



SURVEYOR

CALIFORNIA

ISSUE #188
WINTER 2018

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UAV/UAS (Drones) and Land Surveying

Training the Next Generation of Land Surveyors

How Best to Use Ground Control in Drone Surveying

A Tale of Two Lots and Their Owners

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SURVEYOR CALIFORNIA

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The California Surveyor is a bi-annual publication of the California Land Surveyors Association, Inc. and is published as a service to the land surveying profession of California. It is mailed to all members of the California Land Surveyors Association, Inc. The California Surveyor is an open forum for all Surveyors, with an editorial policy predicated on the preamble to the Articles of Incorporation of the California Land Surveyors Association, Inc. and its stated aims and objectives, which read:

Recognizing that the true merit of a profession is determined by the value of its services to society, the California Land Surveyors Association does hereby dedicate itself to the promotion and protection of the profession of land surveying as a social and economic influence vital to the welfare of society, community, and state.

The purpose of this organization is to promote the common good and welfare of its members in their activities in the profession of land surveying, to promote and maintain the highest possible standards of professional ethics and practices, to promote professional uniformity, to promote public faith and dependence in Land Surveyors and their work.



PRESIDENT'S MESSAGE

Ronald J. Nelms CLSA 2018 President

At the Cal Poly Pomona Conference, I participated in a panel discussion on the topic of CLSA. A question was posed by our esteemed Past President and also Past President of NCEES, Pat Tami: **“What does CLSA have to offer to Land Surveyors and why would I want to be a member?”** His question was meant to reflect on the attributes of CLSA and if it was meeting the needs of Land Surveyors. My response was weak and generic, similar to a politician’s rhetoric on the campaign trail. Mr. Tami deserved a better answer as does the membership and those contemplating joining this great organization.

Associations have to have purpose and meaning as to why it exists for their longevity and continued growth. Let’s go to our mission statement to have a better understanding:

The goal of the California Land Surveyors Association is to promote and enhance the profession of surveying, to promote the common good and welfare of its members, to promote and maintain the highest possible standards of professional ethics and practice, and to elevate the public’s understanding of our profession. CLSA represents all land surveyors, whether they are employees or proprietors,

whether in the public or private sector.

The key word that pops out is **“promote.”** Promoting means to support and encourage the professional. To do that we need to make sure a foundation is in place.

CLSA definitely has the infrastructure and support to do so. We have chapters throughout the state, committees and liaisons which help address our most important issues.

Are we equipping the Surveyor? Definitely! We have workshops, seminars, and Conferences. The monthly E-news and the Bi-annual *Cal Surveyor* magazine. The forum, Directors, website, or Central Office are valuable tools for our members to gain information. I would encourage all to ask questions of your Directors and Central Office. The website is a living, evolving place to stay current with CLSA happenings. In addition we reach out to colleges and universities through various programs and include youth programs such as Scouting Merit Badge and Trig Star.

Are we elevating the public’s understanding what we do? We participated in the American School Counselors Conference in Los Angeles with over 3,800 attendees and the California

Association of School Counselors Conference with 1,500 attendees. Recently the Board is investigating the idea of hiring a marketing firm to help us in this area.

Are we achieving the highest standards of ethics and practice? Because it is a constantly moving target that requires team work and a shared purpose through our experiences as practitioners by combining methods, techniques, and science to come to our conclusions it can be somewhat elusive. However, CLSA is meeting that goal by continuing to review legislative actions and perfecting professional practices. In addition we encourage participation at the chapter meetings to gain insight into integrity and principles.

CLSA continues to encourage the surveyor by:

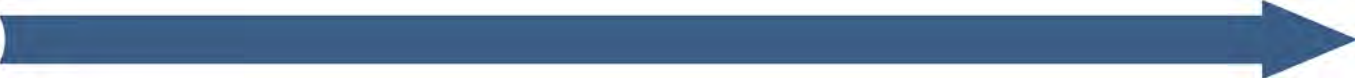
Aspiring to obtain the highest level of professionalism. When the public hires a surveyor they need know they are getting someone who can meet their expectations. CLSA encourages and promotes that higher standard so that when the public sees that the surveyor is a member they can have confidence and trust that they will receive the expected level of professionalism. At this time California does not require continuing education but CLSA has by resolution been in favor of it. If continuing education is

done properly, it would go a long way to meet that expectation. CLSA has a volunteer Professional Development Program. I can also say with certainty that there are many dedicated individuals within CLSA that are devoted to the cause of elevating the profession.

Giving a sense of belonging to each of its members. My involvement with CLSA has brought me lifetime friendships that I know I can count on. People who I can call on if I have a question or need some advice. The chapters are our greatest asset and they provide comradery and fellowship. Check with your local chapter, many of them have social activities such golf tournaments, picnics, or attending a sporting event. They also serve their community such as laying soccer fields or flags for Memorial Day. For those of you in remote areas we are exploring the idea of E-Chapters so that those members will be able to correspond with others. CLSA is working to give a sense of belonging to all surveyors.

CLSA has purpose and meaning to why it exists and because of that it has a lot to offer to its membership. If you are a non-member consider joining us. ☺

Ronald J. Nelms
CLSA President 2018



EDITOR'S MESSAGE

Landon Blake
California Surveyor Editor

Welcome to the Winter 2018 Issue of the *California Surveyor Magazine*! In this issue our volunteer team has put together two articles about UAVs in land surveying. In the first article, Michael Knopf answers the question: "Do you need a land surveying license to perform aerial mapping with a UAV?" In the second article, Logan Campbell and Daniel Katz from Aerotas discuss how to best use ground control points in UAV aerial mapping. We round out this issue with an article by Joe Deal on the

importance of training the next generation of land surveyors and one by Paul Mabry on the importance of building and maintaining good relationships with other surveyors working in your region. I've also written a review of a court case involving adverse possession and the destruction of survey monuments that appears in this issue.

In the president's message for this issue Ron Nelm answers the very important question: "What does CLSA offer to its members and why should I want to

be a member?" He touches on our mission statement and talks about two things CLSA is doing to support land surveyors. In the Legislative Committee Report Michael Belote reviews our upcoming election on November 6 and talks about some of the major new legislation that was passed this last year.

As always, I'd like to thank our regular contributors to the magazine. That includes the guys at Aerotas and John Berkowitz, who handles graphic design and layout

of the magazine. I've also been getting a lot more help from Paul Mabry and Jared Serpico rounding up content and editing the articles. In addition, we had fresh article contributions from Michael Knopf and Joe Deal.

If you are interested in writing an article for the magazine, or if you think you could serve as an editor or assistant editor, please reach out to me. Many hands make the load light. I hope you enjoy reading this issue! 🌐





LEGISLATIVE REPORT

Michael Belote
CLSA Legislative Advocate

Passing the Torch

As this column is written, California is less than two weeks from the November general elections. Experts are debating the extent that our state will experience a “blue wave,” but it is a virtual certainty that the state legislature and the Congressional delegation will move into even stronger control by Democrats; Republicans are very likely to occupy fewer than one-third of the seats in the state Assembly and Senate, giving Democrats at least the theoretical power to increase taxes, place measures on the ballot, and override governor’s vetoes without Republican votes.

Democrats are overwhelming favorites in every statewide constitutional race, with the possible exception of Insurance Commissioner, where independent Steve Poizner, a former Republican and former Insurance Commissioner, could become the first non-party affiliated statewide officeholder in California history.

With the change in governors, we are rapidly approaching the end of the Jerry Brown era in Sacramento. Consider this: when Jerry Brown leaves office at the end of the year, he will have been governor for almost exactly ten percent of the *entire history of California*, or sixteen years of service in our state’s 168-year history. Especially in his second stint as governor, he has been unquestionably the dominant political force in Sacramento. On some issues, including environmental protection, the governor has been a major international presence. Like

his politics or not, his influence in California has been massive.

A second interesting factoid: if Gavin Newsom is elected as generally assumed, this will be the first Democrat to Democrat governor transition in California in 131 years. In 1887, Democrat George Stoneman passed the torch to Washington Bartlett. Even Ron Nelms doesn’t remember them! Given the uniqueness of this circumstance, it is unknown how many Brown administration officials will stay on during the new administration. Usually there are wholesale changes, and no doubt there will be many changes in a Newsom administration, but it is possible that some individuals will stay.

Some also expect the new governor to move left. It is true that Mr. Newsom has significant business experience, but Jerry Brown routinely was described as “the most conservative Democrat in Sacramento.” We should expect interest groups, and the legislature, to test the new governor early in his term. An example: Governor Brown twice vetoed legislation which would make it unlawful to condition employment on the applicant signing an arbitration agreement. Brown felt that these bills were unconstitutional, preempted by the Federal Arbitration Act. If elected governor, will Newsom agree?

During 2018, over 1200 bills reached Governor Brown’s desk. He vetoed 201 bills, meaning that over 1000 new laws were enacted this year. That is one heap of new law! It is expected that a significant percentage of the

vetoed bills will be reintroduced in the new, 2019-2020 session.

2018 was highlighted by high-profile legislation in four areas: sexual misconduct, wildfires, privacy, and bail. In the area of sexual misconduct, the emphasis on the “me-too” movement resulted in passage of a series of bills, some of which will affect CLSA members as employers. SB 1343, for example, expands employer training obligations relating to sexual harassment. Where previously employers of 50 or more were required to train supervisors every two years, SB 1343 requires employers of five or more to provide two hours of training to supervisors, and one hour of training to all employees, every two years.

The question of liability for, and prevention of, wildfires was one of the key issues debated in Sacramento. A broad range of bills were enacted, but the basic upshot is that utilities did not win relief from liability in lawsuits alleging that they contributed to wildfires. On the other hand, utilities were granted authority to recover liability costs from ratepayers.

Bail in the criminal justice system is obviously of no interest to CLSA, but as citizens members might wish to know that legislation enacted this year basically eliminated the concept of cash bail in the criminal courts, in favor of risk assessments performed by judges.

Privacy was the fourth of the major high-profile issues addressed this year. Facing the possibility of a

privacy initiative on the November ballot, the legislature enacted AB 375, representing arguably the world’s most consumer-protective law in the world. Implementation was delayed until 2020, to allow for fine-tuning of the law next year, but AB 375 gives consumers the right to ask what information is being held on them by covered entities, demand deletion in certain circumstances, find out where the information has been shared, and prohibit the sale of certain personal information.

The big questions of which companies are covered by the new law, what information can be deleted, etc. are not entirely clear. But it is clear that any company with annual revenues over \$25 million, or those that derive substantial portions of their revenue from selling personal information, are covered. CLSA is reviewing the new legislation now in order to answer member questions, and will follow 2019 clean-up bills closely.

Following the general elections in November, the new legislature will be sworn into office in December, and return to Sacramento in earnest in January. Right now, the CLSA Legislative Committee under the chairmanship of Mike Butcher is working hard with the leadership to develop the legislative agenda for next year. It is likely that changes will be proposed to the LS Act. New bills for 2019 must be introduced by the end of February. 🌱



CENTRAL OFFICE REPORT



Kim Oreno
CLSA Executive Director

Earlier this year, the CLSA Board of Directors voted to approve a 2019 Joint Conference with the Nevada Association of Land Surveyors. Please save the dates of March 23-26, 2019.

The conference will be held at the Silver Legacy in Reno, Nevada. The Joint Conference Committee has been meeting

regularly to plan what is sure to be an excellent opportunity to engage with your fellow surveyors, see the latest products from vendors and support students through Education Foundation activities. Jeff Lucas will present a pre-conference workshop, the Education Foundations will host a bowling tournament and silent and live auctions. Don't miss out! 🎯



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UAV/UAS (DRONES) AND LAND SURVEYING:

Do I really need a Land Surveyor's License for that?

By Michael D. Knopf, PE, PLS

This article examines the use of drones in land surveying and mapping, highlighting the proper roles and responsibilities of the Land Surveyor as distinct from that of the UAS operator. While these roles overlap, each having its own set of laws, rules and regulations, land surveyors are encouraged to embrace their proper role.

The profession of land surveying has experienced a technological sea-change; its tools and technologies transitioning from the Iron Age to the Space Age in a single generation of land surveyors. Within that short time period, surveyors have transitioned from using antique instruments, hand calculations and bound field books, to powerful new technologies such as electronic total stations, personal computing, electronic distance measurement (EDM), data collectors, global positioning systems (GPS/GNSS) and robotics.

Today the surveying profession is completely dependent on the digital environment. The development of many advanced electronics, automation and computing tools has presented new challenges for surveying professionals. Like other professions, surveyors sometimes have a difficult time staying ahead of the learning and adapting required

by this unending flow of disruptive new technologies. Often the earliest adopters of a new technology are not surveyors, but those whose primary skill is centered around the new technology itself, rather than the technical principles that ought to govern its proper use. For

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example, when GPS signals were ordered unscrambled by President Bill Clinton on May 1st of 2000, geodetic coordinates could theoretically be determined by anyone, simply by pressing buttons on a GPS device operating as a “black box.” Unfortunately, non-surveying professionals were mostly unaware of the limitations of such things. People, even educated geospatial professionals, often lack a complete understanding of different horizontal and vertical datums. Sometimes, hardware and software vendors suffer similar weaknesses and as a result, they are prone to advertise capabilities that are not always accurate.

The latest new technology to emerge in the mapping world is UAV/UAS, which is a confluence of all the earlier mentioned technologies. UAV stands for Unmanned Aerial Vehicles, referring to the aircraft itself, while UAS stands for Unmanned Aerial Systems, which more broadly encompasses the aircraft, navigation systems, sensors, controllers, and any associated software and data processing apparatus. UAS combines GPS, robotics, automation and computing in a single system. Having some of the same “black box” characteristics as GPS, these amazing “flying robots” can present similar risks from use by non-surveyors who try to provide mapping solutions depending entirely on the magic of the software and results provided by the “black box.”



Orthomosaic

(Detail of Orthomosaic)

Regulatory changes by the Federal Aviation Administration (FAA) in June of 2016 have unleashed a flood of new UAV/UAS user/operators. When used for any commercial purpose, FAA Part 107 regulations now treat all types of unmanned aircraft between 0.55 lbs. and 55 lbs., (including payload) as serious aircraft, requiring registration, strict operating rules and a commercial UAV pilot’s license to operate. While pilot certification is now required of all commercial operators, the UAV regulatory environment is still developing, and it has been characterized by some as “the wild west.” Taking a go-slow approach, the government has decided to take a light grip for the time being and let the technology “cook” for a while before adding new regulations and standards. Beyond the basic flight rules, other important safety factors such as aircraft maintenance, airworthiness, recordkeeping, etc. are, for now, still left up to the operator.

With the rapid increase in the number of drone operators, the marketplace has quickly recognized the value of UAVs. The ability to safely gain visual access from an aerial vantage point has increased the demand for all types of services. Construction and industrial applications have already recognized significant benefits, particularly for locations or activities that fall into the dirty, dull, or dangerous categories, where drones offer significant advantages. The addition of sophisticated navigation systems, advanced sensors (especially better cameras) and automated software has added tremendous value to this technology, but it has also created the potential hazards mentioned previously, of which the public and the land surveying profession should be aware.

Without having a solid understanding of the system limitations or the surveying principles involved, unqualified operators can unknowingly provide outputs that contain serious errors. UAS operators and their clients can get into serious trouble by relying only on the “black box” aspect of the system without the guidance of an experienced land surveyor or mapping professional. Despite the claims of various equipment and software providers, black box software solutions cannot by themselves be relied upon to produce desired results. To protect the public from misuse it is important that land surveyors step up and embrace their role in the proper use of these new tools.

A specialized group of drone operators has begun developing applications for UAS in



UAV – Matrice 600 Pro with RTK-GNSS positioning (photo by Jocelyn Correa)

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aerial mapping. Members of organizations such as the Management Association for Private Photogrammetric Surveyors (MAPPS) and the American Society for Photogrammetry and Remote Sensing (ASPRS) have undertaken extensive testing and use of UAS mapping applications. Results show that low altitude, high resolution photogrammetry can achieve results comparable with traditional manned photogrammetry missions. A more limited number of land surveyors have gone even further by undertaking extensive testing and, in some cases, map accuracies have been achieved with UAS comparable with terrestrial GPS surveys. These results are very exciting, both on a cost basis and in terms of the richness of the data being produced, indicating UAS is likely the next great advance in surveying and mapping technology.

When considering use of UAS for mapping purposes, it is important to adhere to Rule 415 adopted by the Board of Registration for Professional Engineers, Land Surveyors and Geologists, which states:

“A professional engineer or land surveyor licensed under the code shall practice and perform engineering or land surveying work only in the field or fields in which he/she is by education and/or experience fully competent and proficient.”

This mandate is especially applicable to UAS technology when used in mapping applications. Traditional standards of accuracy such as National Map Accuracy Standards were developed in an age of paper maps and are not easily applied to newer mapping systems. To better relate to the types of digital map data being produced today, ASPRS has developed a digital accuracy standard more suitable for UAS mapping applications called “ASPRS Positional Accuracy Standards for Digital Geospatial Data.” This change is important because land surveyors and photogrammetrists no longer provide only two-dimensional maps as their end-product deliverable. With digital data captured in three dimensions, the options for deliverables might just as easily be a series of measurements, a



DSM with Contours

3D model, a CAD surface or a domain-ready dataset.

Land surveying statutes of individual states define the required role of the licensed land surveyor or photogrammetrist. Producing certain outputs using UAS without the involvement of a certified photogrammetrist or licensed land surveyor is not only unreliable, it may be against the law. In California for example, Section 8726 of the Land Surveyor’s Act defines land survey practice to include any of the activities listed below, almost all of which can occur with any mapping project utilizing UAS:

- (a) Locates, relocates, establishes, reestablishes, or retraces the alignment or elevation for any of the fixed works embraced within the practice of civil engineering, as described in Section 6731.
- (b) Determines the configuration or contour of the earth’s surface, or the position of fixed objects above, on, or below the surface of the earth by applying the principles of mathematics or photogrammetry.
- (g) Determines the information shown or to be shown on any map or document prepared or furnished in connection with any one or more of the functions described in subdivisions (a), (b), (c), (d), (e), and (f).

- (i) Procures or offers to procure land surveying work for himself, herself, or others.
- (m) Creates, prepares, or modifies electronic or computerized data in the performance of the activities described in subdivisions (a), (b), (c), (d), (e), (f), (k), and (l).
- (n) Renders a statement regarding the accuracy of maps or measured survey data.

While the UAS operator or drone pilot is required to be knowledgeable about flight operations, airspace, flight characteristics of the aircraft, weather, FAA regulations and pre/post-flight procedures, etc. these factors, important as they are, do not address the other critical aspects of planning a flight mission. For successful mapping missions, other critical elements are needed. These include a thorough understanding of the client’s required map accuracy, proper density and location of ground **control** points, proper sensor selection, proper flight altitude and ground speed, location and number of required ground **check** points and flight pattern overlap to name just a few. For these activities, as well as for post-processing of the data, quality control reviews, etc., a licensed land surveyor or photogrammetrist must be in responsible charge.

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UAV/UAS Drones – continued from page 9

Despite these restrictions, many commercial UAS applications do not involve surveying or mapping and therefore do not require a land surveyor or photogrammetrist. The images produced from even a modest camera sensor mounted on a low-altitude UAV can be stunning. Capturing these high-resolution images for a variety of purposes is one of the most valuable uses of UAS. Much of the time, this type of UAS work does not fall within the definition of land surveying, that is, unless it is accompanied by certain representations.

How does a client determine when the use of UAS might require supervision by a qualified mapping professional? Certain key words can provide clues. In discussing the planned work assignment, certain project objectives often fall within the definition of land surveying including; acreage, area, dimension, location, contours, volume, accuracy, scale, coordinates, or units of measurement such as acres, feet or cubic yards. These words usually indicate work intended to

provide a geo-positional, relational or dimensional reference and as such are likely describing activities that should be performed under the direction of a properly qualified licensed land surveyor or photogrammetrist.

When considering how UAS is proposed to be used, it is important for land surveyors and the public to understand the distinctions between unregulated aerial

photography and aerial mapping that falls within the land surveying realm. 📍



Michael D. Knopf

Mr. Knopf has over 40 years of professional experience, including 12 years as QK's President and CEO, where he oversaw the firm's overall operations, business development and client relations.



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Training the Next Generation of Land Surveyors

By Joe Deal



If you find yourself with less time ahead in your career than behind you, I hope to inspire you to share what you have learned along the way with someone new to our profession. All of us have something we can share with the younger generation of surveyors under our charge.

I began my career as a summer engineering technician with the County of Orange Survey Department. I worked at the Fruit Street yard in Santa Ana, California. I was attending Whittier College and needed a summer job. My Aunt worked for the County Surveyor at the time and told me about a summer job program working in the Survey Department. I asked my aunt what surveyors did, and after a brief description, decided it sounded like a great opportunity. I worked the summer of my freshman year and then quit to go back to school in the fall. I was studying Education and hoped someday to be a teacher and coach. Little did I know how my plans would change.

At the end of my second year of college, I was excited to spend another summer working as a Land Surveyor. I really did not know what we were doing everyday but enjoyed working outdoors and the camaraderie of working on a survey crew. Towards the end of my second summer, I was approached by a supervisor who

asked if I would be interested in a full-time position and possibly a career as a land surveyor. I spent a good ten minutes thinking over the offer, and then decided, "Hey, why not?" That was the beginning of my career in the Land Surveying profession over thirty years ago.

I spent the next ten years working at the County of Orange. I was fortunate in that period to be trained by some of the sharpest "old school" land surveyors I've known. This was a pivotal time in the industry. It was the start of the personal computer age, the beginning of public use of the Global Positioning System and the advent of huge strides in technology used in Total Station instruments. The County Survey Department invested in each of these and spent a great deal of time and effort in training and implementing the new tools.

As I look back on my career, I am grateful for the various party chiefs I worked for. Back then, we were all on rotational crew assignments. You would spend a year working on a crew for a particular chief, and then be rotated to the next chief. I was fortunate to work with a mix of chiefs, each with varying types of experience. Some were experts in high order control networks while others were mainly construction surveyors, building roads

and bridges. Some led GPS Crews, and others performed hydrographic surveys in the Harbor.

I realize now how important my training was when I look back at what a formative time this was. I was fortunate to work for some of the older chiefs who still did things in conventional ways. They did not embrace the new technology as quickly as some and still insisted we learn to do things manually. I remember calculating stations and offsets from a roll of plans using my HP41 calculator. One of the chiefs loaded in a survey program with a card reader and walked me through the programs daily. However, he insisted I do the calculations long hand, and encouraged me to understand what the calculator program was doing.

Similarly, we would calculate each day's work for construction staking while sitting in the survey truck. We would read aloud our calculations and double check one another. We would perform conventional level runs and use the appropriate hand signals to relay our readings to back and forth. We also did hand calculations on the fly as we would ray out reference points along a proposed sloped roadway and then do slope staking from station to station.

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As time passed, I took more classes at Santa Ana College. The college had a great Survey Program and most of the guys I worked with took one or more of these classes. I eventually took the Land Surveyor in Training exam. I had young kids by that time and it was a busy life, working all day and then taking classes at night and on Saturdays. I eventually left the County after ten years and took a position at a small Land Surveying & Civil Engineering firm where I now work. The firm was started by a Civil Engineer who also was able to practice as a Land Surveyor. Later, the firm was managed by two of his sons and a friend of theirs from high school. I came to the company and started out on a two-man crew before becoming a Party Chief with my own crew. Several years later, I left the field to become the Survey Coordinator at the firm. With time I took and passed the California Land Surveyors Exam and became a full licensed land surveyor.

As I look back on my career, I am thankful for the surveyors who took time to train and mentor me each day. I regard myself as a good mix of the old school and new school methods of the profession. If I were to go out on a limb, I'd guess that most of the people who end up in the profession, did so by chance. They had a friend or family member who was a surveyor who influenced them. I have not met many surveyors whose initial goal in life was to become a land surveyor.

As I look to the future, I feel obligated to share my knowledge of the profession with the next generation of surveyors. We all have an obligation as professionals in our industry to pass on what we have learned from our mentors to the next generation. With that in mind, I offer the following observations on how we might begin to do just that.

First, we are tasked with finding new recruits to fill the vacancies in our profession. For

the record, this profession is not for everyone. It is of utmost importance that we find the right individuals to admit into our ranks. When I interview job candidates, I am always honest about the demands of our job. I let them know that the job is very demanding. We begin our days early and work in dangerous conditions, hot weather, cold weather, and windy weather. We are often asked to complete a project in a "day" due to the budget and time constraints we commit to. The surveying profession is definitely not for everyone.

Second, I strongly believe that after we find the right individual, hire them, and invite them into our ranks, we should take every opportunity to train and teach them something new every day. I personally like to check in with my trainees throughout the day. Perhaps give them a survey problem I find in a textbook. Ask them, "Which way is north" when we spill out of

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the truck that morning. Have them pace a distance down the street in search of a monument. Get them to calculate an angle between two bearings on a Map. And if they have never done the required task, even better, it is a teaching moment to show them something new.

Third, we have lost the art of hand drafting. Every surveyor who is able to provide a sketch or an exhibit showing the results of measurements or conditions found in the field is a tremendous asset to a client and his or her co-workers. I was embarrassed several times early in my career by my inability to sketch and produce a clear exhibit. By the same token, I was so impressed by the ability of some of my mentors to produce beautiful hand drafted sketches. Each work was a piece of art. They contained the necessary information perfectly fit and shown on an 8 1/2 x 11 sheet of grid paper. My early mentors insisted that I develop this skill. They assured me of it's importance, and told me that surveyors were often judged by the quality of the notes they kept. I took this to heart and worked tirelessly on my penmanship or "hand" as they called it. I relished the compliments I received from my party chief. Thereafter, I was often left in the office to draft the prior days survey notes, because of my new-found abilities. Sometimes this kept me out of the heat – an unexpected blessing. Unfortunately, we don't expect or teach this to the new generation. We should. We should demand that they work on their penmanship and provide clear and concise notes, even if they don't want to. We live in an age of Computer Assisted Drafting, but all surveyors should be able to do hand drafting. We need to promulgate this lost art.

Fourth, at the beginning of the day, we need to stow the cell phones. Those cell phones aren't needed during the course of most work. I recall while performing survey staking at a construction site, several of my survey party chiefs would demand that I check their cut/fill by calling back the proposed grade. At the very least, I would have to acknowledge that the cut/fill they gave me was correct. This involved two critical items: paying attention to what we were doing; and doing math in my head.

When was the last time you asked this of your junior staff? Try it. It takes some practice, but eventually they get the hang of it. And don't forget the common-sense checks. Tell them to look back at the line of stakes you just set. Do they line up? Is there a bust somewhere? Break out the physical measuring tape every so often and "check in." None of these techniques work if the cell phones are buzzing and staff is distracted every other minute with texting.

I remember another time when I first started out as a chainman. I was not allowed to even touch the instrument. The Party Chief and the instrumentman on the crew handled the instrument so delicately, removing it from the case, holding on to the top mount as they screwed it onto the tripod, cradling it as they stepped down on the legs. I wondered inwardly when was I going to be able to set up the gun. After a few months, my party chief asked me if I wanted to set it up. "Sure," I said. "It's about time." He asked me if I could tell him what the gun was measuring, how it was calculating coordinates from the angles and distances we measured.

"I have no idea," I responded.

"Well," he said, "when you can tell me what the gun is doing, you can set it up."

I made it my ambition over the next few days to figure out what this instrument was actually doing. A beautiful hand drawn sketch from my chief helped the lights turn on, and I slowly gained an understanding of what the machine was doing. We should do this with those in our charge for our modern instruments. It is our responsibility not to allow a generation of button pushers to rise through our ranks. We can do better than that. They deserve better than that.

Finally, the last but not least important item on my list is SAFETY. It is imperative that we teach and model safety to new recruits every day. Teach them to take a look at an intersection before walking out into the street. Always wear a vest. Teach them how to set out safety cones. Teach them how to work in traffic, what to look out for. It is important for their safety and

our own. Never be in such a hurry that you are not safe.

In closing, it is important that we older surveyors look back on our careers and remember the times when we had absolutely no idea what we were doing. Pause to recall that first party chief or supervisor that spent the time to explain what they were doing, or why they did it. If they are still around, call and thank them.

Maybe it's time you begin to mentor someone in your charge. Perhaps you can volunteer at the local community college that offers a survey program. I was able to help a Boy Scout Group with their Merit Badges in Surveying. Donate some money towards a scholarship for surveying students. You too can leave a legacy of fond memories of the things you've shared with others along the way. 🌟



Joe Deal

Mr. Deal began his career at the County of Orange in 1988. After spending ten years with the County, he began working at Joseph C. Truxaw & Associates in Orange. He is currently the Survey Coordinator at Truxaw & Associates.



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How Best to Use Ground Control in Drone Surveying

By Logan Campbell and Daniel Katz



Through our photogrammetry & CAD linework service at Aerotas, we have the benefit of seeing thousands of drone projects. Combined with our own extensive testing, this has allowed us to learn the key practices for ensuring drone surveying is as accurate and efficient as possible. One of the most critical factors in ensuring a profitable and accurate drone survey is ground control.

When using a drone for survey work, accuracy begins with ground control. “Ground control points” (GCPs) are targets marked on the ground and located to a high degree of accuracy with traditional surveying tools such as high accuracy GPS, total stations, or laser scanners. GCPs are then used to reference and correct the 3D model created from the drone photos, ensuring that the model is accurately georeferenced and matches with field-shots taken on the ground.

The purpose of GCPs for drone surveys

If drone photos are stitched together without GCPs, the resulting 3D model is like a rubber sheet, which can easily stretch or warp by as much as 10’ in the X and Y dimensions and 50’ in the Z dimension. This occurs due to inaccuracies in the

drone’s onboard GPS and noise caused in the photo-stitching process. Incorporating GCPs in the model is like driving nails through that rubber sheet, anchoring the final data to a known set of coordinates on the ground. This ensures that all data is in the same coordinate system and that the 3D model is highly accurate within that coordinate system. Even when using a drone with high-accuracy GPS (like onboard RTK or PPK), GCPs are still required to correct for errors and ensure accuracy.



Quantity of GCPs for a drone survey

Though projects vary widely, we have found some simple benchmark guidelines help in the project planning process. Geometrically, three GCPs are required to correct a model, but we recommend a minimum of 5 GCPs, no matter how small the project. This allows the photogrammetrist to check GCPs against each other and correct for errors that can occur in processing.

Many projects will need more than 5 GCPs. However, it’s not a simple GCPs-per-acre calculation. What matters is how many photos “bridge” between GCPs. If the drone is flown low, each photo will cover a small amount of ground, so it takes a large number of photos to bridge between two GCPs. When flying higher, however, each photo covers more ground, so fewer photos bridge between the same GCPs. The more photos that bridge between those GCPs, the more flex and error there will be in the model. This means that when flying at a low altitude, more GCPs are needed than if the same site was flown at a high altitude.



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Ideally, the number of GCPs should be based on the number of photos between the GCPs. In order to simplify this, we base the number of GCPs on batteries used. From our testing with the DJI Phantom 4 Pro, five GCPs per battery is an effective standard. On average this equates to five GCPs for each 250 photos taken. For example, covering 50 acres when flying 400' above ground would only require 5 GCPs, because it can be flown in a single battery. However, covering the same 50 acres at 100' above ground would require 10 batteries, so 50 GCPs.

Site size	Flight altitude	Expected number of batteries	Expected number of photos	Required GCPs
5 acres	100'	1	250	5
20 acres	100'	4	1,000	20
50 acres	200'	2	500	10
50 acres	400'	1	250	5
200 acres	100'	40	10,000	200
200 acres	400'	4	1,000	20

The number of GCPs required drops significantly as flight altitude increases. In practice, it is impractical to fly large project sites at low flight altitudes. Covering 200 acres could be done in only four flights and 20 GCPs at an altitude of 400', while at 100' altitude it would take ten times both: 40 flights and 200 GCPs. However, there is a tradeoff: flying higher will produce lower expected accuracy.

Accuracy Expectations

Predicting, measuring, and validating accuracy from drone data is very complex, and is different on every project. The only way to independently and perfectly measure accuracy for each project is by using checkpoints – independent field-shots measured against the model produced from the drone data. However, through our testing, we have determined benchmarks for expected accuracy when following proper procedures. Accuracy is impacted most by the altitude flown, and adding more GCPs beyond the recommended five per battery does not dramatically improve accuracy in our testing. The below data is based on testing with a DJI Phantom 4 Pro.

Flight altitude (ft AGL)	Photo resolution (GSD)	Maximum area covered per 17 min flight	Expected horizontal accuracy (ft)	Expected vertical accuracy (ft)
100'	0.85cm / 0.03'	5 acres	<0.1	0.10
200'	1.7cm / 0.06'	20 acres	0.14	0.20
300'	2.55cm / 0.08'	35 acres	0.21	0.29
400'	3.4cm / 0.11'	50 acres	0.28	0.39

As can be seen, there is a clear tradeoff between accuracy and flight altitude. This means that careful project planning is essential to ensuring a drone survey produces the needed accuracy, and does so efficiently. Batteries used and GCPs both translate to more time spent in the field, so always flying for maximum accuracy is often not the best business decision. Often it makes more sense to rely on the drone for topo data (contours) and then collect any critical high-accuracy points on the ground.

Location of GCPs

At a minimum, GCPs need to be set in each corner of the project area, and at least one in the middle. If there is a significant amount of elevation change on the site, ensure that there are some GCPs set on the high and low points of the project. Beyond that, best practice is to have the GCPs spread evenly throughout the project.

Next, it is important that the flight area is set to extend beyond the GCPs by at least one flight-line or photo in each direction. If a GCP is outside of the flight area, then it cannot be included in the image-stitching process and will cause high error in that area of the project.

When conducting a linear project (corridor, pipeline, right-of-way, etc.), best practice is to set pairs of GCPs along each side of the corridor at an even interval. For example, if flying at 400', a pair of targets about every 500'-750' is sufficient to meet the above accuracy expectations.

Size, Shape, and Visibility of GCPs

Finally, GCPs need to be clearly marked so that the exact point that was located in the field can be matched in the photos. This means that the GCPs need to have a clear, unambiguous point so the photogrammetrist can be confident that they are entering the coordinates at the



exact same point that the surveyor shot in the field. In our experience, checkerboard-pattern targets work best for this purpose.

It's also important that targets be easy to identify in as many photos as possible. This means that they must be:

1. Not under any obstructions (i.e. trees or buildings) that would block a clear view from the sky from every angle
2. Large enough to be seen in the drone photos (at least 12 inches across)
3. Easily identifiable from any orientation (i.e. not "left side of paint stripe")
4. Of a color or contrast that stands out

Ground control is where accuracy starts with drone surveying, and is what ensures the model fits into the coordinate system you need. It is a crucial step in the project planning process, and requires thorough understanding of tradeoffs for accuracy and field-time. Ultimately, a drone survey being accurate and profitable depends on the right amount of the right type of GCPs set in the right locations around a project site. 📍



Logan Campbell

Logan Campbell and Daniel Katz are co-founders of Aerotas, which provides drone photogrammetry and linework drafting solutions that enable surveyors to reduce project time on topos, ALTAs, and more by 90% in the field & office. Learn more at www.aerotas.com.



Daniel Katz



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Natural disasters can strike just about anywhere. While here in Nevada we are blessedly immune to the ravages of hurricanes like Michael, that struck the South in 2018 or Harvey and Maria who wreaked havoc in 2017, we still had the worst fire year in state history this year. Even so it was nothing like California where the Camp Fire and before that the Mendocino Complex and Carr fires destroyed the homes and livelihoods of thousands of victims. Some of whom were surveyors, like yourself.



The National Society of Professional Surveyors Foundation, through its Disaster Relief Fund, has helped dozens of surveyors whose homes were destroyed by disasters such as these. But we do this from a very modest base and we could use your help. By helping us with a donation, you are helping surveyors across the nation as surveyors elsewhere may one day help you! Please give today.



Go to the NSPS website /www.nspss.us.com for a link to the donation page, or

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A Review of *Cronier v. ALR Partners*

By Landon Blake



Introduction

In this article I review a court case from Mississippi in the dispute of *Cronier v. ALR Partners*. This dispute involved 10 acres of land in a rural part of the state within the Public Land Survey System. It involves an adverse possession claim with interesting twists including the destruction of monuments and the firing of the land surveyor hired to retrace the parcel boundaries. This case raises questions both about the surveys involved and the legal doctrine of adverse possession. It also includes a well written dissenting opinion.

Timeline

Here is a summary of the events pertinent to the timeline of this dispute:

1940s:

ALR purchases land surrounding the Cronier parcel on 3 sides.

1940-1987:

ALR makes use of the disputed property. This includes harvesting turpentine, renting the land out to a hunting club, clearing fire roads, and marking the alleged property line.

1987:

ALR hires Surveyor Dennis to mark the boundaries of their parcel. He sets monuments and yellow paint blazes along the alleged common boundary with the Cronier Parcel.

2012/07/26:

Cronier purchases its parcel.

2012/07/26:

Surveyor Moody is hired by Cronier to survey their parcel and to mark the parcel boundaries for a cattle fence.

2012/08:

Surveyor Moody arranges for a meeting with Cronier and ALR to discuss the preliminary results of his survey, which reveal a large discrepancy between the boundary line marked on the ground and the parcel boundary described in the deed that transferred the parcel to Cronier. Immediately thereafter, Cronier fires Surveyor Moody.

2012/09?:

ALR visits the disputed property and discovers that marks on the alleged boundary have been destroyed. ALR takes photos of the remaining boundary marks.

2015/09:

Moody completes his boundary survey.

2014/07:

ALR visits the disputed property and discovers Cronier has erected a barbed wire fence along the boundaries as described in his vesting deed.

Undisputed Facts

The following facts appear to be undisputed by ALR or Cronier:

- 1) No survey was obtained by Cronier prior to his purchase. No attorney was involved in the property transaction.

- 2) Property corners along the alleged boundary between Cronier and ALR found by Surveyor Moody included an iron pipe monument, an old fence post and yellow painted blazes.
- 3) An old fire break ran along the western boundary of the Cronier parcel.
- 4) The easterly corners of the Cronier Parcel were marked by two iron pipe monuments. These pipe monuments were accepted as marking the easterly boundary of the Cronier Parcel, and were not in dispute.

Party Claims

After failing to reach an agreement with Cronier on the location of their common boundaries, ALR sued to perfect title under a claim of adverse possession. They argued they held openly and peacefully occupied the disputed 10 acres of land between the alleged boundary and the boundary described in the vesting deed of Cronier for longer than the 10 year period required under Mississippi law.

Narrow Legal Questions

Here are the narrow legal questions raised in this case:

- 1) Was the use by ALR of the disputed parcel regular enough and open enough to satisfy the requirements of an adverse possession claim?
- 2) Was the marking of the alleged boundary by Surveyor Dennis part of the open possession of this parcel?

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- 3) Was it significant that ALR had shown Cronier the monuments and marks on the alleged boundary at the time of purchase?
- 4) Did the possession of ALR have to remain continuous after the 10 year statutory period had initially been met?

The Trial Court Decision/ The Appeals Court Decision

The Trial Court found in favor of ALR. It decided ALR had presented sufficient evidence of regular and open use to prove its claim of adverse possession. Cronier appealed this decision.

We will now consider the appeals court decision on the narrow legal question we recited earlier in the article.

Question #1: Was the use by ALR of the disputed parcel regular enough and open enough to satisfy the requirements of an adverse possession claim?

Yes. The appeals court found the use by ALR of the disputed parcel was regular and open enough to satisfy the adverse possession claim.

In its decision, the court noted:

Allen claims that there was no evidence of open, notorious, and visible possession of the property such that he or the predecessors-in-title would know of it. However, the chancellor found several instances of such possession. Photographs, survey plats, and testimony show the painted blazes existed on timber on the northern and western boundaries of the Croniers' property, until they were removed. Moody Jr. testified that Allen took him to the corners claimed by the Rainwaterses; Allen thought they were the corners of his property, until he learned of a discrepancy in the deed. Further, the Croniers' predecessors had honored these boundaries.

Other possessive acts by the Rainwaterses over the years included marking corners, creating firebreaks, fencing borders, harvesting turpentine, leasing the property for hunting, and using the area's road to access other property. Additionally,

the property was flagged by Mr. Dennis, controlled burns were performed, and cows grazed on the disputed property. We cannot accept the dissent's characterization of these activities as a few isolated events. The record shows that there was testimony, apparently accepted by the chancellor, that clearly established decades of open, obvious control of the disputed property. It was not the fact that there were remnants of "meandering" paint markings on trees or an old firebreak, but that this evidence supported the testimony of the Rainwaterses that this property had been in their family's possession for decades. The evidence is sufficient to establish this element.

Question #2: Was the marking of the alleged boundary by Surveyor Dennis part of the open possession of this parcel?

Yes. The appeals court made clear that the surveyor marking of the boundaries and the testimony of ALR about the location of the property corners and character of the property corner monuments was part of its open possession of the disputed parcel.

In its decision, the court stated:

The chancellor found the Rainwaterses had exhibited actions showing dominion and control over the property at issue for decades, and we cannot say she erred. Testimony showed the Rainwaterses had maintained and marked the boundaries of the property since the 1940s by fences, yellow blazes, and firebreaks. Additionally, Austin testified that before Allen bought the property, he told Allen about the corner markers and boundaries. These markers

were still visible when Moody performed the first survey, and were, in fact, pointed out by Allen, according to Moody. Allen's argument is without merit.

Question #3: Was it significant that ALR had shown Cronier the monuments and marks on the alleged boundary at the time of purchase?

Yes. The appeals court mentions this several times in its decision. Although Cronier denies it was shown the property corners at the time of purchase, the court was not persuaded by this testimony. Indeed, the court specifically calls out the testimony of Surveyor Moody, who asserts to the contrary that Cronier showed him the corners that were identified by ALR at the time of purchase.

Although the court doesn't provide much explanation on the weight of this particular fact, it seems the court found it material that Cronier was likely notified of the alleged boundary line by his neighbor prior to and at the time of purchase.

Question #4: Did the possession of ALR have to remain continuous after the 10 year period required for adverse possession had initially been met?

No. The appeals court found that once ALR had met the 10 year requirement for possession, its use no longer had to be continuous because it had acquired unwritten title to the disputed parcel at the point the statutory clock had run.

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In its decision, the court explained:

Allen argues that the Rainwaterses failed to prove continual possession of the property for ten or more years, instead providing only “instances of intrusion” on the property. Additionally, Allen claims this element was not met because many of the Rainwaterses’ possessory acts occurred fifty to sixty years ago, which were again too “remote in time.” However, the Rainwaterses do not need to prove continuous uninterrupted possession for more than ten years. Instead, title ripened after ten years of continuous uninterrupted possession, after which the former property owner would have to prove adverse possession in his own favor to regain title.

Therefore, absent Cronier providing ten or more years of evidence to the contrary, the title, albeit unwritten, remained with ALR.

A Review of the Court’s Decision

I have a confession to make. After reading this court decision, I don’t feel like Cronier was a very nice guy. He apparently lied about being shown the corners by ALR at the time of purchase. It then looks like he removed the corner monuments marking the boundary line claimed by ALR. And, he fired his own land surveyor when he attempted to find a peaceful resolution to the boundary discrepancy outside of court.

Despite my dislike of Cronier, I believe the judge in the dissenting opinion makes a valid argument. It is no small matter to take away land from the legitimate record title holder and give it to another. In this dispute, the land was rural, the terrain was heavily overgrown, and there was no fence marking the purported boundary. The use of the disputed parcel by ALR seems to have been weak from an objective

point-of-view. I have a lot of unanswered questions about this dispute, but based on the facts provided in the decision, I find I side more with the opinion of the dissenting judge, and I would have ruled differently than the majority.

The appellate decision also didn’t examine the issue of estoppel. If the judges had found that Cronier’s acceptance of the corner monuments he had been shown by ALR estopped his later claims, I may have more easily accepted their decision. 🗳️



Landon Blake

Landon Blake is a land surveyor that lives and works in the California Central Valley. He is also a hiker and amateur landscape photographer. You can learn more about his work at www.landonblake.com.

The Takeaway

What lessons can we learn from this court decision?

Lessons for Land Surveyors

One or more of the land surveyors involved in this case failed to adequately do their job. Either Surveyor Davis placed monuments to mark a line that conflicted with the Cronier land description, or the surveyor that prepared the land description for Cronier didn’t create a description that matched the section breakdown on the ground. (It is possible that Surveyor Davis knew there was a problem with the Cronier land description, but if so, he didn’t leave enough of a record to alert others based on the survey map he prepared.)

It seems like the only surveyor that was doing a good job was Surveyor Moody. As soon as he discovered the underlying problem with parcel boundaries, he asked both land owners to come together and fix the problem. Unfortunately, he worked for a client that didn’t appreciate his efforts and was more worried about going to court to prove he was right than he was about reaching a reasonable

solution with his neighbor. In retrospect, this was a shame. It is likely Cronier spent far more on his attorney’s fees than he planned initially. It is a rare surveyor that discovers a problem and tries to facilitate a peaceful resolution with the parties involved. It is too bad Surveyor Moody’s client didn’t appreciate this effort.

Lessons for Land Title Professionals

What lessons are there in this court decision for land title professionals?

Clearly, a survey obtained prior to the time of purchase would have revealed the problem before Cronier moved in. It would be interesting to know whether Cronier obtained title insurance on his parcel and if so, whether it included the survey exception to coverage. If a land title insurance company had insured the parcel without the survey exception, it may have been exposed to potential liability for a claim.

Lessons for Land Attorneys

The court decision made it clear that Cronier didn’t have a lawyer involved at the time of purchase. An experienced lawyer would have certainly advised Cronier to better understand the boundary and title issues and likely to resolve them before the purchase.

It is also interesting to consider what would have happened if ALR had gotten an acknowledgement of the monumented boundary is shared with Cronier in writing from Cronier before the purchase. Could Cronier then have been more easily estopped from claiming to the boundary in his land description?

It is also of interest that the court decision never tells us if the land description in the Cronier deed represented the true location of the boundary. It is possible that line monumented by Surveyor Dennis was the correct line all along. Without more information in the public record, we are left to wonder. 🗳️



A Tale of Two Lots and Their Owners

Why Surveyors need to know and trust each other

By Paul Mabry

How many lawyers does it take to change a light bulb? Answer: One to change the bulb and five to write the environmental impact statement.

This poke at the legal profession applies more generally to a related problem with the profession of land surveying. How do surveying professionals best serve their clients and the public at large when faced with mundane, real-world situations? Just as lawyers are not best suited to change light bulbs by virtue of their profession, so surveyors, in isolation, may not be suited to meet many issues arising in their course of business.

The story that follows is based on my experience practicing law. The facts are changed or omitted to protect confidentiality, but the story demonstrates why we as a profession need to reach out to our fellow surveyors and strengthen the mutual rapport and trust that should accompany any true profession. The public needs us to know and communicate with each other. The public trusts us to understand boundary location issues. We need to fulfill that trust. An important part of that involves talking to each other.

This story begins when I was referred to a client in the central valley having a potential neighbor dispute. The neighbor (not my client) wanted to re-build a residential structure and the properties shared a common alley and fence. Both owners had lots that backed up to each other on one end of an ordinary rectangular block. The neighbor provided an ALTA survey of their property which appeared

typical of many ALTA surveys I've seen. The survey map showed only one reference monument, a PK nail in the street and not of record. However, the improvements shown generally fit the expected locations for the property lines and I didn't anticipate any problem related to the survey. Next came construction plans prepared by an architect and referencing both a civil engineer and a surveyor (not the ALTA surveyor). These plans appeared to shift the entire site by about ten feet. Of course, there was little to reference between the maps since the construction plans showed no ties to existing improvements. Even so, that amount of change was noticeable. After pointing this out, the neighbor's counsel (representing a large multi-state corporation) assured me that there was no discrepancy between the maps but that he would look into it and confirm. A couple of months went by and the neighbor broke ground next door. That's when disaster struck. The neighbor's contractor sawcut and removed the alley and about ten feet of my clients parking area. The contractor assured my client that all was in order, but even to a lay person it was plain to see that footings and other improvements were being placed in the wrong locations.

Recall now that at this point, we have two licensed surveyors involved. The two attorneys are merely trying to understand and facilitate the parties' cooperation. After a tense standoff, the other attorney and I agreed that it would be helpful if I met the Surveyor on site and walked the areas of concern. This was duly arranged. Then came two surprises. First, the neighbor provided an "updated"

ALTA survey that purported to reconcile with the construction plans. The ALTA surveyor gave no explanation why he made the change. However, the right of way dimensions were adjusted by ten feet, the boundary shifted northerly by about the same and new substantial encroachments were noted and shown with dimensions overlapping all three adjoining neighbors. This adversely affected my client and two other neighbors. If correct, this miraculous shift would ripple down the entire block and make every single lot encroach substantially onto a neighboring lot. The second surprise was that the "Surveyor" I met onsite turned out, as best I can tell, to be a construction party chief employed by the general contractor, not a licensed land surveyor and certainly not the THE licensed Surveyor who was referenced in the construction plans. I could only laugh inwardly when opposing counsel later insisted that the "surveyor" I met was in fact the licensed surveyor of record. How do we come to be so mis-identified as professional surveyors? As it happened, I knew of the record surveyor from other professional events and remembered him well enough to know that he was not the person onsite that day.

Needless to say, this confusion over what and who the "Surveyor" was, and whether or not a licensed Surveyor had actually participated in preparing the plans was costly. It was financially costly to both parties, but it was costly to the public because it undermined the value of the surveying profession. The profession

continued on page 23

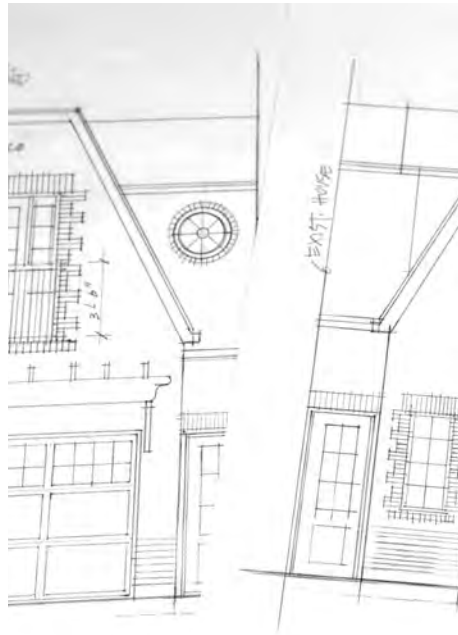


was perceived by all those involved – architects, engineers, construction managers, contractors, city staff issuing permits, neighbors, and other attorneys to be incompetent. These observers, a micro sampling of the “general public”, saw “the Surveyor” as a blustering idiot who spoke incomprehensible jargon and arbitrarily moved property lines.

If the story stopped here, it would mimic a tale many of us may have experienced. The unfortunate case of a “bad apple” causing problems in a specific situation. “Report them to the Board” I can almost hear the response of many. Perhaps. But the story isn’t finished.

Being a surveyor myself and being privy to the nuances that underscore the markings on an ALTA survey, I red-lined the “revised” ALTA Survey and explained not only the deficiencies but the domino implications of such a boundary location on the rest of the block. I also mentioned that pursuant to the PLS Act, a record of such a survey was required to be filed. Confronted with that reality, opposing counsel reluctantly offered to have a third surveyor repeat the work and prepare the record of survey. Construction was halted and crews were pulled while the new Surveyor got to work. In a few weeks the new record of survey was drafted and unsurprisingly, the boundary re-appeared in its original position as shown by the first surveyor on the first ALTA survey. More importantly, the record of survey also included those vital notes explaining the historic source of the division of land in the area, acknowledged the lack of record or actual monument evidence and concluded that a full breakdown of the block using fencelines, sidewalks and back of curb locations was consistent with the conclusion reached by the first surveyor. At long last, this was a professional product with the basic information needed to explain and support a professional boundary opinion. I could have hugged that Surveyor I was so grateful! ... our proverbial lightbulb was screwed in. After months of confusion, delay and rising attorney’s fees, we had an answer and the parties could get on with drafting an agreement. Finished, right?

No! Recall that we have now had three separate licensed professional surveyors all working for the same client and all showing different locations or having different reasons for the same location. Enter Surveyor number four. By this time, my client in frustration had hired his own surveyor to locate the boundary. Disregarding all the prior work of the previous three surveyors, he apparently came up with yet another location for the boundary. Again, this surveyor provided no notes or other explanation for his boundary position, just a map. After I explained to him the liability his survey could cause, and that it likely triggered the need for a Record of Survey, he reluctantly agreed to revise his map as consistent with the



pending Record of Survey. I could not understand his rationale. The best I can come up with is that he had not estimated enough time into his original “bid” for the work. Consequently, he was unwilling or unable to go to the length of checking or disaffirming the prior surveyor’s work. Instead, he seemed willing to publish a faulty map based on weak and incomplete information. In the end, we came to an understanding, but it goes to show that we as Professional Surveyors seem to lack trust in and rapport with our fellow licensed surveyors. Why would a surveyor not consult with another professional when re-tracing the same boundary?

In summary, we have a tale where it took four Surveyors to change the proverbial light bulb. The public meanwhile was watching, learning, and laughing (or cringing) at our collective expense. Did I say four? Oops, that number actually went up to five. For, when the Surveyor filing the record of survey went out to set the lot corner monuments, he found four of six monuments already set in their expected location and neatly tagged by licensed land surveyor. Of course there was no record for those corners.

Now, if you are reading this, you are likely a member of the California Land Surveyors Association and make some attempt to associate with your fellow surveyors. But consider this: Only about a third of licensed surveyors are members of the California Land Surveyors Association. What about the other two thirds of the profession? For a learning experience, log on to the BPELSG website (www.bpelsg.ca.gov) and look up the licensed land surveyors in your area (city or perhaps county in a rural area). It takes a little work to sift through all the licensees to find just the land surveyors with active licenses – there were about 600 total I found in my home area of Alameda. I guarantee you will be surprised to see just how many professionals live nearby with whom you may have never had contact.

We must reach out and get to know our fellows – one by one if necessary. They are our professional family. We must break through the isolation and form a community. That may start with just a single new acquaintance. Reach out to your neighbor colleagues and who knows, instead of having three or four surveyors fighting about the lightbulb, we could together enlighten our world. 🌍



Paul is a full-time Dad and part-time land surveyor and attorney. He lives and practices in the Bay area.

Paul Mabry



Resolution #2018 -07

WHEREAS, Richard P. Ray, L.S. #6390 has been licensed as a Land Surveyor in California since 1990; and

WHEREAS, Richard P. Ray, L.S. #6390 has been a member of the California Land Surveyors Association (CLSA) since 1986; and

WHEREAS, Richard P. Ray, L.S. #6390 has been an Director of CLSA for 27 years, has served on numerous committees, and as CLSA's liaison to other organizations,

WHEREAS, Richard P. Ray, L.S. #6390 was a founding member of the CLSA Education Foundation; and,

WHEREAS, Richard P. Ray, L.S. #6390, is a past president of the Orange County Chapter and has been active in both the Orange County and East Bay Chapters; and,

WHEREAS, Richard P. Ray, L.S. #6390 has retired from Caltrans and the active practice of Land Surveying; now, therefore,

BE IT RESOLVED, That in appreciation for his leadership and long service to the Association and pursuant to the authority of the Association Bylaws, Article 2, Section 2.01 (a2), the Board of Directors of the California Land Surveyors Association hereby awards Life Membership in the Association to Richard P. Ray, L.S. #6390.

APPROVED BY THE BOARD OF DIRECTORS
July 28, 2018

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George Davidson



VERDI EAST BASE

This granite column once marked the eastern terminus of a trigonometric base line originally measured in the summer of 1872 by the English-born surveyor George Davidson. Working for the U.S. Coast Survey, Davidson established numerous survey stations in the area north and west of this site to determine the 120th Meridian, the boundary between Nevada and California.

From Verdi East Base the surveyors had a connection with the railroad telegraph which provided accurate time for determination of longitude. The original 1872 instrument pier was later destroyed and this column was set in its place in 1897. Davidson's work provided the basis for the resurvey of the state line which began later in 1872 by A. W. von Schmidt.

Nevada Association of Land Surveyors/California Land Surveyors Association
In Memory of the Honorable James H. Thompson and Francois (Bud) Uzze, PLS
2011

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Membership in the California Land Surveyors Association, Inc. as a Sustaining Member is open to any individual, company, or corporation who, by their interest in the land surveying profession, is desirous of supporting the purposes and objectives of this Association. For information regarding Sustaining Membership, contact:

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