

# **SURVEYOR** *California*

Winter 2013

Issue #172

## Dave Goodman, PLS, PE Surveys Egyptian Antiquities

Interview by John P. Wilusz, PLS, PE, Editor on page 6

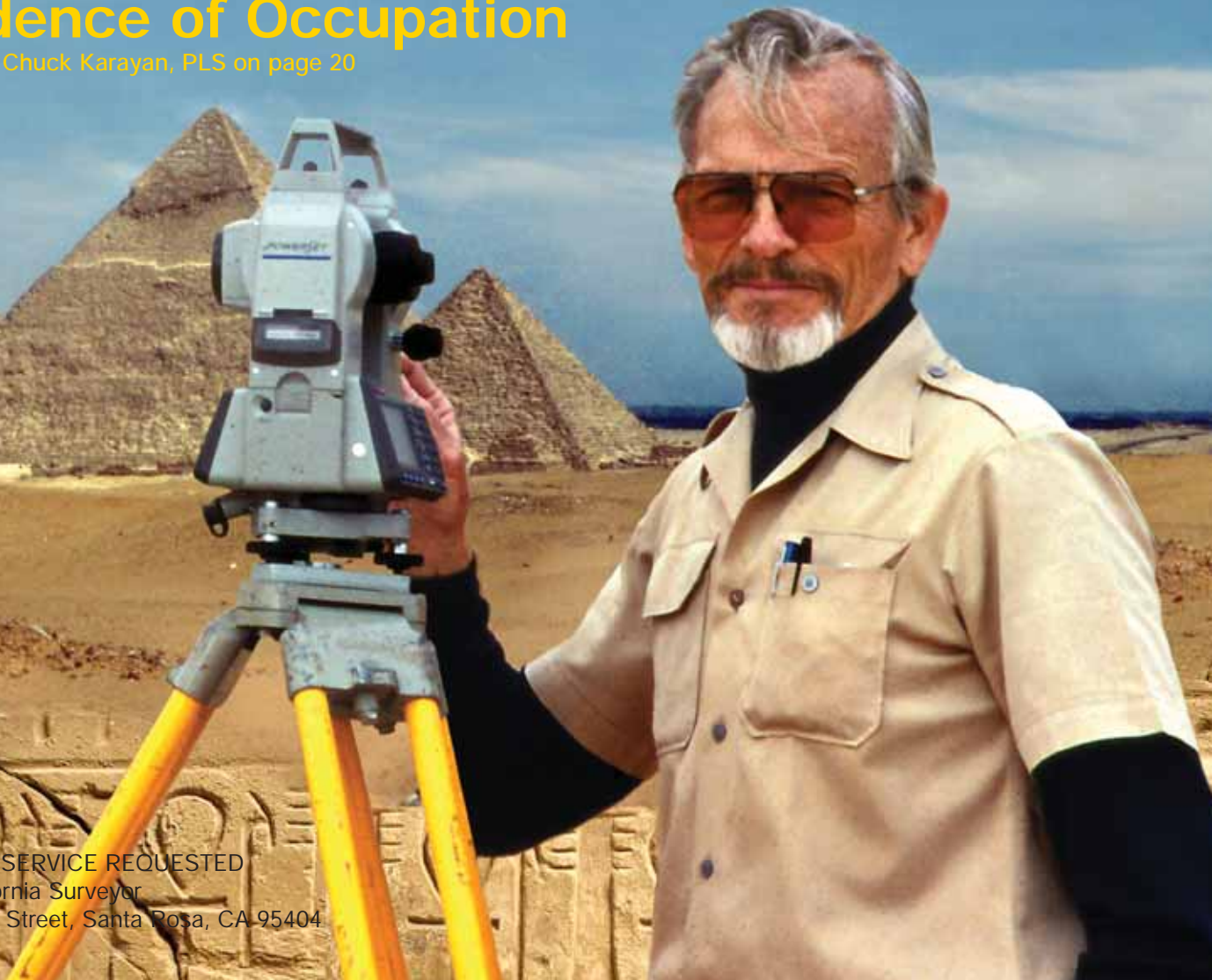
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## Preserving Egyptian Heritage by Scanning the Ramesseum: A Surveyor's Reminiscing

Article by Michael R. Frecks, PLS with Cyn René Whitfield on page 20

## Evidence of Occupation

Article by Chuck Karayan, PLS on page 20



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“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.”

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### Cover

Graphic art and design by Wendy Masarweh  
Photography by the Giza Plateau Mapping Project and John Wilusz

Correction Notice: The group photograph of Fremont Cannoneers on page 7 of Issue #171 was taken by Joel Tracy, PLS. The editor regrets the omission of credit.





In Egypt, 2007

## From the Editor

### Interview with David Goodman, PLS, PE

# Surveying the Wonders of Ancient Egypt



Top to bottom:  
Khafre Sphinx,  
Sphinx in Moonlight,  
Mohammed Abd Gadr;

In December 2012 I interviewed my friend, Dave Goodman, PLS, PE, about his experiences with archaeological surveys in the Middle East. Dave has had a long and distinguished career as a professional surveyor (see the biography at the end of this interview), but for our interview I was most interested in learning about his volunteer activities surveying ancient sites.

#### **JW: How did you first get involved with archaeological surveys in Egypt?**

**DG:** One day in 1977 while at work at Caltrans, my second-line supervisor, George Katibah, came into my office and said, "Let's have a cup of coffee in the cafeteria: I need to talk to you about a proposal." In the coffee shop, George said, "I have just been talking to this professor at Berkeley. He is commencing a project late next winter to map all of the tombs in the Valley of Kings and the Valley of Queens, and he isn't going to take anyone who knows anything about surveying. What do you think about that?" My immediate answer was, "I think that is crazy. Tell him that I will go and be his surveyor." George's response to me was, "What will your wife Mary say?" Mary was supportive (she went with me to Egypt three times) and thus began my 23+ year odyssey with surveying antiquities in Egypt, Sudan, and Jordan.

#### **JW: What did you use for equipment?**

**DG:** Well, the remainder of 1977 and early '78 was spent gathering equipment for establishing the horizontal and vertical control and for mapping tombs and topography. Equipment borrowed or bought and material included: a WILD DI-10 EDM (cumbersome by modern standards but adequate for this project), HP hand-held computers (HP 35 and/or HP 41CX), notekeeping forms (from Caltrans), 80mm aluminum discs (for setting traverse control points around the Valley of Kings, the Valley of Queens, and the necropolis of Sheik abd el Gourna), a plane table and alidade, a Wild T-2 theodolite and a pendulum level. In the mid-1980s a total station was jointly procured by the Theban project and my second project in Egypt, the Giza Plateau Mapping Project. Some equipment was loaned to us by Barry Liston of the Lietz Company. Other handy equipment was a much-used umbrella to shield the theodolite or total station from the sun.

#### **JW: Did you have helpers in the field?**

**DG:** Students, Egyptians, and project "angels" were the main workers with me. Considerable time was spent in training in the operation of surveying equipment, but the majority of my helpers became interested in the "mechanics" of surveying and that panned out quite well.

#### **JW: Did you get paid?**

**DG:** Remuneration for this work was minimal and not of any concern because the project opened a world of travel for Mary and me. After the first two project seasons, I only took reimbursement for travel expenses. Of far greater value than the money, the experience introduced us to the lovely people of those eastern climes. Living in the villages from one to three months brought us into the lives of the warm/friendly villagers where we lived.

*Continued on next page*

**JW: I've heard you talk about the Theban Mapping Project. What was that?**

**DG:** Around the end of April 1978, our project team of six left SFO airport for Cairo and thus began the Theban Mapping Project (TMP) which continues in reduced scope to this day. The objective of the TMP is to prepare a comprehensive archaeological database of the many ruins at Thebes on the Nile River in the modern city of Luxor. Our group included Professor Kent Weeks of U.C. Berkeley, two Berkeley students, two architectural graduates from UCB, and me. (The architectural students were most helpful in translating our field notes into maps of the terrain and the tombs.)

In the first and second project seasons we finished establishing our primary horizontal and vertical control over the Necropolis. We established our control stations by setting 80mm aluminum or steel survey discs. True North was established with Polaris observations. For the vertical control we were able to find one bench mark from the 1928 Survey of Egypt which was based on sea level at Alexandria. Our control traversing began on the monumented baseline of the axis of the great temple of Karnak which lies along the opposite, easterly, bank of the Nile. Through the cooperation of the Egyptian Antiquities Department, design-scale aerial photography was acquired and then field mapping of the tombs was begun. Also, in the first project season we used the plane table to map part of the Valley of Kings (Waadi Maluk).

**JW: Did you have trouble with the language barrier?**

**DG:** By the end of the second project season many Arabic words were a part of our understanding. This was quite helpful when working and when visiting with the most hospitable Egyptian people of Nag Kom Lollah, the village where we lived, and in other nearby villages. With every Friday off there was ample opportunity to visit with the Fellaheen, the peasant class who populated the villages that were alongside the Theban Necropolis. The first project season lasted three months and it was most gratifying to be accepted by the Egyptians as one of their own.

**JW: Egypt can get hot. Did you get any breaks from the desert heat?**

**DG:** The Fridays off were a most welcome relief from climbing up and down the Gebel, the Theban hills, especially the climbing on a few days when the temperature rose as high as 118 degrees F. However, the arid climate usually tempered any excessive discomfort from the heat. Only on one or two projects did we work during the heat of summer. Generally, atmospheric conditions and weather were ideal for our control surveying. On one occasion we did experience rare precipitation and another day brought gale force winds.

**JW: What did you do at the Giza Pyramids?**

**DG:** In 1984 a second mapping project was begun in the Cairo area at the necropolis of the Sphinx and the Giza Pyramids. This project (The Giza Plateau Mapping Project) under the directorship of Mark Lehner continues today at full-bore and has evolved into a large-scale excavating and mapping project. Also, Dr. Lehner has made this project into an educational project for involving Egyptian and American Archaeological and Egyptological students in "open-air", classroom-type studies, and lab work. This project, like all the others, created indelible impressions and memories of magnificent works of art in tombs and pyramids.

A different kind of impression was created one day as I was scaling the queen's pyramid just to the east of the Khufu Pyramid's south easterly corner. About two thirds of the way up the pyramid, the total station slung across my shoulder by a leather strap, had a faulty closure/strapping system which had worked its way loose, and I watched for three or four seconds as the total station, a borrowed instrument, bounced down the pyramid from quarried stone to quarried stone. It came to rest in the sand at the pyramid's base. Fortunately, the case's latch did not pop open, only the case's strap failed. How lucky could we be! Needless to say, the total station was in pitiful adjustment. After a generous amount of time in adjustment, the instrument was again usable. This same queen's pyramid gave the project a glimpse into the control for building this particular pyramid – chiseled Xs for erection were uncovered at all four corners. The ancients had left evidence of their engineering/surveying prowess.

*Continued on page 9*



*Top to bottom:  
City of Pylon, Egypt  
Excavations  
Gadgets*



## President's Message



# I'm Baaaack!



Mike Butcher accepting gavel in January 2000

I am pleased to be serving a second term as CLSA President. My first term as President was in 2000 which was a time of prosperity and growth for our profession. In the time since then, we have been on a rollercoaster ride with highs and lows.

As we begin a new year, many CLSA members are reporting increased work and job opportunity - an encouraging factor hopefully indicating that the struggles of the last few years are behind us and a brighter year lies ahead.

CLSA has consistently provided members with valuable resources and addressed issues affecting the profession. Over the last five years, The Association has realized tremendous accomplishments. Below is a summary of just a few notable achievements.

### Legislative Successes Over the Last Five Years

- 8726 (n) related to statements of accuracies
- Additions & Revisions to the Public Resource Codes: CSRN, CGC, COH, CCS
- 8771: Horizontal and vertical survey control
- Sought and obtained Legislative Counsel Opinion on Statute of Limitations for licensed Land Surveyors
- Cullen Act - White paper and technical assistance to the legislature
- Helped to create bridges to CEAC and ACEC
- Removal of EIT exemption to sit for the LSIT
- Amendments to Stanislaus County Board of Supervisors to protect the position of County Surveyor
- Monitored and provided input regarding changing workers compensation regulations that would affect Land Surveyors
- CLSA participated in several amicus curiae

### Professional Relations

- Supported ACSM/NSPS Lobby Day and developed a Lobby Day hand book for other state associations to use in preparing for Lobby Day
- Supported ACSM/NSPS railroad monumentation legislation
- Maintained liaison with GIS community and hosted a booth at CalGIS and ESRI Conferences
- Monitored and responded to LightSquared/Save our GPS
- Worked with BPELSG to encourage establishment of designated enforcement personnel for monument conservation issues
- Assisted and provided input to CEAC on their update of the Guide to the Preparation of Records of Survey and Corner Records

### Published Resources

- Safety Tailgate Meeting Guide
- Small Project Standard Contract
- Right of Entry Informational Brochures

### Published Resources (continued)

- Monument Conservation Brochure
- Land Surveying Instructional DVDs
- Exam Guide
- GIS and Surveyors Brochure

### Education - Professional Development

- CLSA hosted 24 workshops (12 courses in two locations) over the last five years.
- Annual Conference offers over 25 hours of continuing education
- CLSA now offers monthly webinars complimentary to members
- CLSA developed a voluntary professional development program

### Public Relations/Outreach Programs

- AYSO Soccer Field Layout Program
- Path/Mark Outreach - SurveyPath.org
- TrigStar Program
- Verdi Commemorative Monument
- SkyRadio - American Airlines broadcast. Interview on how the profession serves the public

### Student Support

- CLSA, CLSA Education Foundation and CLSA Chapters have awarded over \$200,000 in scholarships over the last 5 years.
- A student chapter at Santiago Canyon College was chartered
- Student chapter at Cal Poly Pomona was revitalized
- Over 30 students participate and receive complimentary registration, travel and accommodations to the CLSA Conference
- Hosted NSPS Student Competition
- Established endowment fund for CSU Fresno professor
- Provided donation to Cal Poly Pomona for computer lab

### Cal Surveyor Magazine

CLSA has one of the finest magazines in the nation, rivaling even the national professional magazines. Our dedicated Editor, John Wilusz, works tirelessly to provide the profession with a quality publication filled with informative articles. The Cal Surveyor has been nationally recognized, winning the NSPS Excellence in Journalism Award 5 years in a row! Special thanks to John for all his hard work - it is much appreciated!

One of my most memorable moments from this last year occurred while attending the Sacramento Chapter Holiday Meeting. I was honored to present, as President-elect, a long-time CLSA member, Larry Fenske, with a Life Membership Certificate. This is one of the many benefits we can receive through continuous affiliation with our Association. I encourage each of you to take an active role in CLSA and work toward the betterment of our profession!

In closing, I am honored that I have again been entrusted to lead this great Association. I look forward to working with all of you.

I wish you all a prosperous 2013. ❖





Top to bottom:  
Tuts First Coffin  
Surveying GP3A

**JW:** I've heard that the Giza Pyramids are oriented very accurately to true north. Is that true?

**DG:** The Giza Plateau Mapping Project is based on our observations of Polaris. And yes, our topo'ing around the base of the Khufu Pyramid and the Polaris observations revealed rather accurate true-north orientation of the Giza Pyramids of three Pharaohs – Khufu, Khafre, and Menkaure.

**JW:** What are some of the other projects you were involved with over the years?

**DG:** Other projects in which I participated included the necropoli of – Saqqara (about 20 miles south of the Giza Pyramids), Abydos, Hierakonpolis, Gebel Barkal (at Kareema, Sudan), and a project at Aqaba, Jordan.

The site at Aqaba was on the northerly shore of the Gulf of Aqaba and was the site of a quite small village, vintage around 600 A.D. This site was a three- or four-hour drive southerly from Amman. After about 10 days on the project, our lady inspector from the Antiquities bureau came to the project house in an animated state and told the project director and me that David Goodman must leave Jordan within 48 hours. Immediately our project director and I went to the local Antiquities office and learned that I should travel immediately to Amman to meet with the head of the Antiquities Department. Away I went in a hired taxi to Amman and a meeting the next morning with the head of Antiquities. There was no resolution there so I was then shepherded to the police chief of Amman. Again, no resolution, so it was necessary that I be accompanied to the office of a three-star general who was head of security for the country. After thirty minutes or so of drinking Shie (sweetened hot tea) the general, a very nice gentlemen, stood up, thanked me for coming, and bade me a good trip back to Aqaba and a fine project season. No explanation of any kind!!! Apparently some layer in the Jordanian government had finally decided that I was not Jewish. Also, it did not hurt that the General had received flight training in San Antonio, Texas.

The reason for my questionable status in Jordan became quite transparent – at each interview I was asked if I had ever been to Israel. With the name of David Goodman it is not at all unexpected that I might be Jewish. That issue arose early on in Egypt (on every entry into the country), in Sudan, and now in Jordan. On almost every entry into Egypt the issue arose as I came into the country on TWA. Usually I was the first off the plane and down to passport control, I would be the last to finally receive my passport and be allowed to catch a taxi to downtown Cairo. All other passengers on my flight had received their passports and luggage, and I was left alone waiting, waiting.

In spite of my family name, a number of the world's premier monuments of antiquity were mapped. Again, HOW LUCKY COULD I BE!!!

*Born in Paducah, Kentucky, Dave began surveying in 1950 after graduating from Union University in Jackson, Tennessee. He married his college sweetheart Mary Benson that same year and in 1953 they moved to California. Shortly thereafter he went to work for the California Division of Highways, predecessor of Caltrans, and worked his way up through the ranks to be Party Chief, Field Supervisor, Chief of Surveys (on loan to the Department of Water Resources for construction of the state aqueduct), and finally retired as Senior Transportation Engineer in 1991. He retired from volunteer archaeological surveying in 2001. Dave and Mary Goodman live in Carmichael, CA. ❖*



## Geography Quiz

by: Anne Hoppe, PLS  
and Gernar Berhhard, Ph.D.  
Photography by Gernar Berhhard, Ph.D.

This is a view from the largest and most active volcano on our planet. An exploration and surveying expedition arrived at the summit in December 1840, measured its altitude, and estimated the altitude of the volcano in the distance to be 200' higher. What are the two volcanoes? Answer on page 34





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10. Other License or Registration Number(s) RCE# \_\_\_\_\_ EIT# \_\_\_\_\_
11. Have you previously been a member of the State Association?  Yes  No Year \_\_\_\_\_
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*\*First Year's Dues are pro-rated from date of application.*

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By: Michael R. Frecks, PLS with Cyn René Whitfield

*Michael Frecks founded Terrametrix, LLC in 2008 to apply 3D laser scanning technology to meet the need for safer, more efficient roadway and streetscape documentation. He travels throughout the United States speaking to Fortune 500 companies and DOT's about the laser scanning technology and its applications. A more detailed biography follows the article.*

*Cyn René Whitfield is a nationally published journalist who has been involved in marketing for land surveying and 3D/4D laser scanning documentation for the past 28 years. She has a Bachelor of Science degree in Broadcast/Journalism, an Associate's Degree in Electronic Imaging and a Master's Degree in Managerial Business Communications. She is currently the marketing coordinator for Terrametrix LLC (www.terrametrix3d.com), Omaha, Neb. She can be reached at cwhitfield@terrametrix3d.com.*

# Preserving Egyptian Heritage by Scanning the Ramesseum: A Surveyor's Reminiscing



comprehensive documentation of the entire Ramesseum area with detailed close-range 3D LiDAR scans for digital preservation. Light Detection and Ranging (LiDAR) was relatively new in 2004, at least from the static tripod mounted acquisition. Mobile LiDAR was still in development so those most familiar with LiDAR technology was of the more established airborne acquisition, either fixed wing or helicopter. My introduction to the technology was a search for a survey solution in the spring of 2000 to document an elaborate truss system in a church for reconstruction at a new site. I was intrigued by the accuracy and that eventually led me to Cyra and my mentor, Ben Kacyra. Ben developed the scan system most at use today by Leica surveyors and he is the founder of the CyArk Heritage Foundation, located in Orinda, California. Ben's vision for CyArk is to digitally capture the

As a surveyor since 1978, I have many memories. I'd like to say I've seen it all, from technology advancements: the chain, the total station, GPS, static scanners and now mobile LiDAR scanning with Terrametrix. But, through it all I have to say documenting the Ramesseum in Luxor Egypt in 2004 was my most colossal undertaking.

## Project Background

Ancient Thebes is home to the Ramesseum, one of the world's most important surviving examples of an ancient Egyptian temple. Ramsess II is among the largest colossus ever built by Egyptian hands. This project was to complete a

world's significant heritage sites to ensure they will be available for the future. LiDAR is the way to accomplish this in a 3D environment.

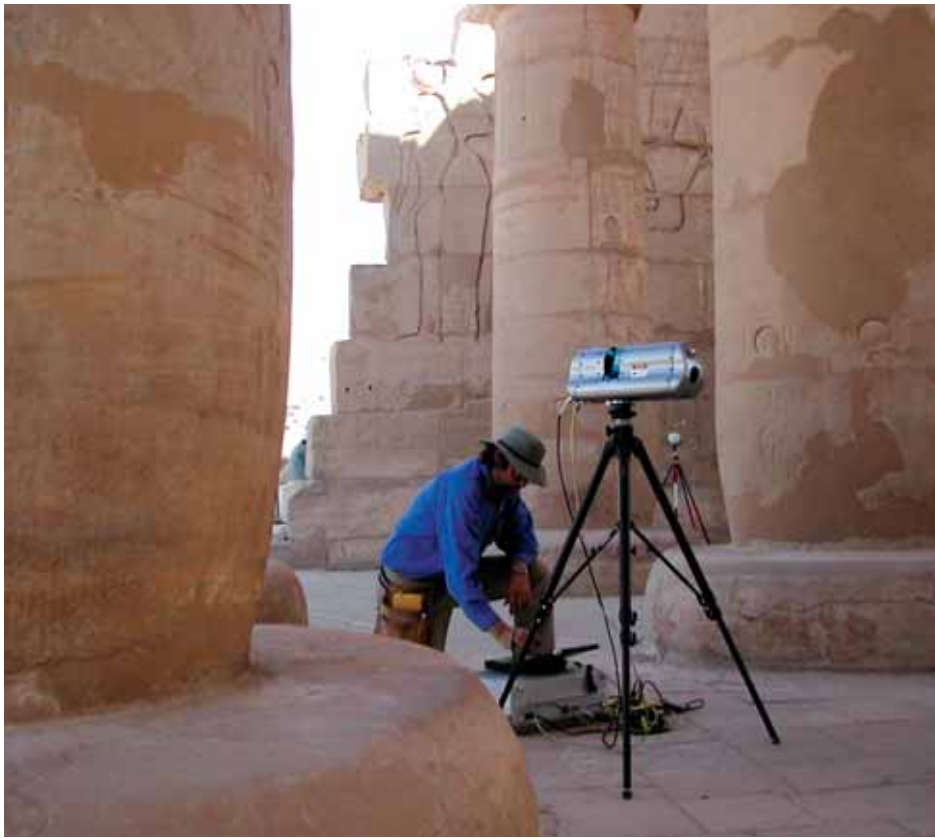
## The Site

The Ramesseum is the memorial temple of Pharaoh Ramsess II (Ramsess The Great). He started building the structure the second year of his 67-year rein and it took about 20 years to complete. Located in the Theban necropolis in Upper Egypt, across the River Nile from the modern city of

*Continued on next page*



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Luxor, this 3600-year-old site is the largest subterranean structure to ever be erected by the Egyptians. It is clearly one of the most impressive tombs erected in the Valley of the Kings, a site that has been recognized as World Heritage by UNESCO.

The Ramesseum boasts some of the world's oldest surviving pylons. A pylon, or monumental portal to an ancient Egyptian temple, is usually comprised of two massive upward tapering walls flanking and perpendicular to the temple's entrance. Scenes from the Battle of Kadesh engraved into the wide outer pylon of the Ramesseum glorify the king's military might despite the fact that he lost the battle of Kadesh. However, Ramsess' eventual triumph against Syria subjugated the Hittites who became laborers and contributed to his monumental building projects. Ramsess' great military might marks the last peak of Egypt's imperial power. 3D laser scanning allows the capture of not only the structure but the culture because of its detail.

Continued on next page

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## The Purpose

Such an undertaking, however, did not diminish the international team of Egyptologists, scientists, surveyors, and academia from digitally reconstructing the ruins. Unlike cultural artifacts safely housed in museums, cultural heritage sites are constantly at-risk. They are exposed to the daily effects of the natural environment, from the seemingly benign: sun, wind, and rain; to the dramatic: earthquakes, fire, and human aggressions.



The idea of producing a digital restoration came first in 1996 from Dr. Philippe Martinez through the Electricite' de France. Under the auspices of the Institute for Study and Integration of Geographical Heritage Techniques and the project began in late 2000 with the cooperation of the Dr. Christian Leblanc heading the contemporary administration of the site from the French Centre National de la Recherche Scientifique (CNRS). The idea was two-fold; to reconstruct the colossi and to prove that not only had the site been erected to a degree that no 21<sup>st</sup> century machinery could do; but also prove it had once been disassembled and reconstructed to realign with the solstice. The theory is that the temple had been built and then rebuilt to realign to astrological coordinates in order to appease the Egyptian Gods.

Future generations of archaeologists and scientists will now be able to benefit from the data that was collected at Luxor. This data, through CyArk, can be sent around the world in a matter of seconds for review and study by the world's top experts in the field. In addition, through the use of 3D animation, the general public can virtually tour the site by means of fly-through technology. This is an important factor to this site as the Valley of Kings has seen millions of visitors per year to the point of deterioration and partial closure. A worldwide repository of this type of historical information could result in a rapid understanding of ancient cultures and eventually leading towards its preservation and restoration.

## The Approach

To piece together history the team first divided the huge number of existing fragments into three groups. The first group required the use of a 3D laser scanner. In this case, the 3D Guru from Visi Image, Inc. was used to scan and document the gigantic pieces. This was my job. Laser scanners create 3D point clouds, accurate three-dimensional representation of a site, composed of individual points which correspond to real-world coordinates. High definition scans afforded the ability to measure small relief hieroglyphs. Smaller pieces made up the second group and they were captured with a more portable seamless system in the form of an optical triangulation scanner. Pieces that did not require 3D digitizing made up the third group. From these groups 80 key pieces were selected for recordation and reconstruction yielding approximately 500,000 measurements per fragment. Depending on the artifacts being scanned and the scanning equipment used the resolutions ranged to sub-centimeter accuracies.



Over the course of the nine days I collected 59 scans in temperatures up to 115 degrees. Most of the scans were performed at night to take advantage of the cooler 100-degree weather. Millions of measurements, or "point data sets" containing an x, y, and z coordinate were taken at the site. This type of documentation is free of the usual distortions of a camera lens or hand measurements and also affords the subject captured to be of a 360-degree perspective.

3D laser scanning at the time had proven itself as a new and more efficient process for archaeological reconstruction and preservation in both speed and detail of accuracy. Because the scan data is "frozen in time" it can be used by future generations and researchers towards piecing together fallen or broken ruins. This reduces wear and tear on sites by placing the information where it is widely accessible, at the desktop.

Continued on page 16



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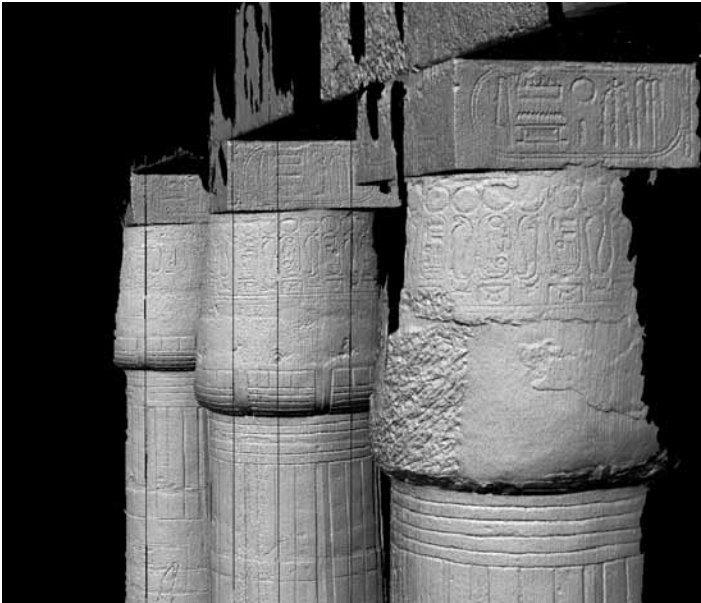
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## The Result

Digital capture of the world's significant heritage sites ensures these places will be available for the future, while uniquely telling their story today. CyArk uses the data captured in the creation of educational and cultural tourism media which is then broadly disseminated via the CyArk website. Education of visitors and potential visitors can have a positive impact on the cultural resource and the community through the promotion of responsible cultural tourism.



I spent nine days traveling and gathering field data for the purposes of creating highly accurate 3D models of the Ramses complex. Here are excerpts from my journal:

### July 5, 2004 Monday

Software delays at office, typical when trying to get out of town or in this case... the country today! Late start to airport transfer materials from two bags to luggage done to weight restrictions (70 lbs)/bag. Flew to Chicago on small plane. Boarded 747 Seat 39C. Started conversation with man in 39B. Turns out he and his wife are from Romania where my kids are adopted from. He is from Satu Mare and she is from Bucharest. They are visiting family in both cities in Transylvania. He is upcoming "famous" artist named Alexandru Darida and his wife is an opera singer in Chicago. Arrived in Amsterdam @ 7:30 am Local time 12:30 our time. (12-hour layover, wow). Left Amsterdam @ 6:00 pm into Cairo @ 1:00 am. Wish I could have seen Amsterdam as I never left the building.

### July 6, 2004 Tuesday

No equipment made it to Cairo. Sat in parking lot with Egyptian driver for 1 hour waiting for instructions whether to go on to Luxor or stay in Cairo for equipment. At 3:30 am gave up and filed claim. Schedule to fly to Luxor at 7:30 am anyway. Northwest Airlines will send equipment to us in Luxor. Toured Cairo in a micro van during the wee morning hours with Egyptian driver. Interesting place. Stopped at a roadside shop (kind of like a hotdog vendor in New York City) and got a Pepsi and crackers. The Egyptian lit a cigarette and I offered him a chew. He tried it but it wasn't well received wiping his tongue. Videoping the sites in Cairo at government buildings,

driver kept telling me "no camera...no camera" in limited English punctuated by armed guards. At 6:00 am we picked up the Egyptian Antiquities Information System (EAIS) Project Director in Egypt and headed to the airport. Flight at 7:30 am landed in Luxor at 8:30 am. Hazy for flight. 91 degrees at landing. Taxi to lab (hotel) 1/2 mile from Ramesseum (way cool) where project manager and crew were waiting. My part of scanning the sandstone building is awesome. With none of my equipment in Luxor due to airline mix up I spent the day setting up scan locations and control points for targets. It required a minimum of three targets for each scan position because scans will be registered using cloud to cloud adjustment for final positioning. Because of the heat we went back to hotel at 2:00 pm and tried to sleep until 5:30pm. Back at site till 9:00 pm. Pray for equipment to get here tomorrow. P.S. at 1:00 pm went with Project Manager and archeologist to look at a potential project, Mentuhotep's Tomb, a tomb with deep open places, in the Valley of the Kings nearby the Hatshepsut temple built into the rocks. Awesome.

### July 7, 2004 Wednesday

Waiting for equipment to arrive. Crews were working at night because of the heat so I spent my days trying to sleep in 108+ degrees in a hotel with no air-conditioning. The sweat would stick the hair to your arms and there was no escape. Even at night it was a cool 98 degrees. The water was iceless and not refrigerated instead we were given hot tea by the locals, so I spent the hot day helping the other crews.

### July 8, 2004 Thursday

Yet another day waiting to hear about equipment. The frustrating part is there is such limiting communication. Cell phone rendered useless. As a surveyor I am used to maximizing production and I am out of my element at the whim of an airline. One non-performing cog in the system and the project schedule can be affected or come to a halt. It reminds me of the 235 miles my crews spent traversing the Missouri River in 1979 and 1980. We were a long ways from civilization and had access only by boat. An equipment mishap under those conditions and you were a long way from help.

### July 9, 2004 Friday

Went with the archeologist to the East side of Nile River touring the temples of Karnak, and Luxor. I had an expert translator of the engravings from an archeologist of 25 seasons working these writings and deciphering their meaning. The venue was 100 feet lengths of wall standing 15 to 20 feet tall telling of the stories or columns filled with hieroglyphics telling the story of the culture that occupied this space 1600 BC. Every surface that could be carved told a story. Some of these columns still had the original colorful dye. I can only imagine what this place looked like with the gold that adorned this space before thieves stripped it of its beauty. Absorbing this I understand the mission we are on and the importance of providing a digital preservation.

Finally got some movement on the equipment now verified to be in Amsterdam. I flew to Cairo at 5:15 pm and was able to stay in air-conditioned hotel. I had started this trip with six bags and now sitting in my air-conditioned room I realized I only have a shaving bag but hey the air-conditioning is heaven. Amazing what simple things we take for granted. Went to airport to collect equipment at 1:00 am and finally at 4:30 am, after a time visiting with the custom agent, was heading to national airport for flight out to Luxor at 5:15 am equipment in hand (gate checked!).

Continued on next page



### July 10, 2004 Saturday

Started scanning at 9:00 am at the northeast side the hypostyle. The hypostyle area has a flat roof supported by rows of columns which joins the main part of the temple with two halls to the most sacred area. This area narrows as a focus from the front gate to where the Egyptian idol Holy of Holies resides. It is like standing in the end zone with the opposing teams' end zone narrowing to the size of a one car garage. My set-up is to the back of this area on the northeast side of the hypostyle. My scanner mounted on a tripod, a computer and two liters of 100-degree water (not by design) seemed like an insignificant speck surrounded by such ageless architecture and history. My testing lasted until 1:00 pm.

### July 11, 2004 Sunday

Waited until 9:00 am to go to Mentuhotep's tomb. This was the additional area the Project Manager had spoken to me about when I first arrived. Mentuhotep's tomb had been sealed for ten years due to vandalism and was opened only to us for the scanning. We were guided down stone steps covered with wind-blown sand abundant in the Sahara Desert. Carried our equipment approximately 40' to 50' foot below ground to a wrought iron gate with multiple locks and different mechanisms of security. Once past the gate a right turn took me to a small alcove before I entered the open courtyard. To the left a life size statue of Mentuhotep and his wife protected from the elements. The open courtyard area is essentially a 40' x 60' hole in the ground with rooms carved out with ten-foot ceilings lining the perimeter. The rest of the area was open to the sky. At the far end of the courtyard were two stairways each leading down to the tomb. Two things will remain with me... one the immense heat probably 115+ degrees in a still environment. It was so hot I couldn't touch the toughbook or tripod without getting burnt. It was so still that the footprints prior to sealing this area ten years ago were still visible. And the second....as we were scanning the courtyard sitting in the shade of one of the rooms. Each scan took approximately four minutes and it was a relief to get out of the hot sun. On the third scan of the courtyard we heard this ting.... ting.... ting....ting... down the stairs toward the tomb. One thing I was sure of... no one had been down here in ten years and we were the only ones here. Unnerving. The glass lens cover flew out of the scanner and down the steps toward tomb because the heat was so intense it was expanding the casing of the equipment. Super glued glass back in and kept scanning. Very hot. Rest of crews finished their sections but I was still behind due to equipment delay. Started at 7:00 pm scanned through night at Ramesseum. Extreme wind blowing the sand in the glow of the sodium lights surrounding the Ramesseum presented an eerie yellow glow. Bipods toppling over and bare electrical wires exposed on the ground carry power to my scanner. I wonder if Ramsess was laughing at me.

### July 12, 2004 Monday

9:00 am all other crews leaving, their work is completed. I will stay and scan tonight and tomorrow alone. Only one total station left for me and it is not working. Can't process to check scans. Ramesseum nice evening here alone. Light wind for once which makes it nice with no dust. Should be interesting here alone at night with just the inspector and a few local Egyptians. They call me Dr. Frecks and feed me hot tea to keep me cool. Long sleeves and long pants keep you protected from the beating sun even at night they have a cooling affect. Clothing always feels like they just came out of dryer. There are two sounds... one the hum of the scanner and the other a nightly prayer chant in the distance. Looking forward to going home Wednesday. HOT.

### July 13, 2004 Tuesday

Scanned from 4 pm to midnight to finish. The way my luck has gone on this project, I am glad today is not Friday. On the way back to the hotel my driver was stopped by armed personnel. It is apparently a way of life here. I was half asleep leaning against the door when I hear the tap tap tap of an automatic weapon on the window at my head. I rolled down the window and was asked.... Where are you going? I answered... Where have you been? I answered... then he says "I believe you"... and I thought Gooooood ....what if he hadn't!

### July 14, 2004 Wednesday - Glad to be going home.

You can view the documentation of the Ramsess II Temple at The CyArk site located at <http://archive.cyark.org/ancient-thebes-intro>

A PLS since 1992, Michael Frecks, PLS has over 35 years of experience in the field of land surveying. He has long been an innovator and his experience solving problems in the AEC disciplines has enhanced the efficiency of laser scanning by identifying which tools to use for specific results. He is a strong advocate of the use of 3D imaging systems to accurately characterize "as-is" conditions of existing structures. This approach to field measurement and documentation increases the accuracy, availability and usability of virtual, smart object modeling for BIM within the design. His career project portfolio includes documentation for world-wide UNESCO identified sites; plant environments including nuclear and processing facilities; architectural documentation of theatres, plazas and historic buildings; and transportation/civil documentation using static scanners as well as mobile mapping systems.❖

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By: Chuck Karayan, PLS

**Chuck** began surveying in 1963. Since then his career in public and private practice has taken him from the deserts of southern Arizona to the forests of northwestern Washington. He is licensed in Oregon and California; is a contributing writer for *The American Surveyor* magazine; and he teaches courses on water boundaries at the University of Wyoming – Outreach School. Academically trained as an earth scientist/geographer, he also attended the University of San Fernando Valley, College of Law. For over 25 years, his career has focused on boundary and land title matters as a manager and expert witness.

## Evidence of Occupation

Following his 1066 victory at the Battle of Hastings, William-the-Conqueror created the Domesday Book, a cadastre used in establishing the original Baronies and ‘titled estates’ throughout England. In the years following 1066, these large land holdings held by Williams’s allies (the new nobles) were fragmented into smaller and smaller *freeholds* and *leaseholds*.

The commoners and peasants transferred their rights in these smaller parcels by oral ceremonies called Livery-of-Seisin. Until the 1677 adoption of the Statute of Frauds, which among other things called for written descriptions in the transfer of real property, uncontested occupation was their only evidence of ownership. Since 1677 written descriptions have evolved into our modern concept of record title. Today record title is generally considered better evidence of ownership than “naked possession.”

When my surveying career began in 1962 there was a deep schism within the profession between “fence line surveyors” and “deed line surveyors” as they pejoratively referred to each other. Essentially their disagreement centered on the question of whether record title or occupation should prevail when the two disagreed. In part because the groups were nearly equal in size, and in part because neither side advanced a ‘winning’ argument, the disagreement remained unresolved.

This on-going argument deprived the profession of an accepted ‘standard of care.’ Some surveyors simply located, mapped, and monumented the lines of occupation; others conducted no records research, simply locating, mapping and monumenting the description in their client’s deed. Most licensees operated somewhere between these extremes, but without a universally agreed upon ‘procedure and level of performance’ it is difficult to call such an environment *professional practice*.

Into this chaos stepped Curtis Maitland Brown. Through enduring and monumental effort he traced judicial and legislative law through the analytical process necessary in surveying, producing the widely acclaimed *Boundary Control and Legal Principles*. Shortly thereafter Mr. Brown authored *Evidence and Procedures for Boundary Location*. These two texts have been accepted as authoritative sources by an overwhelming majority of surveyors as well as many courts.

By the mid-1970’s most surveyors had generally decided that in the event of conflict between record title and occupation the former should prevail. Unfortunately, by phrasing the question in that man-

ner, *the baby was thrown out with the wash*. A better question to have asked and answered would have been: Under what circumstances does one or the other prevail? In adopting the premise that “one size fits all.” i.e., record title prevails, many members of our profession discarded occupation as legitimate evidence of title. Neither the legislature nor the judiciary has done so.

The purpose of this discussion is not to argue for or against the use of evidence of occupation in establishing boundary monumentation. Nor is the purpose to establish criteria for determining which line, “deed” or “fence” (if either), should be shown as the boundary on a map or plat. Rather, the purpose of this discussion is to focus on the surveyor’s duty to his or her client and to the public; that duty being: to collect, preserve and present *all of the evidence which could have an effect upon the boundary*.

Judges and juries seldom visit the site of real property disputes. If they do, they are not able to see a boundary or record title line because these are legal concepts which do not have specific physical characteristics. Rather, the court relies on the surveyor to *gather all of the evidence*, to display it on maps and exhibits, and to integrate that evidence into their professional opinion.

California Business and Professions Code (The Land Surveyors Act) states in §8762(b) (3) that the Record of Survey shall include “**evidence** that, by reasonable analysis, *might* (emphasis added) result in ... alternate positions...” California Code of Regulations, Title 16, Division 5 (Board Rules ... Relating to ... Land Surveying) states in §404.2(b) that the required responsible charge of the surveyor includes the ability to answer questions regarding the analysis of “**evidence** related to written and unwritten property rights.”

The 5<sup>th</sup> Edition of *Boundary Control and Legal Principles* (§1.10) states: “The surveyor’s responsibility is to collect **evidence** of past boundaries described in documents...” and it goes on to state that the surveyor is also responsible “to collect **evidence** of possession and use...” The 3<sup>rd</sup> Edition of *Evidence and Procedures for Boundary Location* (§12-20) states: “If possession lines do not agree with written or deed lines, the relationship of the written or deed lines to that of the possession lines must be shown”. The ALTA/ACSM Minimum Standard Detail Requirements for Land Title Surveys §5 (Field Work) in C. Lines of Possession require “The character and location of **evidence** of possession or occupation ...”

Continued on page 22



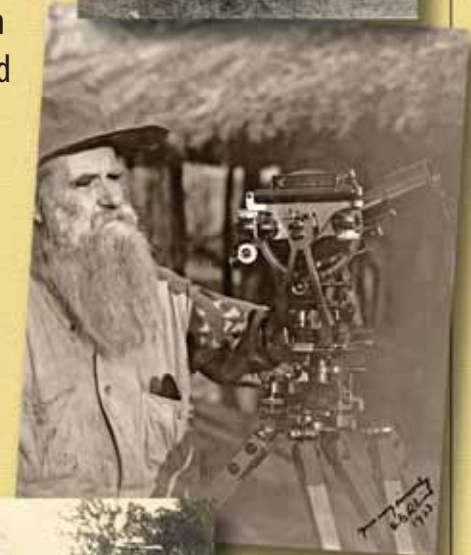
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The duty to collect, preserve and present the evidence of title does not depend upon the question of acceptance or rejection of such evidence; nor does it depend upon the question of encroachment; and, the duty exists without regard to the relative evidentiary weight assigned. In other words, no matter how “the boundary question” is answered (record title, occupation, both, neither), and whether-or-not the evidence is used as a basis of that boundary, the surveyor is obligated to show the occupation/use by their client or by his/her adjoiner. Moreover, the obligation includes locational data pertaining to that evidence at the same level of accuracy/precision as all other evidence of title.

Due in part to the sheer volume of litigation, ‘field trips’ by the trier-of-fact (judge/jury) have become extremely rare in today’s world. Instead, the courts rely on the parties and their witnesses to collect, preserve and present all relevant evidence. The location of such **evidence** being fundamental to justice, our legislature provided surveyors with “the right of entry upon or to real property” and imposed upon the owner or tenant a duty “to provide reasonable access without undue delay.” (B&PC §8774(a); see also Penal Code §602.8 (c) (4)). Clearly the legislative intent was to ensure the surveyor’s ability to meet the duty of identifying, locating and perpetuating all evidence of boundary and title.






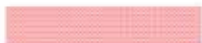

Only some evidence is physical in nature and susceptible to location; some evidence consists partially or totally of declaratory statements. The collection, preservation and presentation of these declarations can be as vital as other boundary and title evidence. For this reason the legislature has endowed surveyors with the authority to place such declarants under oath when gathering and memorializing declaratory boundary and title **evidence**. (See: B&PC 8760).

Before discussing application of these ideas, I believe that it will be useful to lay some foundation for terminology commonly used. First, in this discussion I have – and will continue to – assiduously avoid the issue of defining “boundary.” The duty of collecting, preserving and presenting relevant evidence applies without regard to how “boundary” is determined. Second, since the courts are the final arbiters of boundary/title disputes, I have chosen to use the meaning of terms as the law has defined them rather than adopting the vernacular meaning used by many in our profession.

<b>EVIDENCE</b>	Testimony, writings, material objects or other things presented to the senses that are offered to prove the existence or nonexistence of a fact. (California Evidence Code § 140)
<b>RELEVANT EVIDENCE</b>	Evidence, including that which pertains to the credibility of a witness or hearsay declarant, having any tendency in reason to prove or disprove any disputed fact of consequence to the matter being decided. (California Evidence Code § 210)
<b>RECORD TITLE</b>	Real property rights evinced by one or more documents entered in the public land records. (Black’s Law Dictionary)
<b>FENCE</b>	A hedge, structure, or partition erected for the purpose of separating two contiguous estates. (Blacks Law Dictionary)

Historically many law schools encouraged students with a ‘social science’ educational background and discouraged students from the ‘physical sciences’. Fortunately that is far less common today, but the foundation of that bias had some merit. Physical scientists, engineers, technicians, mathematicians, etc. tend to expect ‘hard’ (absolute) answers while historians, political scientists, philosophers, etc. tend toward ‘soft’ (generalized) answers. Over the years, many surveyors have expressed frustration with the lack of a “definite answer” in studying boundary law. I am sure that some readers may feel the same way. Particularly in the process of evaluating evidence and assigning relative weight to it, multiple opinions are possible (this is at the heart of professional practice and why two surveys may come to opposing conclusions). Lawyers are trained to be able to make different legal arguments from one set of facts. This is why it is so important that the surveyors **gather all of the evidence**; that it be **preserved** in their field notes; and that it is **presented** in their mapping.

Each of the following illustrations depicts “Ash Drive,” a public right-of-way (the fee title to which is not relevant to our discussion); the top of the drawings are North; the illustrations are schematic in nature and are not drawn to scale; the decimal-feet dimensions shown are not intended as limits or requirements for the concepts illustrated (magnitude receives legal attention only when “quantity” has a direct effect upon “quality”); the symbols used are described in the legend below.

	The R/W line of Ash Drive
	The center-line of Ash Drive
	The Record Title line of a land parcel
	Parcel limit as described in deed/plat
	Wood or wire fence/block wall/etc.
	Bricked surface area
	Hedge/artificial planting

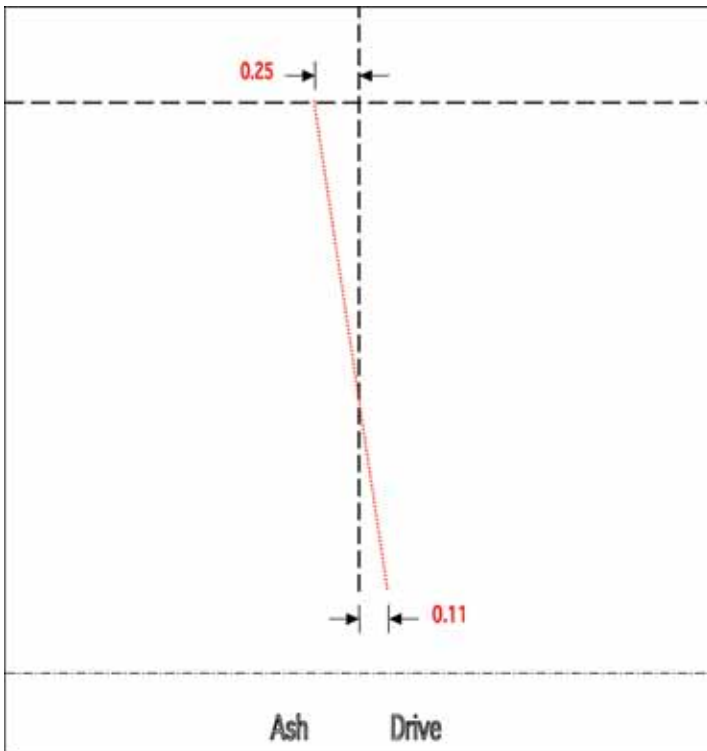
It is truly rare for the measured limits on the ground to exactly match those expressed in record documents. This is in part because today’s equipment is so much better than what was available in the past (at the time of the original measurement and/or “paper description”); it is also in part because all measurement is an approximation, incapable of exact replication.

In mathematics, precision (and therefore implied accuracy) is calculated using the individual deviations of the mean. Except for data beyond the adopted standard (outliers) variation is merely considered evidence of validity. In jurisprudence minor variation is considered not to exist per the doctrine *De Minimus non curat lex* (The law does not concern itself with trifles). The thinking in both arenas is that small, insignificant differences are just “background noise.” While precise measurement is of significance in our profession, particularly in validating the position of recovered monuments, it rarely has determinative value to the law.

Continued on next page



Illustration 1 below shows a common situation wherein the fence crosses the record title line but deviates from it by small amounts on each end. If the record title line was monumented or mapped as the boundary, the fence could well be used as evidence of the owners' intent to hold to that line and support the surveyor's professional opinion. If the fence was a block wall with capstones, it is quite possible that the Record Title Line (RTL) would continuously be on top of them, merely running from one side of the capstones to the other. It would be hard to imagine any court instructing the parties to remove the "encroaching" wall and erect one on the "true line."



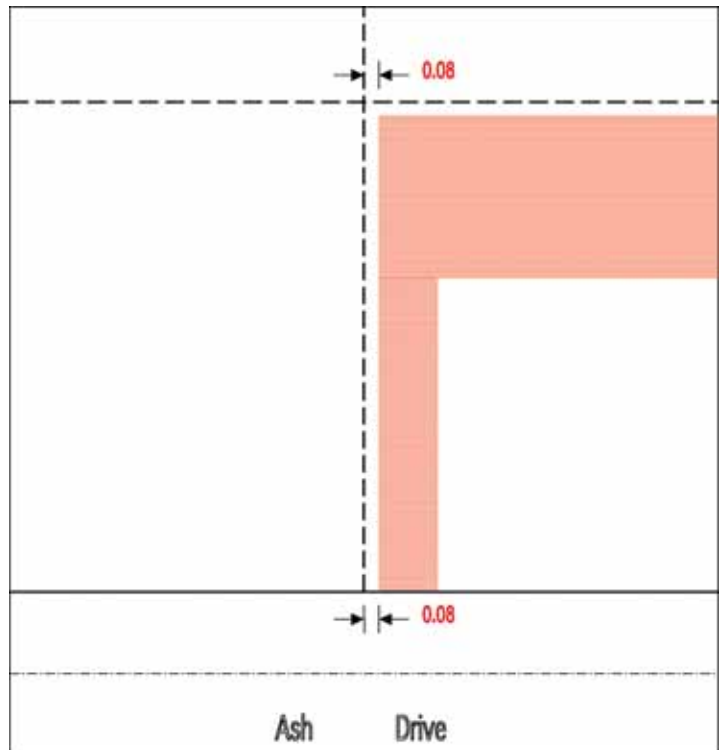
**ILLUSTRATION 1** - The existing fence crosses the Record Title Line, deviating at the ends by relatively small amounts.

*This evidence is likely to be viewed by the court as indicating the parties' intent to conform with, and supporting the use of, the Record Title Line as their boundary.*

Illustration 2, (top right) shows a similar situation wherein the improvements parallel the RTL but remain entirely on one side of it. The court is much more likely to see the evidence of a *de minimus* deviation from the RTL as a claim to it than as a recognition/assertion of a different line.

The situation shown in illustration 3, (top of page 24) occurs less frequently and presents different issues. It is obvious that 'human error' has played a part in the misalignment of the fence, but "which human and when" are important factors. If the original surveyor marked the corner 1.00 feet east of its intended location and the original purchaser relied upon that, the fence constitutes evidence of the record title line (monuments prevail over the plat). If, however, the fence was constructed without reference to an 'original monument,' then the original purchaser must have made the mistake and the plat represents the record title.

In my opinion, the Record-of-Survey ought to include an analysis of whether or not the front lot corners were established at the time of subdivision. If the front corners (or off-sets) were so established then the R/S should also include the evidence and positions of such monuments to the east and west.



**ILLUSTRATION 2** - The brick walkway and patio are significant economic investments. The evidence that the edge of those improvements parallels and nearly coincides with the Record Title Line would tend to support an opinion that it (the RTL) constituted the boundary.

*While the evidence shows an absolute deviation from the RTL the difference is so small as to be meaningless in the eyes of the law; De Minimus non curat lex (The law does not concern itself with trifles).*

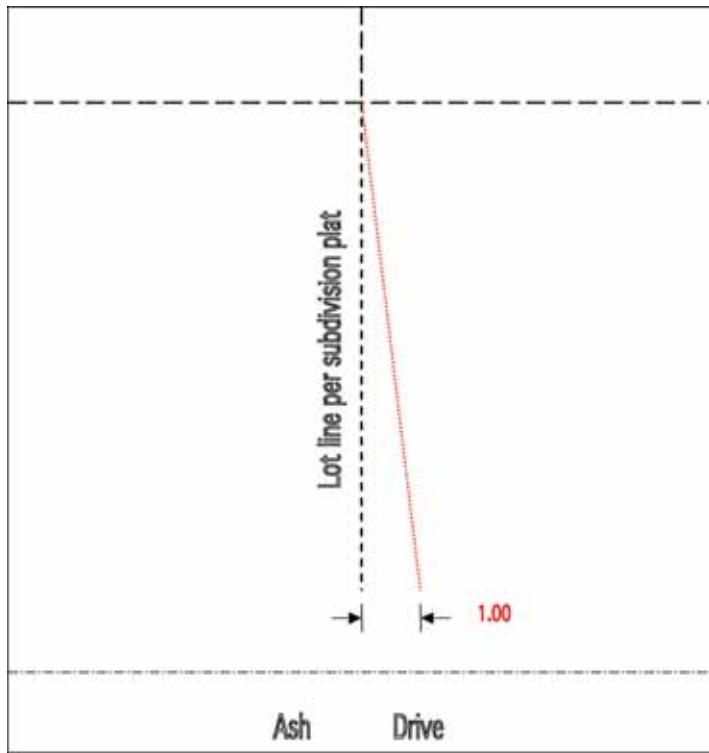
"If the original monuments are no longer discoverable, the question of location becomes one of evidence merely... the surveyor...must inquire into all the facts, giving due prominence to the acts of the parties concerned..."

Judicial Functions of Surveyors, T. M. Cooley (Chief Justice, Michigan Supreme Court)

Whenever a fence line and the record title line are not coincident the surveyor should ask: (a) Who built the fence? (b) When was it built? (c) Why was it built? (d) How have the parties treated the fence since it was built? This *evidence*, the thorough and complete answers to these questions, is vital since it potentially affects the legal and/or equitable rights of the landowners and may therefore form the basis of a court's ultimate decision. The situation shown in illustration 3 (top right of page 24) is significantly different. While such situations occur far less frequently than those previously discussed, the impact is potentially much greater, as is the breadth of the evidence which the surveyor will need to gather. In addition to the above questions regarding the 'fence' (hedge) the surveyor should inquire into the occupation and/or use of the area on both sides of the record title line.

As an example, the presence of a recreational vehicle parked between the RTL and the hedge as well as the presence of oil stains on the ground could be pivotal. But simply noting their presence would not fulfill the surveyor's duty. Is there a fence in addition to the hedge? Where? Whose R/V is it? If it is the adjoiner's: How often and for how long has it been parked there? And, is that a permissive use? Is it paid for? Etc., etc. etc. The surveyor is responsible to gather *all of the evidence* that could affect the boundary.

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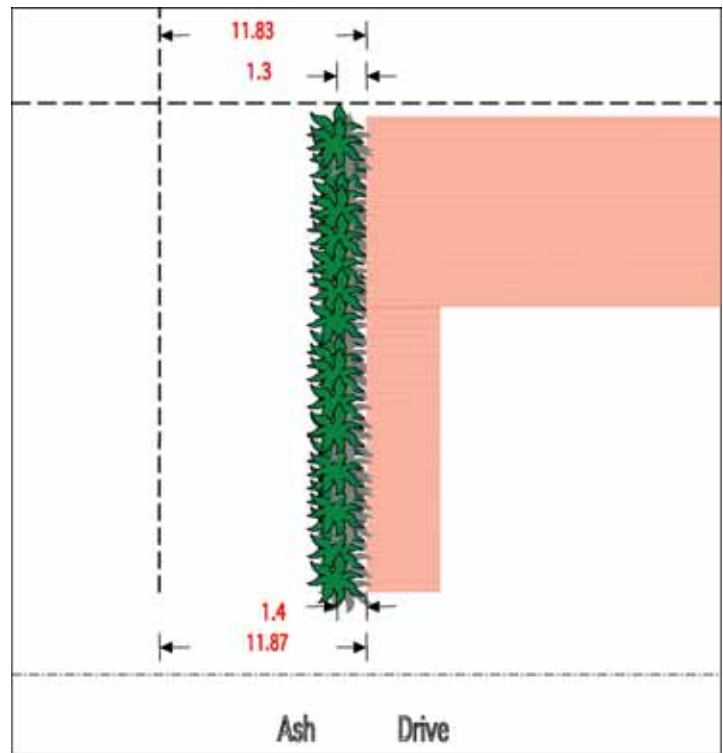


**ILLUSTRATION 3** - Obviously, human error has played a dominate role in the position of the fence. The pivotal question is who made the error. If the original surveyor or the builder's agent marked the corner 1.00 feet east of its intended location and the original purchaser relied upon that, the fence constitutes evidence of the original (true) line – monuments prevail over the plat/deed. If, however, the fence was constructed without reference to an 'original monument', i.e., the original purchaser made the mistake, the plat/deed represents the record title. Further evidence would be needed to formulate a defensible boundary opinion.

Law schools train future lawyers to analyze the facts in a given case. The students are then asked to develop more than one legal argument from them. This analytic approach of considering *all possibilities* which the evidence supports and choosing the most rational is embodied in the Theory of Major Probability which Mr. Brown ascribed to William C. Wattles (§11.47 of BC&LP). Mr. Wattles ascribed the idea to the Hawaii Supreme Court. In any event, the authorities seem to agree that it is a process which surveyors should pursue; and, it conforms to our duty of gathering and considering all of the available evidence.

The legal concept of *The Preponderance of the Evidence* implicitly acknowledges that the surveyor is likely to gather some evidence which could support a contrary conclusion. While our professional opinion may result in a particular line being adopted as the client's boundary, another surveyor (or the court) may place varying evidentiary weight on some items and thereby arrive at a different conclusion. And, the attorneys are allowed to plead and prove contradictory claims – such as Agreed Boundary (requiring mutuality) and Adverse Possession (requiring hostility). These are but some of the reasons that we are expected to gather the evidence, preserve it in our field notes, and memorialize it in our plats – not just the evidence supporting our opinion, but *all of the evidence*.

The illustrations above have been relatively straight forward, intended to focus on a particular idea. But the reality of most boundary surveys is often much more complicated.



**ILLUSTRATION 4** - The ALTA/ACSM Minimum Standard Detail Requirements for Land Title Surveys §5 (Field Work) would not require inclusion of the *evidence* of occupation/use shown herein since it is more than five feet from the Record Title Line (assuming that the RTL is considered the boundary). But, the location of the boundary is the primary purpose of the survey; moreover, the surveyor's opinion as to its location may subsequently be challenged in court.

The identification and memorialization of evidence is a statutory obligation in addition to (and distinct from) expressing an opinion as to the boundary's location.

In illustration 5 (next page) as a very young man Ezekiel Wainwright acquired a rural parcel described as being four hundred feet wide. His Last Will and Testament devised portions of the now suburban lot to his oldest and youngest sons as shown. Seven years later the youngest son sold his portion (the westerly 200 feet) to your client who ordered a survey revealing that the lot is actually 391.77 feet wide as well as the existing fence's location.

A preliminary analysis might have leaned toward an internal boundary at the mid-point, the brother's parcels being considered simultaneously created – they would therefore share the excess/deficiency proportionally. Assuming that to be the case the evidence of occupation (the fence) is indicating a different line.


The surveyor, gathering all of the evidence, would inquire into: Who built the fence? When was it built? Why was it built? How have the various parties treated the fence since it was built? Are there other improvements? Who built them? When? Why? Etc.

Since the documents forming the record title are likewise merely evidence, the surveyor's inquiry must also seek to divulge whether or not corner monuments were expressly or implied called for and whether or not they (or their positions) can reliably be reestablished.

Assume for the sake of discussion that Ezekiel built the fence, constructed a house on the easterly portion and listed the westerly 200 feet for sale with a local real estate broker. Not finding a buyer willing to

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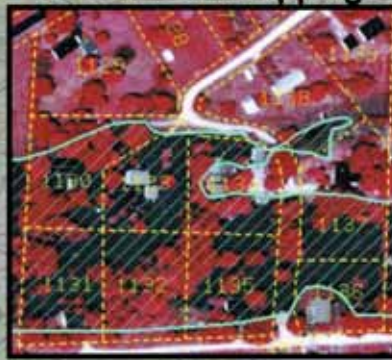


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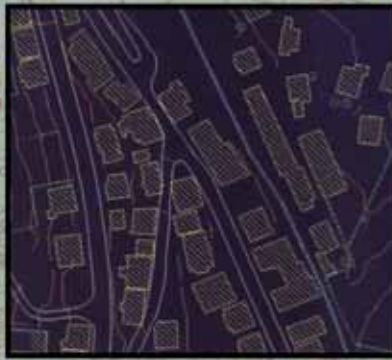


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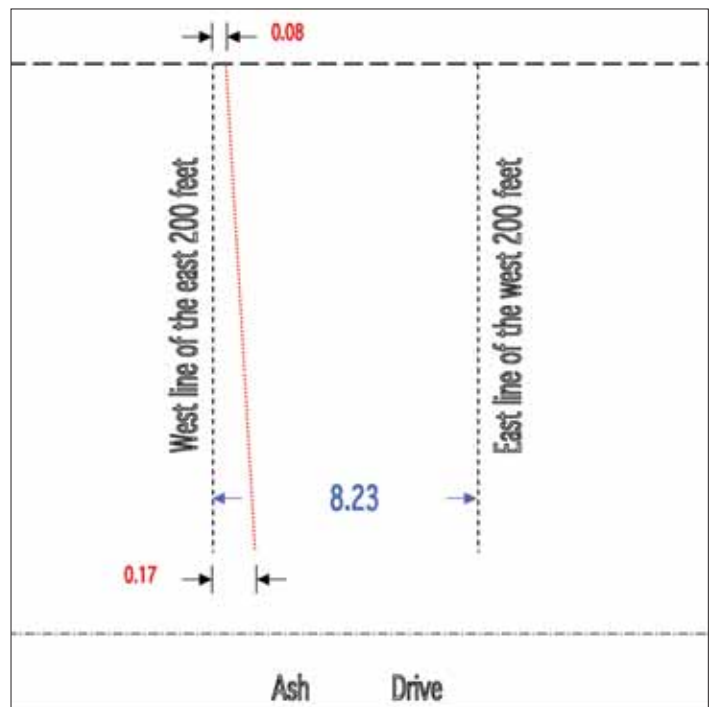
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pay his asking price, he withdrew the listing. The oldest boy moved into the house, occupied the property, paid the taxes and insurance, and cared for his father until his death. Given this evidence you might decide that the parcels were actually created prior to Ezekiel's demise, that the oldest son acquired his rights first, and that the fence is the best evidence of the grantor's original intent. In that case the record title line dividing the two parcels would not be equidistant from the outbounds, nor would it be 200 feet from its westerly boundary; it would be the fence itself.

Instead, assume for the sake of discussion that the oldest son built the fence and house immediately after Ezekiel's death. The first seven years of his occupation might not be considered hostile due to the familial relationship with the adjoining. But, if your client delayed having the survey for five or more years that occupation could be considered hostile and under Color-of-Title.

Now assume that Ezekiel's property was completely unimproved upon his death and that his sons, finding no monumentation of his or his adjoining's properties, agreed to and mutually constructed the fence as their common boundary.

These are but three of many legal arguments which the evidence supports that could bolster or oppose the use of the fence. Without regard to how a surveyor determines a boundary, that professional opinion is always subject to judicial review. The court's authority to determine boundaries includes not only the legal concepts used by surveyors but also includes equitable and 'public policy' matters – any or all of which may involve the evidence of occupation and/or use. ❖



**ILLUSTRATION 5** - The two parcels were created by Will (the testator's deed called for 400'). Since the parcels were created simultaneous the RTL would be "split," Additional evidence and legal argument would likely be necessary to form a boundary opinion.

Whenever you find possession not in conformity with the RTL you should seek evidence of: (a) Who built the fence? (b) When was it built? (c) Why was it built? (d) How have the parties' treated it since it was built?



By: Gregory A. Helmer, PLS

**Mr. Helmer** is a Professional Land Surveyor in four states with over twenty-five years of experience in geodetic control, surveying geomatics and GIS. As a Senior Vice President with the firm of Michael Baker, he has been an innovator for advanced technologies. He is nationally recognized for his contributions to GPS surveying and high-precision geodesy. Mr. Helmer is a contributing author to the National Height Modernization Program for NOAA, and a founding member and past Chairperson of the California Spatial Reference Center at Scripps Institution of Oceanography.

# Computer Vision, Watch For It



Sony recently released the newest model of their popular line of prosumer digital cameras. The NEX-7 includes a 24 megapixel CMOS sensor, and while the available lenses lack mapping-precision calibrations, matched with the 24mm f/1.8 lens this \$2,200 data collection system will effectively scan a two-dimensional scene at 100 feet with a point density of approximately 0.06 feet.

The vast amount of data contained in such an image, even if captured at far lower resolution, goes far beyond the snapshot emailed to your friends. Computer Vision, sometimes referred to as “machine vision”, is an emerging field of study for extracting information from imagery. Softcopy photogrammetry, LiDAR and remote sensing fall within this discipline, but the applications reach a great number of industries, with the greatest benefits coming from automation of the imaging and data extraction processes. Think of 1<sup>st</sup> & Ten, the imaging system used to project the scrimmage line and first down line on NFL broadcasts. Security systems that use fingerprints or retinal scans have been around for many years, but the same intelligence is being applied to facial recognition in crowds, and to recover, in near real time, attribute signatures from the incredibly massive amounts of intelligence video from military drones. The ability to automatically extract 3D modeling is of most direct application to surveying and mapping, and the video and gaming industry is pushing this technology forward rapidly. Xbox and Playstation both have sophisticated 3D image recognition linked to inertial measurement units to track player movements and adjust game play accordingly. With sophisticated computer graphics software from developers such as Wavefront, Side Effects, and LightWave, real-world scenes and characters are routinely captured in rich 3D imagery to develop realistic virtual models for motion picture effects or interactive game environments. Similar technology is being applied to develop, manufacturing quality

control monitoring, medical diagnosis, and precision navigation systems for intelligent vehicles, driver assistance, and aids to the blind. With so many industries leveraging a multitude of related systems and algorithms, it is inevitable that computer vision technology will find application in some familiar assignments.

Of course a major driving force behind computer vision is the ever-increasing processing capability of modern computer systems. Softcopy photogrammetry was only possible because affordable computers reached a point where they could retain a pair of high-resolution images within memory while performing the multi-dimensional transformations necessary to extract 3D object data. Today's desktop computing capability handles this challenge with room to spare. This excess processing capacity can be used to develop far more sophisticated models using large numbers of overlapping images from multiple view angles. Algorithms similar to photogrammetric bundle adjustment and auto correlation can then turn this highly-redundant model into a 3D point cloud with full RGB color attributes. Your next LiDAR scanner could very well be a few thousand dollars worth of digital camera and software.

If softcopy photogrammetry and computer vision still feels like a service you subcontract to your skillful friend and vendor, or something reserved for the Google vans roaming our streets, consider what your existing software and equipment suppliers are investing in computer vision. Autodesk ImageModeler™ is essentially softcopy photogrammetry embedded into your CADD platform. The software accepts one, two or more images of a scene, with known targets for calibration, and projects the stereo image scenes into 3D scenes and photorealistic texturing. The resulting model and extracted 3D features integrate into the full suite of Autodesk Civil 3D, Revit, Maya and other

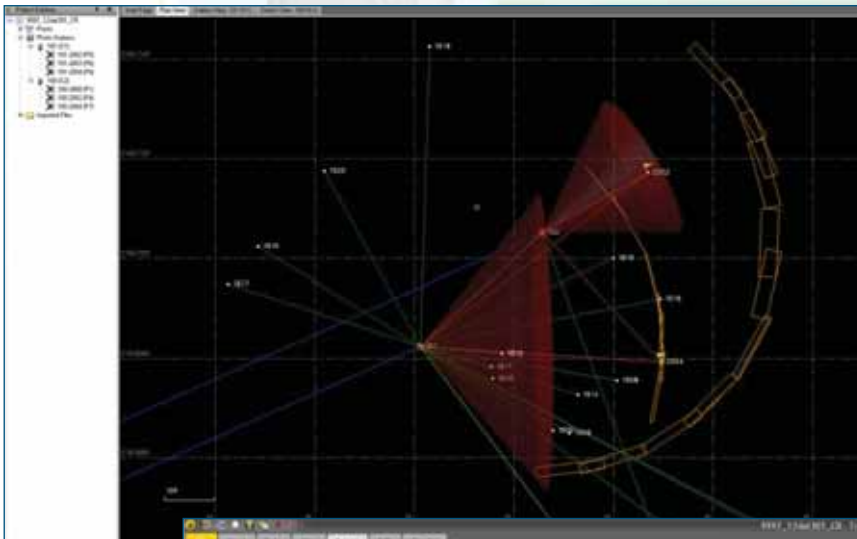
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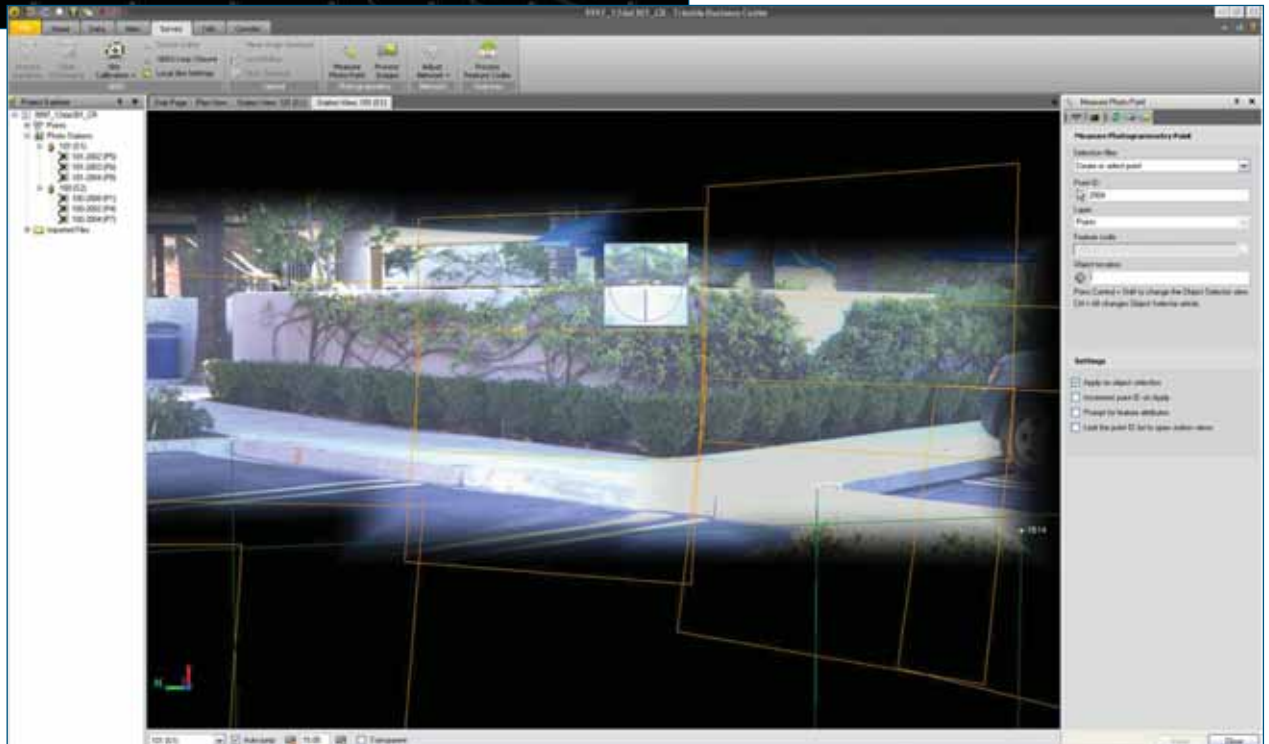
software. Leica and Trimble also see computer vision in your future, both having integrated through-the-lens digital cameras into their latest total station instruments. Combined with their respective image processing software, desktop topographic mapping becomes an effective tool to supplement surveyed data points resolving line-work issues and filling in additional features on the fly.

We live and work in a multi-dimensional universe with no end of attributes and events begging to be modeled and analyzed, so as to answer important questions and create value for society. Surveying Geomatics professionals have

been performing this service since the first land boundaries were transcribed to maps. The sophistication with which we have measured and catalogued our universe has only improved, and the complication of the questions demanded continues to increase. Mastering image processing and computer vision, as you previously mastered field data collectors and Global Navigation Satellite Systems, is necessary for you to continue creating value for the communities and industries you serve. What is certain is that if you do not, another professionals or another discipline will recognize the value and provide these services for you. ❖



Computer vision software for Surveying Geomatics applications includes the ability to compile multiple overlapping images into scenes. Control points within the scenes are used to resolve scale and perspective angles, and stereo views can be used to capture topographic features from desktop mapping. The highly-redundant nature of multiple overlapping view angles can be used in state-of-the-art softcopy software to automatically extract dense point clouds with full RGB attribute data.



# Professional Outreach Events



## Third Annual Initial Point Walk-a-Thon and 5K Run

By: Peter G. Wiseman, PLS

This annual event is held at Yucaipa Regional Park in the County of San Bernardino. All proceeds go to benefit the Riverside/SanBernardino Chapter TrigStar Competition, held in March of each year. The event is held on a Saturday morning in either October or November when the temperature cools down and it's divided between a 3K walk (for those of us that no longer run anywhere) and a 5K run (for those of us who still can). It is held at the park because it is the home of the San Bernardino Mountain Initial Point replica sponsored and constructed by the California Inland Empire Council of the Boy Scouts of America for the San Bernardino Initial Point Sesquicentennial Anniversary Celebration held in 2002. The replica is constructed so that when standing at the dedication plaque and looking directly past the monument, the viewer is looking directly at the peak where the original monument stood.

A flat rate donation is collected by volunteer participants from family, friends, workmates and corporate sponsors which averages about \$20 per donation (pretty easy to talk someone out of 20 bucks for a good cause). Actual walkers/runners/collectors vary from year-to-year but we can usually expect between 15 and 25 walkers/runners and between 25 to 35 "collectors" primarily consisting of chapter members and their families. As in years past, lunch is served to all attendees raising money for the event; a local pizza establishment in Yucaipa did the honors this year. The Walk-a-Thon raised just over \$1,300 towards the prize money awarded the 1st through 3rd place winners and each participating school at the competition.

This is a very easy fundraising event to put on but it does take some effort to get the word out and get folks involved. As we say to our members "it's OK if you don't want to give up a Saturday morning to walk or run, just give us your money." ❖



## Sacramento Chapter Feeds Surveying Examinees

By: Annette Lockhart, PLS



The Sacramento and Central Valley Chapters have been providing lunches for FS and PS exams in April and October for several years now. It started when Rob McMillan took his FE exam and had to find lunch. When that proved to be a challenge, he presented to the Chapter, the idea of providing lunches. We have been providing them ever since.

Lunches provided at the site allow the candidates to relax and to socialize. For the FS candidates, this is usually their first contact with CLSA. This kind of event is not difficult to plan. We get sandwiches from a local Subway and chips, soda, and water from Costco. This event usually requires just a few members and few hours for set up and lunch. If you want more information, contact us at [ideas@sac-surveyors.org](mailto:ideas@sac-surveyors.org). ❖

**Let us know about your local professional outreach events so we can share the good news. - Editor**

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# CSU Fresno Endowment Fund

## *Donate Today to Ensure Tomorrow*

### The Issue:

- California has been steadily reducing funding for educational institutions.
- The CSU Fresno Geomatics program is considered to be small and is more susceptible to cutbacks or elimination.
- Both professors that hold a professional land surveying license, are now retired

### The Need:

- CSU Fresno Geomatics program was the first four year surveying degree program in the nation and the first to become ABET accredited.
- CSU Fresno Geomatics has graduated over 700 students.
- Students graduating from the CSU Fresno Geomatics program have gone on to serve in many leadership positions in the land surveying profession both in the private and public sector.

### The Solution:

- The CLSA Education Foundation has worked with CSU Fresno to create an endowment that will fund a full-time professor licensed to practice land surveying in California. This will help to ensure that the CSU Fresno Geomatics program continues.
- Lyles Foundation will match all donations, dollar-for-dollar, up to \$1 million

### The Benefit:

- Your donation is fully tax deductible! CLSA Education Foundation is a 501(c)3 charitable organization. Tax ID number 68-0482650
- Show your support for the surveying profession and the great program at CSU Fresno.

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Channel Islands Chapter  
East Bay Chapter  
Hennon Surveying (Glendale, CA)  
Jim & Barbe Herrick  
Gary Lippincott  
KDM Meridian, Inc. (Lake Forest, CA)  
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Sacramento Chapter  
San Diego Chapter  
Simpson Land Surveying, Co.  
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Sonoma County Chapter  
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Ed Boris  
Central Coast Chapter  
Dorothy Calegari  
Les Freligh  
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Michael Jones  
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Gwen Gee  
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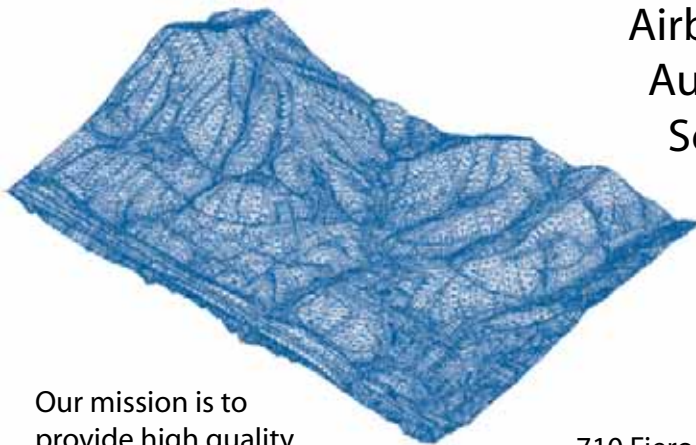
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# Dear Mr. Smith:

## A Letter to a Prospective Client About My Fee

**Editor's note:** This is the text of an actual letter Stephen sent to a prospective client – the only thing we changed was the name. He followed up with us shortly thereafter to say “Mr. Smith” hired him to do the job. We expect that more than a few of you will relate to the sentiments Stephen expresses.

Dear Mr. Smith,

I wish I could offer you a lower fee. I may be able to do so in the future, but at this time my fee really reflects the least amount of time I expect to spend on your project.

Consider how long it will take me to obtain a copy of your tract map and related survey records, review them to discover what controlling monuments were set in the vicinity along your street some 56 years ago and how they may have been recovered and perpetuated since then by other surveys, calculate coordinates on those controlling monuments and on your lot corners, transfer the data into my field data collector, load up my survey vehicle and drive to the site. All this happens before I ever do one minute of field work

with my assistant. By the way, he must have years of experience to run the instrument and perform field calculations; he is not someone I can pick up outside the Home Depot to work with me for the hour you estimate this job would take.

Suppose it takes me even an hour of field time to recover and confirm the monuments set in 1955, which, by the way, have more often than not been lost long ago to public works projects and even private driveway improvements like yours. Even if I do recover them in place, I will have to decide how to handle the minor discrepancies I will almost certainly discover between the measurements I will make and those made more than half a century before. When I am finally satisfied with the control, however far I may have to survey for it, only then can I begin to stake out the points you require and set durable monuments with my tag. After I am finished I will then have to prepare a two page corner record for the County of Ventura, package it and mail it in together with any references. I expect that they will be, in my opinion, overly critical as has happened in the past, and will send it back with some comment I will have to address, make a minor revision (or not), and return it to them. By the way, they charge a fee for this which I intend to pay out of the check you write to me.

I really do wish I could reduce the cost. I enjoy the fieldwork and construction staking more than boundary work, but when you are building close to, or on the line, the inspector will likely ask for a survey. Boundary survey records, if done in accordance with California law, become public so that they are open and verifiable by other surveyors. This adds value to the property and means escrow will likely close with one less “speed bump,” because when you sell the house, the buyer or his agent can obtain a copy of the survey stamped by both the private surveyor and the County Surveyor. I've attached an example of a corner record for your reference.

If you have answered the phone to take survey requests for the last 31 years like I have, you'd appreciate why the inspectors do what they do. I haven't actually kept track of it, but I believe I've had more calls from people living next door to construction projects than from those building them. I always tell them to call the city and see what can be done, because it only makes sense that the person doing the project should pay for the survey. I tell the caller they should not have to pay for a survey for their neighbors project any more than they should have to pay for the concrete.

I understand that you would go with a lower bid. Please call me again the next time you need a survey. Maybe I will become more efficient or have employees who are faster than I am. I guess maybe I am too careful. I would appreciate knowing how far off I was and whether or not the other scope of work includes the preparation and filing of a public record.

Stephen Hughey, PLS ❖

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The LS Review sessions at the 2012 CLSA/NALS Conference were videotaped. The DVDs are being made available to the profession as a resource. A great resource for studying for the LS exam!

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# Geography Quiz

by: Anne Hoppe, PLS  
and Germar Berhhard, Ph.D.  
Photography by Germar Berhhard, Ph.D.

## Answer to the Geography Quiz:

Mauna Loa and Mauna Kea on the Island of Hawaii.



Mauna Kea on the Island of Hawaii.

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*What are we all going to do?*

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What should you do? The same as you always do. Keep up your relationships, learn new skills, work hard, be friendly and diversify if necessary.

#### Risk Management

Pay attention to basic risk management principles. Risk management is always asking yourself a lot of "what if" questions and trying to answer them.

#### Remember these 5 things.

*After you've identified your own risks you can:*

- **Avoid the risks**-don't take the job or use a well - qualified and insured subcontractor to do the work
- **Control the risks**-be careful how you work, implement safety training, know who you work for and who works for you, review your losses and claims to prevent them from happening again
- **Retain the risks**-with self insurance or large insurance deductibles
- **Transfer the risks**- using insurance or indemnity agreements
- **Monitor the results**-with cost/benefit analysis to see if your program is successful

Good planning and anticipation on your part will take you a long way toward care, quality and professional excellence.

#### 2013 New Year Forecast

Coming into the New Year make a good budget, put aside money for taxes, insurance rate hikes, and health care costs.

Check you insurance valuations on your property, equipment and workers comp payrolls.

**Know that insurance rates are going up 5 to 10%.**

#### Professional Liability Insurance Checklist

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- Full prior acts coverage
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- No hammer clause
- Consent to settle
- Blanket contractual liability coverage
- Extended reporting period
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- Cyber Liability Coverage
- Waiver of Subrogation
- Worldwide coverage
- Broad definition of professional services

Finally, be sure to add the cost of your insurance, like you do your expenses, to your bids.

Now go out, sell, survey, make good money and have a Happy and Successful New Year. ❖

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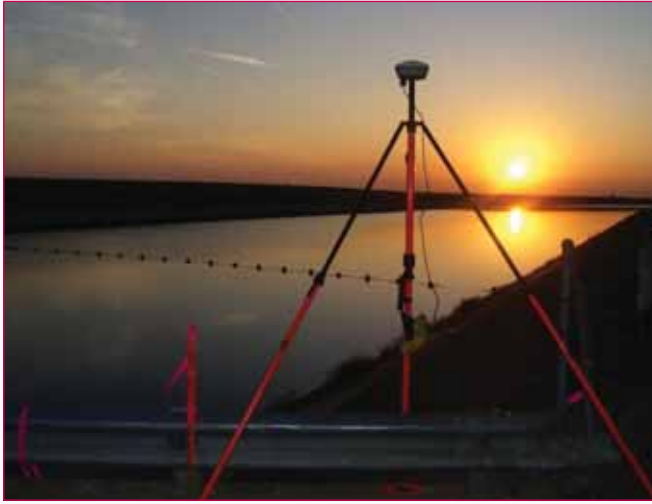
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# Photo of the Year



Sunset over the California Aqueduct. Submitted by Pat Tami, PLS.



Adkan Engineers chain man Dan Baldwin laying out LAX striping while Space Shuttle Endeavor was in Los Angeles.

Submitted by Mitch Adkison, P.E., P.L.S.

Submit Photos to [CLSA@californiasurveyors.org](mailto:CLSA@californiasurveyors.org) Deadline: December 31, 2013

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# Q&A SMA Expert



*Michael P. Durkee, represents developers, public agencies and interest groups in all aspects of land use law. Mike is the principal author of Map Act Navigator (1997-2013), and co-author of Ballot Box Navigator (Solano Press 2003), and Land-Use Initiatives and Referenda in California (Solano Press 1990, 1991).*

*mdurkee@ww-envlaw.com*

## Question

**I represent a client who is unhappy with certain Conditions of Approval that city staff is proposing for his Tentative Map. What steps do I have to take to take/worry about in order to preserve his right to later sue the city over the Conditions of Approval?**

## Discussion

**Great question! There are generally three issues relating to “perfecting” a lawsuit against a city or county that a challenger should be aware of: (1) Exhaustion of administrative remedies; (2) Appeals/automatic affirmation; and (3) Statutes of limitation.**

### 1. Exhaustion of Administrative Remedies

In a legal action or proceeding to attack, review, set aside, void or annul a finding, determination, or decision of a public agency regarding a subdivision map (including a Condition of Approval), the factual and legal issues raised in court will be limited to those raised by the challenger at the administrative level. Opportunities for raising such factual and legal grounds include the public hearing (before the decision is reached), or in written correspondence delivered to the agency (before the decision is reached). This requirement is known as “exhaustion of administrative remedies.” The exception to this requirement is limited: (i) The issues could not be raised at the public hearing by persons exercising reasonable diligence; or (2) The body conducting the public hearing prevented the issues from being raised at the public hearing. Gov’t Code § 65009(b)(1).

Further, in order for full exhaustion to take place, the action being challenged must be appealed to the highest administrative body available under the controlling local ordinance (i.e., to the city council, board of supervisors, or whoever else is listed as the highest appellate body at the public agency in question).

Failure to exhaust is fatal. The court is said to have no jurisdiction when exhaustion of administrative remedies has not been fulfilled; cities and counties will use your failure to exhaust all available administrative remedies as an “affirmative defense” to kill your lawsuit. However, the public agency may not assert the affirmative defense of failure to exhaust unless public notice has been given, informing the public that they may be limited in raising only those factual and legal issues they raised at the public hearing or in written correspondence. Kings County Farm Bureau v. City of Hanford, 221 Cal. App. 3d 692 (1990).

### 2. Appeals/Automatic Affirmation

The Subdivision Map Act provides certain procedural rules regarding appeals. In particular, Map Act § 66452.5 provides, in pertinent

part, that an appeal shall be filed within 10 days of the decision being appealed. Map Act § 66452.5 then further provides that upon the filing of an appeal, the appeal shall be set for hearing “within the next 30 days after the date” of the filing of the appeal. However, Map Act § 66452.5 also provides a caveat: if there is “no regular meeting of the legislative body within the next 30 days for which notice can be given . . . [then] the appeal may be heard at the next regular meeting for which notice can be given, or within 60 days . . . whichever period is shorter.” (Id., emphasis added.) Map Act § 66452.5(c) then provides the “consequence” for such failure to act in a timely fashion: “. . . the decision from which the appeal is taken shall be deemed affirmed . . . .” (Emphasis added.)

Those who would be hurt by such a deemed affirmation may have to file a lawsuit and seek judicial tolling of its effect before that deemed affirmation takes place so as to not suffer its consequences.

### 3. Statutes of Limitation

All persons are barred from bringing a lawsuit against a city/county (or other public agency) to attack, review, set aside, void, or annul its decision (including Conditions of Approval) unless the lawsuit is filed and served on the public agency within 90 days after the date of the decision. Gov’t Code § 66499.37. The statute of limitations for challenging the validity of conditions imposed precedent to final map approval begins to run when the conditions are imposed, not at the time of final map hearing. Soderling v. City of Santa Monica, 142 Cal. App. 3d 501 (1983); see also Timebridge Enters., Inc. v. City of Santa Rosa, 86 Cal. App. 3d 873 (1978).

The Map Act’s 90-day statute is very short compared to other laws. Where the challenged condition of approval was a restriction on the use of land, as opposed to an exaction that divested the property owner of a possessory interest in land, the applicable statute of limitations was set forth in the Map Act, not the Mitigation Fee Act. Fogarty v. City of Chico (2007) 148 Cal. App. 4th 537. By applying the Map Act’s 90-day statute, the landowner’s action was time-barred because he had failed to serve the petition on the city within 90 days of the date of the decision, as required by Section 66499.37. In Fogarty, the court held that the condition at issue – the designation of an 80-acre parcel as a no-development zone – was not an exaction subject to the Mitigation Fee Act, but rather was a restriction on the use of land. One question left unanswered by the court was which statute of limitations would have applied had the condition actually constituted an exaction attached to the vesting tentative map. The Mitigation Fee Act provides a 180-day statute of limitations for challenging the imposition of a fee (exaction); however, the Map Act provides a 90-day statute of limitations. The Fogarty court did not reach this issue. Clearly, a fix – either from the Legislature or the courts – is in order to resolve this uncertainty.

In the interim, though, the cautious practitioner must assume that the shorter statute of limitations applies. ❖



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## News and Views from the Enforcement Unit

When I was first asked to write this article several months ago, I was just going to write about unlicensed activity and how you can help the Board enforce against it. But then I thought of a few other topics that might be of interest as well, so I decided to expand my article.

### The Enforcement Unit Staff

The Enforcement Unit is staffed by nine Enforcement Analysts who handle the complaint investigations and two Enforcement Analysts who handle the citation program, an Enforcement Technician who deals with Organization Records and provides clerical support for the rest of the Unit, and me as the Enforcement Program Manager. The shortest amount of time anyone has worked in the Unit is about five years, while some of us have worked in the Unit for over 20 years. In addition to handling complaint-related work, the Enforcement Unit is also responsible for handling all of the inquiries that do not relate to the licensing/application or exam processes. This means we deal with all of the questions regarding the complaint process and the laws, as well as general inquiries that may not be covered in our laws, such as how long a licensee should maintain their records after a project is complete. None of us are licensees, so we rely on our staff licensees and our expert consultants to help us understand the technical aspects of the cases and inquiries. Luckily, both Ric Moore and Ray Mathe are willing (and eager) to discuss land surveying issues with us.

You can reach the Enforcement Unit via our general email address [BPELS.Enforcement\\_Information@dca.ca.gov](mailto:BPELS.Enforcement_Information@dca.ca.gov), or you can call or email me directly at (916) 263-2241 or [Nancy.Eissler@dca.ca.gov](mailto:Nancy.Eissler@dca.ca.gov).

### Monument Conservation and Preservation

Many of you may already be familiar with one of the Enforcement Analysts, Larry Kereszt, who is the designated contact person for monument conservation and preservation issues – or “Mon Con Contact,” as I like to call him. For anyone who wasn’t able to participate in the recent webinar that Ray and Larry presented on this topic (“BPELSG: Prevent Monument Destruction Before It’s Too Late”), it is available on CLSA’s members’ website. We are still working on the online reporting tool to facilitate the submittal of information to the Board and hope to have it available early in 2013. If you have concerns or questions regarding monument conservation matters, you can call or email Larry – (916) 263-2240 or [Larry.Kereszt@dca.ca.gov](mailto:Larry.Kereszt@dca.ca.gov).

### Unlicensed Activity and How You Can Help the Board

A recurring theme I hear at the Chapter meetings and the Conference, as well as in other communications with licensees, is the perception that the Board doesn’t care about unlicensed

activity and doesn’t do anything to enforce against it. “Why should I submit a complaint to the Board? Last time I did, you didn’t do anything because the person is still out there doing the same thing” are the common statements I hear. We do care very much about enforcing against unlicensed activity because it is very damaging to the profession and to the consumers. But, we are somewhat limited in what action we can take against unlicensed individuals, which can lead to the appearance that we aren’t doing anything. Unlicensed activity can be a criminal misdemeanor; however, in order for criminal charges to be filed, we have to convince a District Attorney to accept the case. Many times, the DA’s Office will ask us what preliminary steps we have taken to put the person on notice that they cannot offer or perform land surveying services. If we haven’t taken any steps yet, the DA’s Office will often refuse to file charges. We are much more successful in having a DA file criminal charges in cases where we can show that the person has a history of unlawful activity and that we have put them on notice in the past. So, while it might look like we aren’t doing anything initially, what we are really doing is trying to build a stronger case. With the first complaint, we may advise the unlicensed person what they are doing to violate the laws and seek their acknowledgement that they will cease such activity. When we find out that they are continuing such activity, we have a much stronger case because we can show that they had already been advised of their unlawful actions. That’s why it is so important for you to submit complaints to us, especially if it is someone who is continuing to violate the laws.

In closing, I want to thank everyone at CLSA for giving the Board, and me, the opportunity to contribute articles to the Cal Surveyor this past year. We look forward to future opportunities to work with CLSA and its members to promote the profession of land surveying and the continued professionalism of those who practice it. In doing so, we are able to provide the best protection to the public and meet the Board’s mission and goals. (And, speaking of future opportunities, mark your calendars for the CLSA/NALS Conference from March 23 – 27, 2013. We’re planning something special for it.)

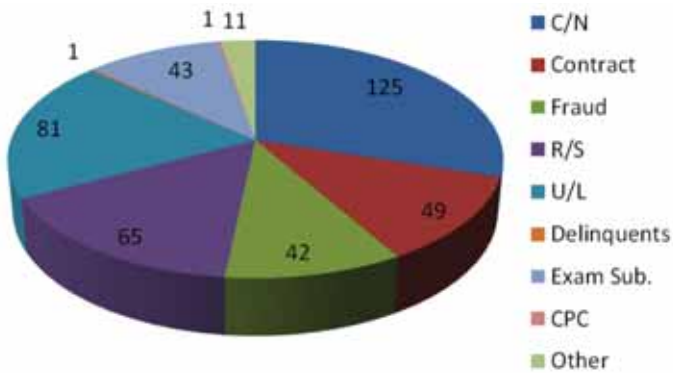
And, in case anyone was wondering, the answer to that general inquiry example given above is that there is no time period specified in the laws or regulations for how long you should keep your records. We recommend you consult with your attorney and/or your liability insurance carrier regarding how long you should maintain your records for civil liability purposes. It is also important to remember that there is no statute of limitations for the Enforcement Unit to investigate complaints, and oftentimes it is the licensee’s own records that provide the evidence that the licensee did not violate the laws.

*Continued on next page*



## PELS ENFORCEMENT PROGRAM (FY 2011-12)

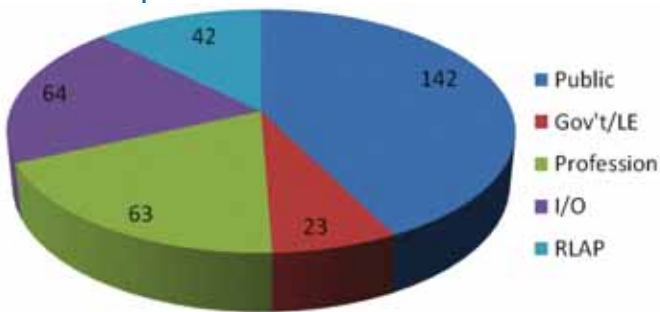
### Category of Alleged Violations at Opening of Complaint Investigation Case



**NOTE: May total more than the number of complaint investigation cases opened**

- C/N = Competence/Negligence
- Contract = Contractual Issues (breach of contract, failure to execute written contract, failure to include all required elements in written contract)
- Fraud = Fraud/Deceit/Misrepresentation; Aiding and abetting; Criminal conviction
- R/S = Failure to file; Failure to resubmit; Monumentation
- U/L = Unlicensed Activity
- Delinquents = Delinquent Reinstatement applicants
- Exam Sub. = Exam subversion (includes those removed from exams and collusion analyses)
- CPC = Code of Professional Conduct (16 CCR §§ 475 & 476)
- Other = Anything not covered above (i.e., failure to sign/seal; failure to file OR)

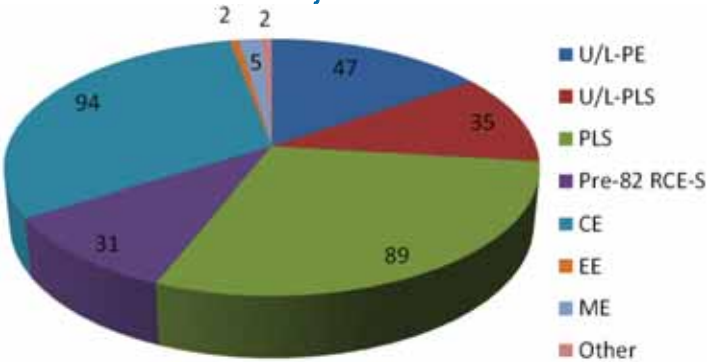
### Source of Complaint



**NOTE: May total more than the number of complaint investigation cases opened**

- Public = Consumers, individuals not licensed by BPELSG, attorneys, etc.
- Gov't/LE = Government Agency or Law Enforcement (includes federal, state, and local governmental entities, e.g. County Surveyor's Office, Building Dept.)
- Profession = Licensees of BPELSG; also includes professional associations (such as the JPPC)
- I/O = Internal/Other – no complainant (exam subversion), inquiries that result in the Enforcement Unit opening a case, anonymous
- RLAP = Reporting of Legal Actions Program – cases opened as a result of receiving a report of a civil judgment, settlement, or arbitration aware or criminal conviction

### Area of Practice/Licensure of Subject



**NOTE: May total more than the number of complaint investigation cases opened**

- U/L-PE = unlicensed activity relating to the practice of professional engineering
- U/L-PLS = unlicensed activity relating to the practice of professional land surveying
- PLS = allegations relating to the practice of land surveying by a Professional Land Surveyors
- Pre-82 RCE-S = allegations relating to the practice of land surveying by a Pre-82 Civil Engineer
- CE = allegations relating to the practice of civil engineering by a Civil Engineer
- EE = allegations relating to the practice of electrical engineering by an Electrical Engineer
- ME = allegations relating to the practice of mechanical engineering by a Mechanical Engineer
- Other = allegations relating to the practice of any other discipline of engineering by a licensee in the specific discipline (i.e., traffic engineering by a Traffic Engineer) ❖

## San Francisco Treats

By: Dane Ince, PLS

This looks like a 1947 Ford Super Deluxe Woody to me. I believe this vehicle puts an end to all debates on the merits of various survey rigs, when it comes to style. This picture is from the annual report by the Bureau of Engineering, City and County of San Francisco to the Board of Supervisors for the year 1947-48. This vehicle was used by San Francisco City survey crews in the 1940's ❖





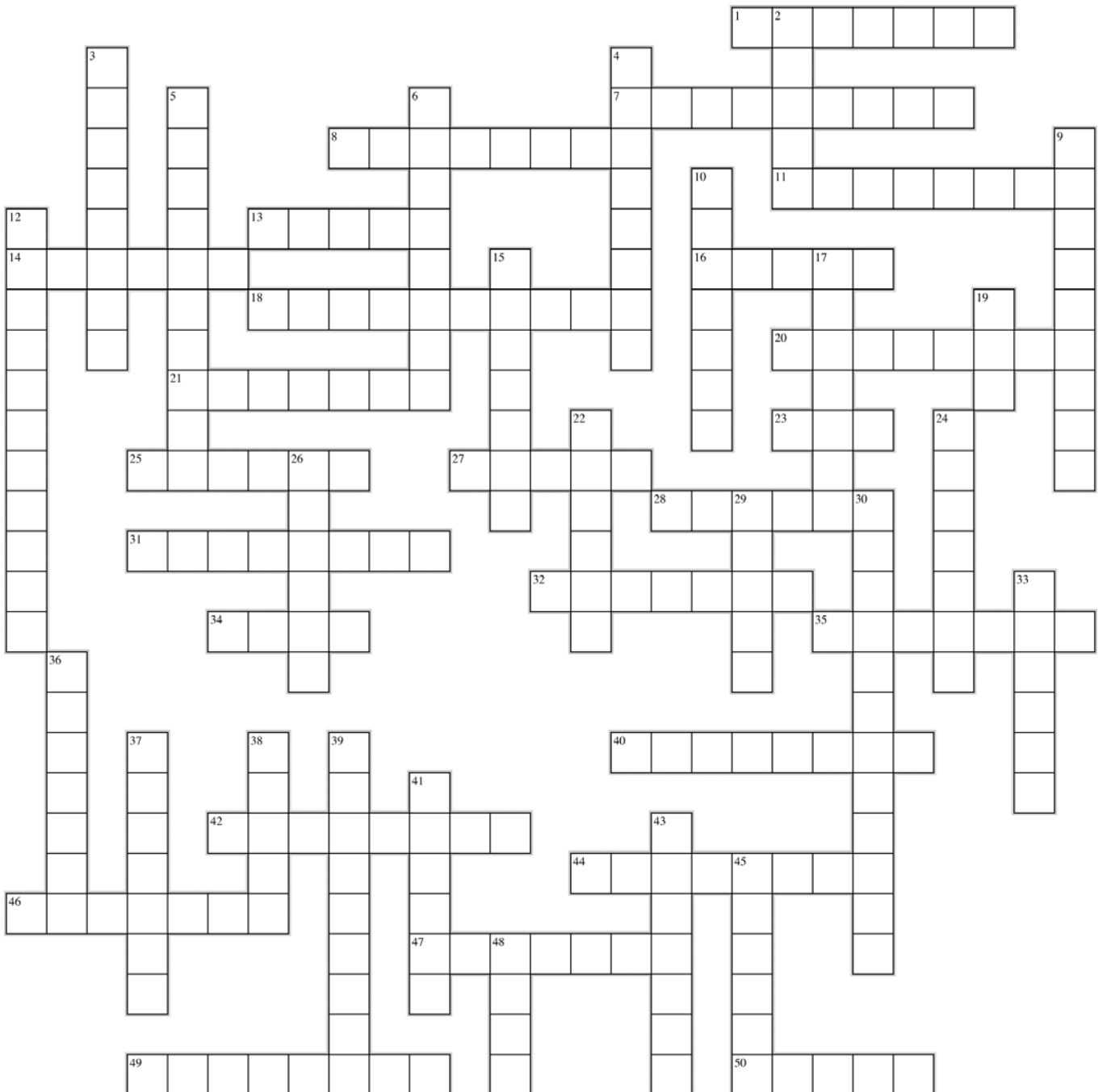
# Crossword Puzzle

By: Ian Wilson, PLS

*Ian Wilson, PLS is the Director of Survey for Cardno WRG, Inc. in Roseville, CA. He started surveying in 1988 in Southern California and is now enjoying life in Northern California. Ian enjoys hearing from fellow members about the crossword puzzle and is always looking for clue ideas and input. He is licensed in California and Nevada and has specialized in boundary, topographic and Land Title surveys. His expert witness practice in boundary and easement issues is growing. Ian has been a member of CLSA since 1988.*

## CLSA Crossword Puzzle #25

If you have an idea for a puzzle theme or a clue you would like to include in an upcoming puzzle, email to [clsa@californiasurveyors.org](mailto:clsa@californiasurveyors.org)





## Across

1. GOODMAN BIRTHPLACE AND CURRENT HOME OF SURVEYOR PAULK
7. ANOTHER CHARACTERISTIC OF A GOOD PROPERTY DESCRIPTION
8. A PROMISE
11. BAR OF DENIAL
13. ORAL EVIDENCE
14. OUTSIDE 1-INCH ON A RECORD OF SURVEY
16. LAND OF THE ROPE STRETCHERS
18. EYEWITNESS TYPE
20. MARK OF A CORNER
21. TYPE OF COMPASS
23. SPACE BETWEEN DESCRIPTIONS
25. OVER A SURVEYOR'S HEAD
27. ANOTHER TYPE OF SKIN CANCER
28. JUDICIAL RULING
31. TESTIMONY OR WRITING OFFERED TO PROVE A FACT
32. OVERHEARD
34. HIGHEST POINT
35. ANTIQUE SURVEYOR'S INSTRUMENT
40. ENFORCEABLE AGREEMENT
42. INTEREST
44. FANCY OPENING
46. CURRENT TECH TIPPER
47. LEFT TO THE STATE
49. DIRECTION TYPE
50. REFERENCE SURFACE

## Down

2. SAY YES
3. NEW METHOD FOR PHOTOGRAMMETRIC GPS CONTROL
4. CONTEST IN LAW
5. CHARACTERISTIC OF A GOOD PROPERTY DESCRIPTION
6. VIOLENT LAND ACT
9. PERSON OF ACTION
10. KARAYAN'S FENCE BUILDER
12. TYPE OF REPORT USED IN GPS FIELD WORK
15. OF THE FINGERS IN CAMERA
17. DIVIDE
19. INHERITABLE ESTATE
22. PIECE OF LAND
24. THOSE TO WHOM PROPERTY IS TRANSFERRED
26. HOME OF THE RAMESSEUM
29. HISTORY OF TITLE
30. INTRUSION
33. SPECIFIES INSURANCE COVERAGE
36. DEPARTMENT CREDITED WITH DEVELOPING GPS FOR USE
37. "ANCIENT" EGYPTIAN SURVEYOR?
38. PATCH OF LAND
39. DEGREE OF REFINEMENT
41. 1/360TH OF A CIRCLE
43. TYPE OF DEED
45. SURVEYOR'S DOG WITH THREE LEGS
48. SLANG FOR COORDINATE GEOMETRY

Graphics

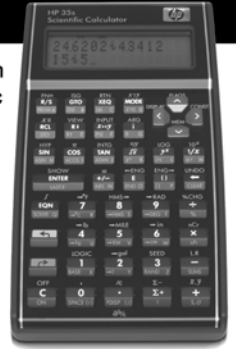


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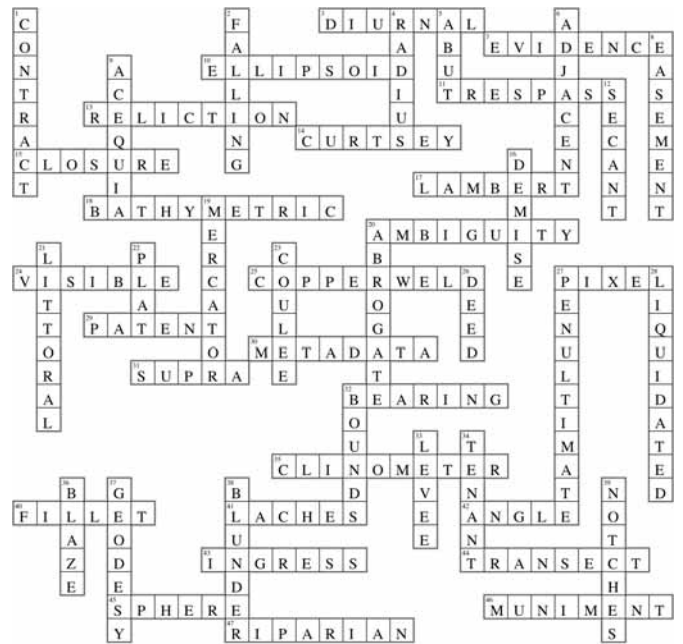
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### Key to CLSA puzzle #24 (Surveyor Issue # 171)





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## Top Captions for issue #171 Cartoon

LS Review Class – “Responsible Charge”  
Linda Richardson, PLS

“Jethro! Bring me that chaining pin or Thor’s going to thump you with his bola!”  
Phil Danskin, PLS

Property Line War I – They had to start somewhere.  
Charlie Czapkay, PLS

As soon as the engineers and geologists stop arguing, we surveyors will take care of it.  
Dan Hooper, PLS

News Item: “Construction workers in Fresno, California have unearthed an old clay tablet depicting people and hieroglyphs carbon dated back 12,000 years. The hieroglyphs on the obelisk indicate the people to be the Geomatycs people from Central Mongolia. The ancient Geomatycs people were known for their pursuit of astronomy, mathematics, and surveying. The workers have been cautioned to keep a sharp eye out for other remnants of this once proud civilization.”

BJ Tucker, PE, PLS



Submit your caption for the above cartoon to [clsa@californiasurveyors.org](mailto:clsa@californiasurveyors.org) by March 1st. Our favorite captions will be published in the next issue of the California Surveyor.

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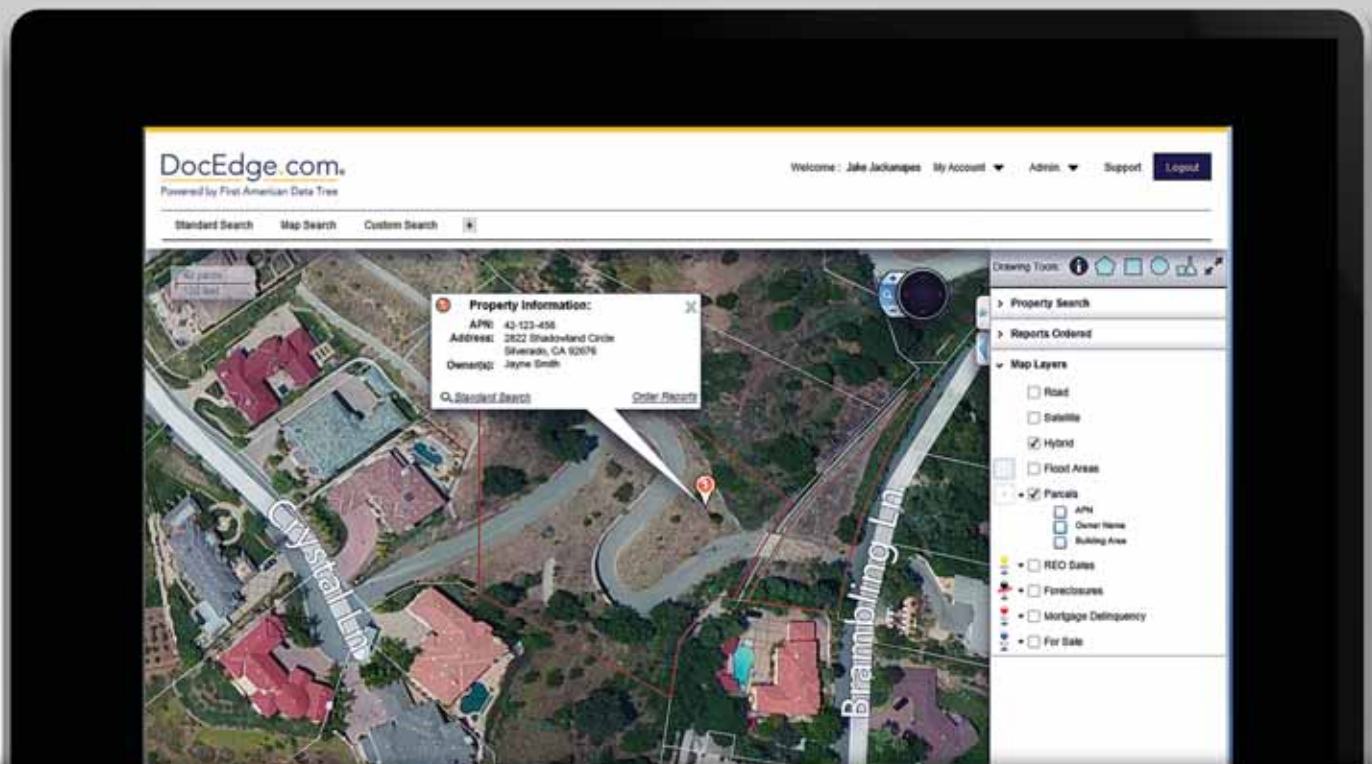
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