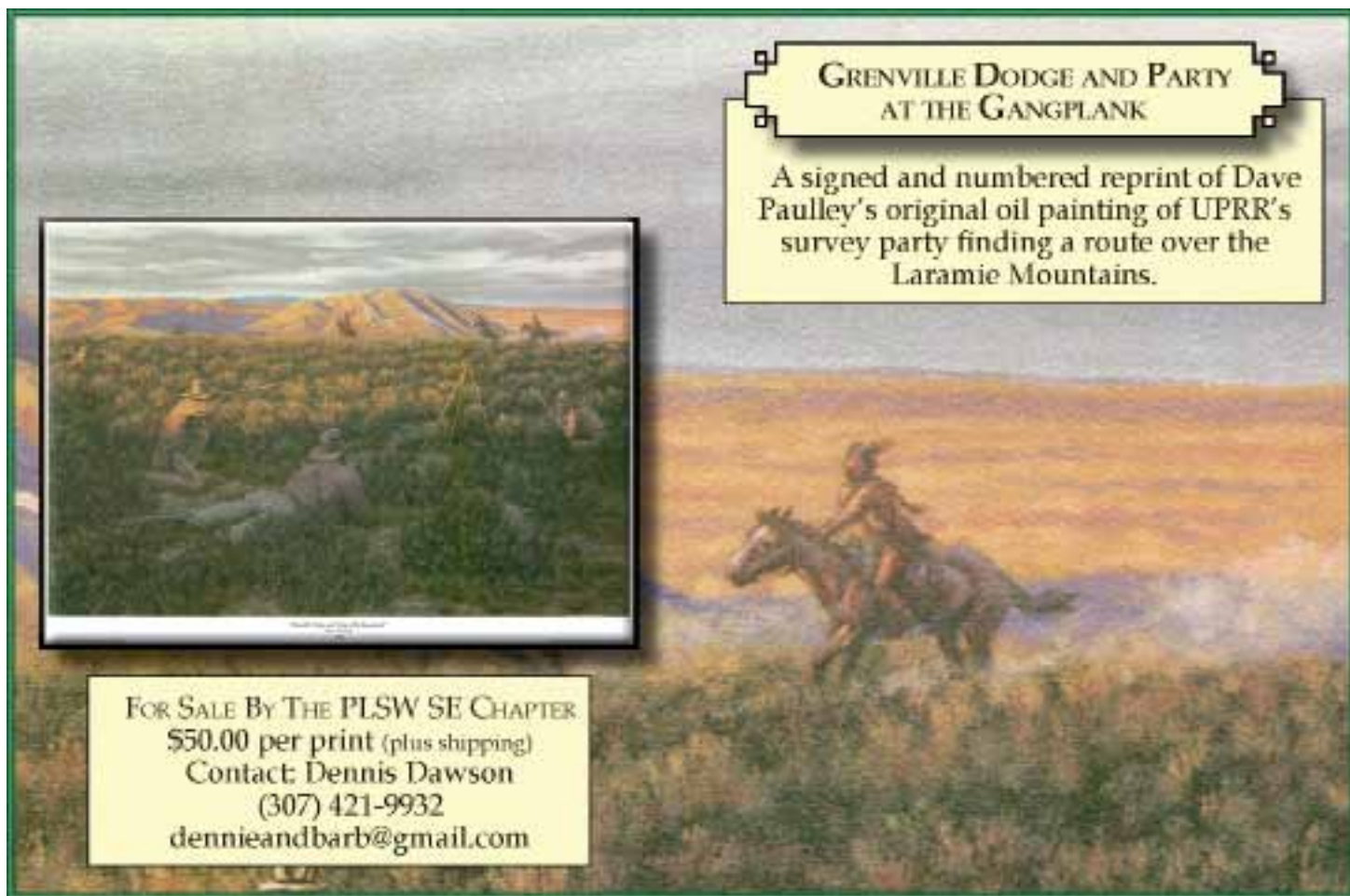
OPUS Projects is a web-based geodetic application which enables baseline processing of simultaneous, static GPS observations and conducting least squares adjustments to achieve maximum accuracy and consistency within the survey network. At this time, users need to take or have taken OPUS Projects Manager's training

to gain access and use OPUS Projects. There are several classes currently available to sign up for and all NGS training is free of charge. To see upcoming classes please visit the NGS Upcoming Training web page³.

OPUS Projects 4.0 now in Production

In early July, OPUS Projects 4.0 completed beta testing and was moved to our production servers, making it the current authoritative version. This update allows users to process GPS projects and submit them to NGS for bluebooking and loading into the NGS Integrated DataBase (NGSIDB). In the past, organizations submitting projects to NGS had to develop "bluebook" files after adjusting the projects in vendor-specific software and/or text editors. The latest version of OPUS Projects (4.0) has greatly improved this process by providing online session processing and adjustment software that now creates all the "bluebook" files required to submit observations. Submitting this data to NGS adds new certified coordinates to the National Spatial Reference System (NSRS) that are available on NGS datasheets. This provides the ability for users to





easily establish survey control where they need it. OPUS Projects can make technical assistance and problem solving more efficient by enabling users to work with Geodetic Advisors or GPS project analysts at NGS within the software. Everyone can work with the same project online to analyze any issues with the data, adjustments or files, eliminating the need to send data files back and forth. There is a new detailed user guide for OPUS Projects 4.0 (currently in draft form) available for download⁴.

OPUS Projects 5.0 now in Beta

In the middle of September, the much-anticipated OPUS Projects 5.0 was released to the public for beta testing. This is a very big update that allows users to do session processing and least squares adjustments using CORS, static occupations and Real Time Kinematic (RTK) or Real Time Network (RTN) collected vectors. Users can upload vectors from RTK/RTN observations to OPUS using the GNSS

Vector Exchange (GVX) format⁵. Many vendors are working to develop conversion software to export vectors in this format. NGS does have internal software for converting vendor vector files so you can contact me if you have any vectors you would like to convert to use with OPUS Projects 5.0.

Links

- 1 https://geodesy.noaa.gov/library/pdfs/NOAA_TR_NOS_NGS_0067.pdf
- 2 <https://geodesy.noaa.gov/GPSonBM/>
- 3 <https://geodesy.noaa.gov/corbin/calendar.shtml>
- 4 <https://geodesy.noaa.gov/OPUS-Projects/docs/Documentation.pdf>
- 5 <https://geodesy.noaa.gov/data/formats/GVX/>

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