



Central Valley Chapter - California Land Surveyors Association  
[www.californiacentralvalleysurveyors.org](http://www.californiacentralvalleysurveyors.org)

# Central Valley Chapter THE PRISM

**Up  
Coming  
Meetings!**

**Date:** March 23, 2016

**Time:** 6:00 p.m.

**Location:** Perko's @ 901 North Carpenter Road, Modesto

**Speaker:** Ric Moore, BPELSG

**Topic:** BPELSG, Open Questions

**Date:** April 27, 2016

**Time:** 6:00 p.m.

**Location:** Perko's @ 901 North Carpenter Road, Modesto

**Speaker:** Dominic Signorotti, BPBS, LLC

**Topic:** Land Law in Central California

## Announcements

### 2016 MEMBERSHIP DRIVE IS UNDERWAY

Support your local CLSA Chapter by becoming a Chapter member today. It's fast and easy. There are several ways to pay:

1. Pay through the Chapter website
2. Mail your check to the Chapter home address
3. Bring your payment to the next Chapter meeting

We can not grow without your contributions and support.

### EDUCATION FOUNDATION AWARDS SCHOLARSHIPS

The CLSA Education Foundation has awarded over \$55,000 in scholarships this year. \$25,250 was awarded through 28 scholarships at the 55th Annual Fresno State Geomatics Conference on January 29, 2016.

Central Valley Chapter Scholarship winners were awarded as follows:  
 Corey Walker was awarded the Chuck Kincaid Memorial Scholarship  
 Scott Myatt was awarded the Thomas H. DeLaMare Memorial Scholarship  
 Ryan Jackson was awarded the Jesse Stanley Memorial Scholarship

### NEW CHAPTER TREASURER

2016 Chapter Officers are as follows:

President - Landon Blake  
 Vice-President - Will Paul  
 Secretary - Rich Brown  
 Treasurer - Warren Smith  
 Chapter Director - Keith Spencer  
 Chapter Director - Kevin Genasci  
 Alt. Chapter Director - Landon Blake  
 Alt. Chapter Director - Will Paul

### 2016 Chapter Officers

President: Landon Blake  
 Vice President: Will Paul  
 Secretary: Rich Brown  
 Treasurer: Warren Smith  
 Chapter Director: Keith Spencer  
 Chapter Director: Kevin Genasci  
 Alt. Chapter Dir: Landon Blake  
 Alt. Chapter Dir: Will Paul

### 2016 Chapter Committees

By-Laws Committee:  
 Keith Spencer (Chairman)  
 Construction Committee:  
 Landon Blake (Chairman)  
 Education Committee:  
 Kevin Genasci (Chairman)  
 Membership Committee:  
 Rich Brown (Chairman)  
 Monument Preservation Committee:  
 Mike Quartaroli (Chairman)  
 Newsletter:  
 Rich Brown (Editor)  
 Professional Practices Committee:  
 Mike Quartaroli (Chairman)  
 San Joaquin County Liaison Committee:  
 Kevin Genasci (Chairman)  
 Stanislaus County Liaison Committee:  
 Rich Fultz (Chairman)  
 Website:  
 Keith Spencer (Web Master)

### 2016 Chapter Programs

Adopt-A-Road:  
 Rich Brown (Coordinator)  
 Boy Scout Merit Badge:  
 Zachary Wong (Coordinator)  
 TrigStar:  
 Bill Koch (Coordinator)  
 Workshops:  
 Rich Brown (Coordinator)

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# Classes, Training, and Continuing Education

## CAD Masters - AutoCAD Level I (3-Day Course)

Mar 14-16, 2016 Walnut Creek  
 Mar 15-17, 2016, Sacramento  
 Apr 11-13, 2016 Walnut Creek  
 Apr 25-27, 2016, Sacramento  
 May 9-11, 2016 Walnut Creek  
 May 23-25, 2016, Sacramento

[Register here](#)

## CAD Masters - AutoCAD Level II (2-Day Course)

Mar 21-22, 2016 Walnut Creek  
 Mar 31-1, 2016, Sacramento  
 Apr 18-19, 2016 Walnut Creek  
 May 9-10, 2016, Sacramento  
 May 31-1, 2016 Walnut Creek

[Register here](#)

## CAD Masters - AutoCAD Civil 3D Intro (3-Day Course)

Mar 21, 2016, Sacramento  
 Apr 4, 2016, Walnut Creek  
 Apr 18, 2016, Sacramento  
 May 2, 2016, Walnut Creek  
 May 16, 2016, Sacramento  
 May 31, 2016, Walnut Creek

[Register here](#)

**Mark Your Calendars**

## CAD Masters - AutoCAD Civil 3D Adv. (2-Day Course)

Apr 20, 2016, Walnut Creek  
 May 11, 2016, Sacramento

[Register here](#)

## CAD Masters - Civil 3D for Surveyors (2-Day Course)

Mar 14-15, 2016, Sacramento

[Register here](#)

## CLSA 50th Annual Conference

Mar 19-22, 2016, Rohnert Park

[Click here for more information](#)

## Point of Beginning—Land Boundary Master Class

Feb 29-Apr 17, 2016, Online

[Click here for more information](#)

If you have information about a training or class, please submit to: [editor@californiacentralvalleysurveyors.org](mailto:editor@californiacentralvalleysurveyors.org)

## Editor's Message



I had the pleasure to attend Fresno State's Annual Geomatics Conference this year. Not as an attendee, but as an assistant for the Education Foundation. This is the second year I have been able to go to this great event. I am always amazed at the dedication that the students have to making this conference such a success. There were dozens of vendors and firms there showing what they have to offer, in hopes of securing a new client or even a new employee.

The day started with Keith Spencer and myself setting up the booth for CLSA. We had several students and visitors alike, looking for all types of information. Lunch was prepackaged and very easy to grab, so we could eat at the booth, but most stayed in the adjoining room where it was served, visiting with old friends and new.

As the evening came, the event started to look like it was winding down, only to jump into high gear. It was time for the Auction, Bulldog Race and finally the awarding of the scholarships. This year over \$25,000 was awarded to Fresno State students at the Conference, with \$2,500 coming from the Central Valley Chapter. I was able to spend a little time with the Chapter scholarship winners, Scott Myatt and Corey Walker. These are to amazing young men that give me great hope for our profession. They both have a spark in their soul that ignites towards surveying.

I was able to see how the scholarships effect students, current and past. I met Alex Calder, a past Central Valley scholarship awardee, who is now the new San Francisco Chapter's first Chapter President. Alex was able to , as they say, "Pay it Forward". He awarded \$2,000 in scholarships from the SF Chapter and BKF, the company Alex works for. Isn't this what it is all about? Preparing students to mature in this career so they can turn around and help those behind them.

Thank you for your support of our Chapter. With out you we wouldn't be able to contribute like we do.

If you would like to comment on this topic or suggest another, please submit it to: [editor@californiacentralvalleysurveyors.org](mailto:editor@californiacentralvalleysurveyors.org)

# National News

## Newest in the Ongoing Series

By Wendy Lathrop, PLS, CFM

We go through this every few years: the Federal Emergency Management Agency's Elevation Certificate expires and a new one is not ready until several months post-expiration. Part of this is related to the need for each and every form issued by any federal agency to be reviewed and approved for release by the Office of Management and Budget (OMB). In line with its stated mission "to serve the President of the United States in implementing his vision across the Executive Branch" (a direct quote from the OMB website), OMB oversees agency performance and "information/IT (including paperwork reduction, privacy, and security)." This is why we see two sections on the first page of the form entitled "Paperwork Reduction Act Notice" and "Privacy Act Statement" as well as an OMB Control Number. This is also a reason for further delays in release of updated forms, simply a fact of governmental life.

So—back to more essential aspects of the newest Elevation Certificate, released January 6, 2016. The biggest technical change is in the building diagrams. Old Diagram 2, for structures with a basement, has been split into 2A and 2B. As a quick reminder, a basement has a floor that is below grade on all sides no matter what the use of that subgrade area may be. The distinction between a basement and a crawlspace that is subgrade on all sides is defined by the height and depth of the enclosed area: FEMA's Technical Bulletin 11 tells us that a crawlspace is limited in height to four feet and in depth below grade to two feet. If either (or both) of those measurements is exceeded, we have a basement and not a crawlspace. The Elevation Certificate changes where the

Continued on page 12

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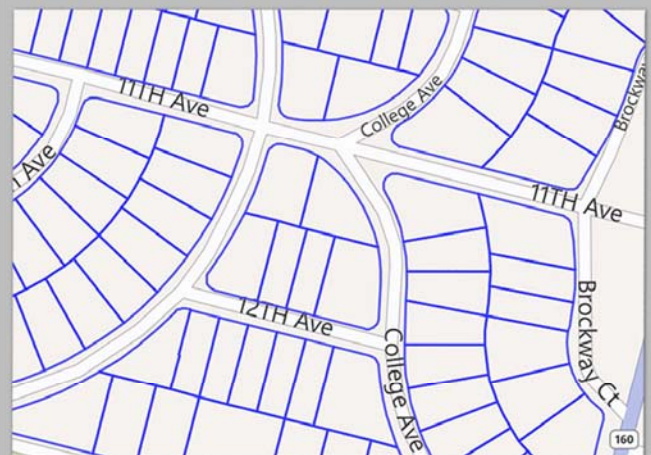


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## State News

### It's In There

#### 2016 Changes to State Legislature

##### Board Rules:

No Changes

##### Professional Land Surveyors Act:

8710 {Amended by Stats. 2015, Ch. 428}

8729 {Amended by Stats. 2015, Ch. 157}

8759 {Amended by Stats. 2015, Ch. 428}

8780.2 {Amended by Stats. 2015, Ch. 428}

8800 {Amended by Stats. 2015, Ch. 428}

##### Professional Engineers Act:

6710 {Amended by Stats. 2015, Ch. 428}

6714 {Amended by Stats. 2015, Ch. 428}

6735 {Amended by Stats. 2015, Ch. 430}

6738 {Amended by Stats. 2015, Ch. 157}

6749 {Amended by Stats. 2015, Ch. 428}

6775.2 {Amended by Stats. 2015, Ch. 428}

6797 {Amended by Stats. 2015, Ch. 428}

##### Subdivision Map Act:

66452.25

66474.02

66477

66499.7

##### ALTA/NSPS Land Title Survey:

Section 2

Section 3

Section 4

Section 5

Section 6

Table A

# Carlson for Surveyors

From field... to finish

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# Technology

## Photogrammetry: Helps Surveyors Save Time and Improve Accuracy

Written by Jerry Fireman

Surveying is a time and labor intensive process that requires extremely high levels of accuracy. Two North American surveyors are addressing this challenge by using photogrammetry to increase the number of points surveyed by several orders of magnitude while reducing field time by half or more. Photogrammetry is the process of generating measurements and models from photographs. "Photogrammetry helps us win more jobs by providing more competitive pricing," said Paul Lepine, Senior Geotechnical Technician for exp Services Inc., Burnaby, British Columbia. "Photogrammetry provides much more accurate measurements since every point is created in 3 or 4 photos and these photos are reconciled together to obtain closure for the entire model," said Eric Blackburn, President of EBI Surveying, Tampa, Florida.

### Rock slope surveys

exp specializes in performing rock slope surveys that are required when rock slope remediation systems are built alongside highways. The company surveys the rock slopes and calculates the amount of mesh required to cover the slope and also proposed locations for metal stanchions used to secure the mesh. The company also estimates the required rock scaling--the removal of loose rock from slopes--and shotcrete--concrete that is sprayed onto the rock slopes. One of the critical areas in the survey is at the joint planes formed by breaks of natural origin in the continuity of either a layer or body of rock. Water often invades cracks at the joint line or fracture. Later as the temperature drops and freezes the water, its volume expands. This expansion pushes the rocks on either side of the joint apart, breaking off pieces of rock that may fall onto the road.

In the past, exp surveyors used a total station to survey a few thousand points on a typical 100 meter long rock slope. This process normally took three days. One of their challenges was that the two-lane highways are typically only 15 meters wide and the rock slope cuts are commonly 30 to 50 meters high and sometimes up to 100 meters. "It is very difficult to take measurements that high and to find safe and appropriate total station setups while surveying by the highway," Lepine said.

Several years ago, exp began using PhotoModeler photogrammetry software from Eos Systems. exp originally used a different software package but switched to PhotoModeler when it was discovered that PhotoModeler could be purchased for the amount that it cost to rent the other software for one month. When Lepine first began using photogrammetry, he placed photo control targets on the rock and surveyed the 3D coordinates for those points in order to provide the proper scale rotation and translation for the photographs. He then walked along the rock slope and took pictures with a digital camera, taking care to obtain at least a 60% overlap between adjacent pictures. This process took only one day for a 100 meter long rock slope.

When Lepine returns to the office, he uploads the photos into the photogrammetry software and uses a feature called SmartMatch to automatically detect and match features across multiple overlapping photos. The software then computes the position of each point in the images in 3D space. "SmartMatch saves a considerable amount of time compared to the previous process of manually matching common features between the photos," Lepine said. "The time required to orient the photos is reduced from a few days to a few hours. The result is a dense point cloud consisting of millions of points that defines the topography of the rock slope to a much higher level of accuracy than was possible in the past." Accurately depicting the 3D geometry of the rock slope is critical because contractors prepare their bids for the remediation work based on this geometry.

More recently, exp has further improved the survey process by using a DJI S900 Hexacopter drone with a Calibrated Sony NX5T camera to take the photos. Lepine commands the drone to hover and moves the gimbal into position for the shot of the rock slope. This method allows for better survey coverage of the rock slope than photos previously taken along the highway by hand. As with the manual photos, he overlaps each photo with the preceding shot.

exp's governmental customers typically markup photos of the rock slope with lines drawn to indicate the outline of where they want the mesh. Lepine then makes a 3D model of the mesh using the surface drawing tools in PhotoModeler. At this point, the model is exported to AutoCAD Civil 3D where Lepine calculates the area of each section of mesh, creates annotations and generates separate surface models of each mesh. These deliverables are then provided to exp's client.

Continued on page 11

## Pictures of the Issue

### 55th Annual Fresno State Geomatics Conference

January 29, 2016

#### 2016 CLSA Central Valley Chapter's Scholarship Winners

Corey Walker was awarded the Chuck Kincaid Memorial Scholarship (Central Valley Chapter)

Scott Myatt was awarded the Thomas H. DeLaMare Memorial Scholarship (Central Valley Chapter)

Ryan Jackson was awarded the Jesse Stanley Memorial Scholarship (Education Foundation)



*Corey Walker (L) and Scott Myatt (R)*

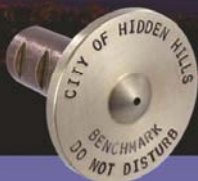


*Ryan Jackson with Bill Hofferber*

If you have a historic or interesting photo you would like to see in a future edition of The Prism, please submit to:  
[editor@californiacentralvalleysurveyors.org](mailto:editor@californiacentralvalleysurveyors.org)

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## Just For Laughs

45x		2-	3+		6
	5		2÷		3-
3÷	3+	4-	72x	3	
				15x	
16+				5-	3-
1		2-			

### KENKEN

Directions: Each row and each column must contain the numbers 1 through 6 without repeating. The numbers within the heavily outlined boxes, called cages, must combine using the given operation (In any order) to produce the target numbers in the top-left corners. Freebies: Fill in the single-box cages with the number in the top-left corner.

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## Classifieds

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Want to work for a Land Surveying, Civil Engineering and Landscape Architecture firm in the Wine Country on varied projects - Land Development, Vineyards, Ranches, Geothermal Development?

Key Requirements for this position:

- California PLS is required - 7+ years of Land Surveying experience preferred - Field and Office skills are required for this position - Experience with AutoCAD Civil 3D is desired - Experience in Client contact and development is a plus
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### COUNTY OF SANTA CLARA LOOKING FOR FIELD SURVEY TECH II

The County of Santa Clara is now accepting applications for a Field Survey Technician II. The ideal candidate will have field and office experience working on topographic maps, construction projects and right of way/boundary surveys. Robotic total station, GPS equipment and AutoCAD drafting skills preferred. Excellent benefits, training and educational opportunities and great work environment make this job a great career opportunity. [CLICK HERE](#)

### COUNTY OF SACRAMENTO HIRING ASSISTANT AND ASSOCIATE LAND SURVEYORS

The filing deadline for both examination is 5:00 PM on March 21, 2016.

Please see job announcements for important testing information, including tentative test dates. This communication is a courtesy announcement only and is not meant to replace the full job announcements. Please view the official job announcements for all requirements and testing information. The full job announcements and on-line application is available for viewing on our website, or by visiting our office in person:

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# THE SUBDIVISION MAP ACT

## A One-Day Seminar

This seminar provides guidelines for effective use of the Subdivision Map Act.

- New Legislative and Judicial developments in 2014
- When the Map Act applies (and when not)
- What kind of Map (tentative/final or parcel map) to use
- Exemptions and Exceptions under the Map Act
- Life of Tentative Map
- Conditions of Approval/Exactions/Dedications/Fees
- Creative mapping approaches
- And more...





# Monument Obituary

By Mike Quartaroli, L.S.

SJCO BM P-31.1, SJCO BM OP-31.4, and SJCO BM N-32.1 were beloved siblings and supportive members of the French Camp Road Benchmark Family. These three benchmarks were born in 1976. All three benchmarks lead a serene and productive life along historic picturesque French Camp Road, occasionally providing vertical control predominantly for the Forward Landfill. These three monuments are survived by only 13 benchmark family members. The original extended French Camp Road Benchmark Family had 35 relatives. Only 13 are known to survive today predominantly at the northwesterly end of French Camp Road. A very, very sad commentary on the value placed on survey monuments. All three benchmarks were brutally decapitated by unknown assailants. The skeletal bleached foundation of the three benchmarks sadly lay in the open for all to see. There remains are a vivid reminder of their brutal destruction. SJCO BM P-31.1, SJCO BM OP-31.4, and SJCO BM N-32.1 destruction death notice has been posted on the San Joaquin County Public Works "Go Request" reporting page.

Donations of your time to the CLSA Central Valley Chapter Monument Conservation Committee is requested in memory of SJCO BM P-31.1, SJCO BM OP-31.4 and SJCO BM N-32.1. There are many tasks that you could help with. Also, ask about the "Adopt a Monument" program. Make a lasting difference to the surveying profession.



SJCO BM P-31.1



SJCO BM N-32.1



SJCO BM OP-31.4



## Photogrammetry... *cont. from page 6*

Sometimes the client requests modifications and when the client is satisfied Lepine produces a final drawing that is included in the package provided to the contractors for bidding. Often, when the construction is being performed, contractors may propose changes, such as extending the mesh to cover additional areas of the rock slope. In this situation, exp returns to the site after the construction is completed and performs an as-built survey using PhotoModeler that is used to determine the contractor's payment.

Bank site in PhotoModeler. On the right is the set of georeferenced 3D point locations which will be exported to AutoCAD software. Two of the 40+ images taken of the survey site can be seen on the left.

### Redevelopment surveys

EBI Surveying based in Tampa, Florida is another company that has moved from conventional surveying to photogrammetry. The company focuses on surveying properties prior to redevelopment. It produces a map of the site that shows each of the improvements, such as buildings, pavement, signs, fences and inlets, as well as the topography of the site. In the past EBI measured each individual feature with a total station which took between two and three days for a typical one acre commercial site. The accuracy that could be achieved by this approach was limited by the fact that each measurement was independent of the others so the dilution of precision could not be calculated.

"After making the decision to give photogrammetry a try, I took a look at several different software packages and found they were bulky and difficult to use," said Eric Blackburn, President of EBI. "But when I tried PhotoModeler I found that its developers had taken a lot of time to develop an interface that makes sense to the user. The program works and feels a lot like Microsoft Office or AutoCAD so it's easy to understand. One of my favorite features is the 3D viewer which I keep open while I am marking and referencing the photos so I can easily keep track of which areas have been completed and which ones still require work."

Blackburn now begins the survey process by setting anchor points around the site that will later be used by the software to determine the correct position and angle for each shot. He then sets up a camera on a 50 foot high telescoping pixie pole and takes 40 to 100 photos of each site, indexing the camera field of view about 15 feet for each shot to achieve 60% or greater overlap between shots. There are still some improvements that can't be measured with photographs because key dimensions are hidden from view. For example, Blackburn must open manhole covers and take a measurement to the bottom of the pipe. However, in total eliminating the need to measure every point manually has reduced the field time required for a property from 15 to 20 hours in the past to only 6 to 8 hours today.

Blackburn brings the camera data back to the office and loads the photos into the photogrammetry software. He opens up photos and manually selects an anchor. The software then automatically finds each additional occurrence of that anchor point in other photos so Blackburn only needs to open up one photo for each anchor point. "I actually requested that this feature be added to the software," Blackburn said. "In fact, I have made several requests for improvements to the software and have often seen those changes reflected in subsequent program updates." Once Blackburn has marked and referenced the photos, the software generates a set of georeferenced 3D point locations which are then exported to AutoCAD software. This is delivered to the customer.

"Photogrammetry offers major advantages both in time savings and quality improvements," Blackburn concluded. "We find that we spend 60% to 70% less time in the field because we no longer have to measure most individual points. Another advantage is that we no longer have to worry about the possibility of missing an improvement that should be included on the survey. In the past when this happened I needed to go back to the site to take additional measurements. Now that we take photos of the entire site the client can easily measure the position of any improvements based on the 3D model. Photogrammetry also provides much more accurate measurements and calculates the potential error for every point which is from 1 to 3 hundredths of a foot. I am eagerly awaiting the time when regulations permit the use of drones for surveying because the ability to take higher photos will improve the quality of surveys."

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## Newest in the Ongoing Series... *cont. from* [page 3](#)

measurement is taken, saying the enclosure's floor must be within five feet of the top of the next higher floor (rather than four feet from the bottom of that next floor), but the intent is the same.

New Diagram 2A is the same as the old Diagram 2 with which we have been familiar for years; 2B is the new addition. While the main description at the top of the box with each diagram is the same, the "distinguishing features" and the drawings are distinct. 2B specifically addresses structures for which the base of the access to the basement is subgrade, requiring stairs down to the doorway.

The only other technical change is in the instructions for Item A5, regarding the longitude and latitude coordinates for the center of the front of the building. If decimal degrees are used, coordinates are now to be provided "to at least 5 decimal places or better" as opposed to 4 decimals or better in prior versions. However, coordinates are still to be "accurate within 66 feet."

Now, format of the form—that is a different matter. Section D with our signature, seal, and comments has returned to the back of the form, where it was many years ago. Earlier protests about separating the information being certified from the actual signature had moved the signature and seal to the front of the form for a while, but new requirements to use the DHS template in designing FEMA forms now impose specific size type and other details that prevent certification and certified elevations from appearing together. Such a shift also means that Section G, for Community Officials, has been moved to a third page of the form, all by itself.

There are two updated URLs in the instructions. Item B1 gives a new link for the Community Status Book. This document identifies every participating and/ or mapped community's unique six-digit number, the date of the most current index map, and other important information about a community's participation or non-participation in the National Flood Insurance Program. Item B12 instructions provide an updated link for information about the Coastal Barrier Resource System in the Keywords section of FEMA's website.

Some typographical errors have entered the mix in retyping the contents of the form—which is now formatted for legal sized paper rather than letter stock. While references to the pages of the Elevation Certificate on which the building diagrams appear are outdated for Items A7 and A8, these are not critical. Other typos are simply from poor proofing. But there are words missing from the description of "distinguishing features" for Diagram 8 that make it incomprehensible. Go back to the old version to figure out what it means.

As always, there is a phase-in period during which the old expired form can still be used. During those six months, both new and old forms are accepted, and it may be possible that some corrections to the new form will be issued (without changing the transition date of when only the new version will be accepted).

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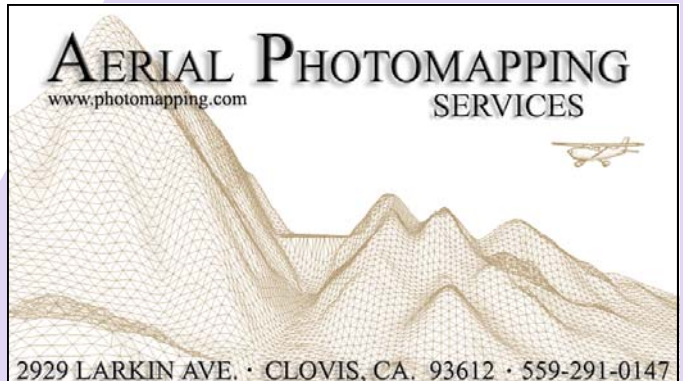
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**CLSA EDUCATION FOUNDATION**

*Land Surveying Photo Gallery*



California Land Surveyors Association Education Foundation would like to thank Bryant Sturgess for generously donating his collection of historic images.

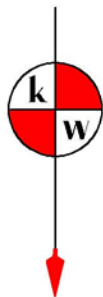
The proceeds from the photos sold on this website will be used to fund scholarships for land surveying students.

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