California Surveyor

Winter 2009 Issue #157

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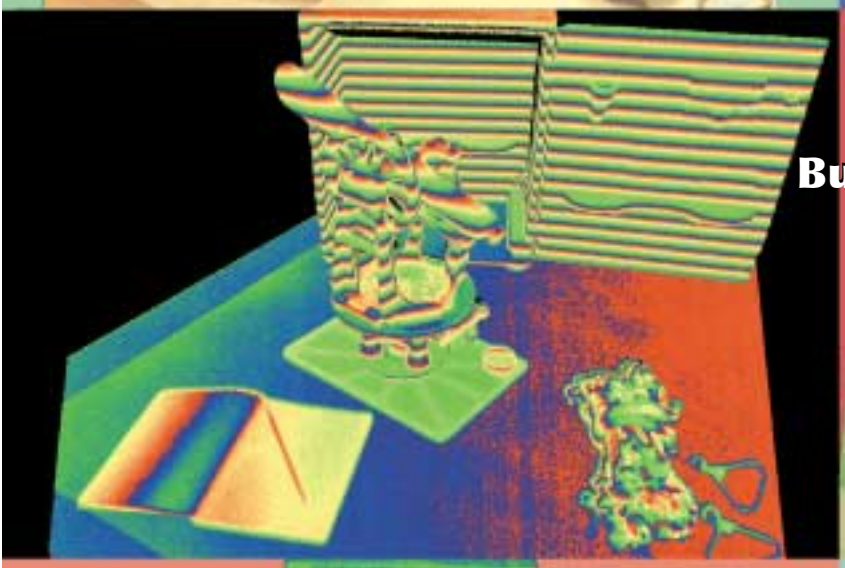

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California Surveyor

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

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

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

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Articles, reports, letters, etc., received after the above mentioned date will be considered for the next edition.

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By: John P. Wilusz, PLS, PE - Editor

From the Editor

"Professional stature is not gained by self-proclamation. Professional stature must be earned and can only be measured by what others think of us. If you want to find out whether you are a professional man, ask what others think, don't ask yourself." – From "Professional Status of Land Surveyors" by Curtis Brown, first published by ACSM in 1961.

CLSA Website

Curtis Brown's words on professionalism are just as relevant now as they were when he wrote them nearly fifty years ago. Today there is no better place to grow as a professional than the California Land Surveyors Association. One of the many benefits of CLSA membership is the website. The website is currently being overhauled (behind the scenes) and will soon have a new face, but let's take a look at at the resources available at www.californiasurveyors.org

Since 1984 the TrigStar program has been introducing young people to land surveying applications of trigonometry. If you would like to get involved the website can help. From the home page click on "Favorite Forms" and then "TrigStar Manual" to find a thorough and well-organized guidebook that has everything you need to know to get started. For inspiration and to learn more about TrigStar be sure to read Jerry Miller's article "TrigStar Success" in this issue of the California Surveyor.

Click on "Professional Development" from the home page and read about CLSA's Professional Development Program. Even though California does not require continuing education, most other states do. If you are licensed in one of them, or even if you are not, consider taking advantage of this program for tracking your professional improvement. Attending classes, seminars and workshops are common ways to earn professional development hours (PDHs), but they're not the only ways to do it. For example, did you know that PDHs can be obtained by writing published articles, like those that appear in the California Surveyor? The website has the details.

Searchable PDFs of back issues of the California Surveyor are also available on the website. Follow the link from "Publications" and you will find issues #1 through #157. Open an issue by clicking on a number. Then use the "Ctrl" and "F" keys together to initiate a Google-like search of the contents. If there is a specific article you are looking for this handy feature can help you find it. Many fine, informative articles have appeared in the magazine over the years and it's great news that we still have easy access to them. One article worth a second look is "What the CLSA Central Office Does," written by past editor Phil Danskin and published in issue #139. Our Central Office handles so many responsibilities that it's tiring just to read about them.

Members Only Area

The Members Site contains various goodies that can only be accessed with your member ID number. For starters, the CLSA Code of Ethics is worth reading if you are not already familiar with it. It suggests conduct by which professional surveyors can uphold and advance the integrity, honor and dignity of the surveying profession; a healthy reminder for us all. Curtis Brown's article, quoted at the beginning of this editorial, can be found in the Members Site under "Articles".

If you are not yet a licensed land surveyor but hope to be one, you should know that CLSA has many past PLS examinations archived on the Members Site. From 1962 to 1992 there are thirty-one years of exams to choose from. Download and study to your heart's content. For sample problems with solutions you can link to the "CLSA Exam Guide", which also includes chapters on test taking strategies, statutory subject matter, time management and calculator policy. The hardcopy can be ordered from the website for $25, member price.

Also available from the Members Site are past editions of the PLS Act, PE Act and Subdivision Map Act. Some years are missing so if you have them please pass them along to Central Office. They will be happy to scan them and return the originals. This is an easy way to provide service if you are in a position to do so.

CLSA Conference 2009 and the Scholarship Auction

Finally, be sure to mark your calendar and make your reservations for CLSA Conference 2009, March 28 – April 1, at the Hilton San Diego Resort (Mission Bay), San Diego, CA. The most current information can be found, where else, but on the website. While you are making your plans consider bringing a donation for the scholarship auction. The CLSA Education Foundation is looking for the usual equipment, books and survey-related paraphernalia. Follow the links from "Education" through "Invitation to donate" to download the form "Education Foundation - Scholarship Auction Donation".

Explore the CLSA website for yourself and you'll find much more. Behind all of it are people who gave of themselves to improve their profession. For me the greatest benefit of CLSA membership has been the privilege of knowing and working with such people. Membership in CLSA has plugged me into the surveying community in a way that nothing else could have. Today I have friends, mentors, and colleagues I can rely on across the state. You can have this too, if you don't already. All you have to do is join and get involved, and you'll begin to build relationships you can rely on throughout your career as a California Surveyor.

"Every man owes a part of his time and money to the business or industry in which he is engaged". - Theodore Roosevelt

John Wilusz, PLS, PE is a Water Resources Engineer in the Delta-Suisun Marsh Office of the California Department of Water Resources.

Cover Image:

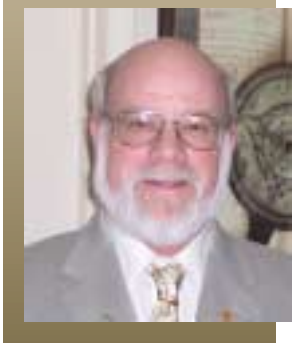
A 1960's era K&E 30 minute transit, a Gunter's chain, and a Dietzgen field book scanned with a Leica ScanStation 2. Scan and images by Kevin Akin, PLS, Office of Land Surveys, Caltrans.

Kids Korner

Do you have a picture of a "junior surveyor" in your family that you would like to share? Send it in and we will put it in the Kids Korner.

Antar Lombera, son of Ray Lombera, PLS, learning how to operate the total station at his home in Glendale, CA.

Dreidynn Case, daughter of Tim Case, PLS, on the job In Paso Robles, CA.



By: James M. Herrick, PLS - President

President's Message

This final President's Message from me will be my reflections of a year that was nervously anticipated and speedily over. I can't believe how fast this year has gone by. If I can pass on any advice to those that follow me, it would be that if you have something that you really want to get accomplished you need to start before you actually become President. Once you become President, the year just goes and all of a sudden it is November and you are saying to yourself, "Where did the year go?" It really does seem like only yesterday when I arrived home after work and I said to my wife, Barb, that she would not believe the phone call that I had received. She said try me and I told her that Bob Hart had called and asked me if I would accept the nomination for state Treasurer! She was as surprised as I was, but the first words out of her mouth were "say yes!" Obviously I did say yes and I have never had a moment of regret. It has truly been a pleasure to serve as your President. I was able to see how many Land Ssurveyors are out there promoting the profession and trying their best to make it better. Their efforts are applauded by me and should be memorialized by all Land Surveyors. It is not easy to be in the front lines and a simple thank you once in a while will do wonders for them and I say a great big thank you to all of them!! So it is with some sadness, and at the same time excitement, that I look back at 2008 and reflect on some of the things that happened that I view as being beneficial to all Professional Land Surveyors in California.

I was not sure how to get this message off of the ground so I looked back at my initial acceptance address to the CLSA Board of Directors from last February to see what I had said I wanted to do and then do a short review to see if I attained the stated goals. The first thing that I mentioned was continuing the recruitment process that was started by Robert Reese and continued by Steve Shambeck. I think that we have done that although we might have lost a little intensity and we need to get it back. With the current downturn in the economy, it is sometimes hard to maintain that initial intensity. We need to continue to let young people know that land surveying is a viable profession and encourage them to join with us in this very rewarding line of work. I think that this effort has become a little more streamlined in its application and that it continues to move forward. I have observed that most surveyors have become very aware of the recruitment situation and are using every opportunity to move this forward.

The second item was to continue to promote membership in the organization. To that end, a quad-fold brochure has been developed. This was a joint effort by both the Membership Committee and the Central Office. This brochure is designed to explain the CLSA organization and the benefits of belonging to CLSA. It also includes some testimonials from Professional Land Surveyors including one from yours truly. It is available through the Central Office of CLSA. I am sure that you will be impressed when you see it. I want to thank both the Membership Committee and Central Office for their efforts. I think that we have been successful in the area of membership recruitment. Our membership continues to grow as does the enthusiasm for the organization.

The third item was to keep moving forward with the Voluntary Professional Development program. We have finalized that program and have begun to receive applications for it. It is my hope that eventually we will have good participation in this program. Most of the bugs have been shaken out of the program and all that remains is for people to take advantage of it. I encourage all of you to participate and support it.

The fourth item was moving forward with a public awareness program to educate the public about what we, as Land Surveyors, have to offer them. This process has not moved forward as quickly as I had hoped but we are beginning to make progress. CLSA 2009 President Matt Vernon has a keen interest in this and he will continue to move it ahead. I believe that this is a very worthy and important cause to invest our energy in and that it should be kept in the forefront of CLSA efforts.

For the fifth item I wanted to continue to promote the Education Foundation in its efforts to provide land surveying students with financial assistance. We had another successful auction this year and awarded a record number of scholarships. The Foundation has been very fortunate to have the continued support of the land surveying community and I am sure that will continue. We tried something new this year in awarding a few of the scholarships at the conference opening ceremonies. I think that we should continue this effort. It promotes both the organization and the students. These students represent a large part of the future of the land surveying profession and we need to continue our support for them.

The last item that I wanted to complete was the salary survey. This survey was successfully completed and the results posted on the CLSA website in August. The salary survey contains a very large amount of information which should be helpful to everyone. This project started in early 2007 when an attendee at the

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Sacramento Chapter meeting that I attended came up to me and suggested that we should do this. This took a while to come to fruition but I think it was worth the effort.

We also worked on several other items throughout the year.

- The Professional Practices Committee completed a tri-fold handout to assist in the explanation of the surveyor's "right-of entry". This tri-fold includes the pertinent state laws and gives an explanation of what to expect when a land surveyor is on your property searching for monuments. It also gives information for law enforcement to assist them with any questions they may have.
- We also had a very successful effort at the GIS ESRI Conference in San Diego. Not only did we have a CLSA booth, we were also fortunate enough to have Bill Rhoades and Karen Koklich give a presentation at the Conference that was designed to show how land surveyors can help the GIS community and enhance their work product. From all reports it was well received and I extend a very large thank you to them for their efforts.
- We had another very successful legislative year. One of the biggest accomplishments being an in-depth review of the liability of Land Surveyors, what Statues of limitations for liability might apply and how they might be applied. This was completed by the Legislative Counsel of California at the request of the Honorable Noreen Evans. This opinion is very favorable to Land Surveyors and is available for your review on the CLSA website. Go to the Forum page and do a search for "Legislative Counsel". If you have problems finding this, please contact the Central Office for directions to this article.
- We had another very successful Conference at the Silver Legacy in Reno. I extend a big thank you to all those that attended and supported this conference.
- We were also fortunate enough to have Pat Tami become the President of the Board of Registration and NCEES Western Zone Vice President. I extend a large thank you to Pat for his continued efforts and interest in the land surveying profession and to RBF Consulting for being willing to share his time with our profession.
- We also awarded Dorothy Calegari, our long time Executive Director, Honorary Membership in CLSA. It was a pleasure to present her with the certificate and it is a well deserved recognition for all the years of support that she has given the land surveying profession. Unless you have been involved in CLSA at the state level, you may not realize how much she has contributed to our profession. I have been involved at the state level for many years and I can assure you that Honorary Membership in CLSA is a small token of that appreciation. Members and non-members alike owe her a huge thank you!! So **THANK YOU** Dorothy Calegari!!

So with this brief look back I believe that we have had a very successful year at CLSA. With all the enthusiastic help of both members and the Central Office one would expect nothing less. It is through the efforts of the members and the assistance of Central Office that things get accomplished. Without this support CLSA would be nothing but a shell of an organization. It is through this support that CLSA continues to be **THE** leader in the land surveying profession both at the state and national level.

This year in review in a few words does not do justice to all the work put in by members, committee chairmen, committee members, the executive committee, central office, chapter members, my wife Barb, CLSA officers, and all those Land Surveyors that are out there leading the charge everyday. It is through all these efforts that CLSA continues to thrive. I want to say that it has been a pleasure to serve as your President in 2008. It has been a year, probably better described as a journey, that I will never forget. I cherish all the new friends that I have made and I am humbled by the efforts of everyone involved. Thank you for the **privilege** of serving you!! ❖

CLSA
CALIFORNIA LAND SURVEYORS ASSOCIATION

By: Lee Canfield

NSPS Certified Survey Technician Program Who's Using it and Why?

With so much emphasis being placed these days on enhanced professional standing of surveying through the development of educational opportunities in our four-year university programs, it is sometimes easy to overlook a significant segment of the profession. That segment is the multitude of technicians who every day collect and process the data on which we, the professional surveyors, base and form our opinions.

As we pursue and encourage the concept of a four-year degree requirement for licensure, it is important that we also plan for the career advancement of those who, for whatever reasons, will not attain that status. We must understand that the incentive and initiative necessary to keep our invaluable technicians in the business can only be recognized if a clear career path has been defined. A uniformly recognized method for documenting one's progress and achievements can be a major factor in this process.

Certification is used by many organizations to acknowledge, through testing or some other mechanism, that someone has met requirements it has set forth for a particular activity. Certification is not the same as licensure, which bestows upon one the right to provide a service to the public in return for acceptance of the responsibility and liability associated with that right. It does, however, provide credibility for the person holding the certification.

Likewise, certification is a tool that can be used by anyone who wishes to purchase something for which the value may be subjective. In surveying, a certification statement on a plat, signed by the surveyor, indicates that the service provided in order to create the plat was conducted at a level of high professionalism and quality.

It is within the context of providing both a credential and an evaluation tool that the Certified Survey Technician (CST) Program, run through NSPS, was created. The program has been in existence for several years and has generated a great deal of interest from employers, technician level employees, and those who procure surveying services. A company owner can now have the ability to better gauge an applicant's capabilities by using the CST Program than is typically possible through what is written on a resume. Likewise, those seeking employment need a credential to show that they have achieved recognition for a certain level of competence. These are among the many factors that make the CST Program a meaningful benefit to the surveying profession.

Another aspect of the CST Program is that it can serve as the basis for a career track for the technician level employees who may not have the opportunity to achieve the professional surveyor level because of existing or impending laws requiring a four-year degree. The CST Program should be promoted as a benefit to members who can offer it to their employees at a

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reduced rate. Building a career track for technicians is critical to the future of the surveying profession because people need to have documentation that they have reached a particular level of competence. Without that documentation, the incentive to not only progress, but also just to stay in the profession may not exist.

For example Ron Collier, Survey Division Manager for Charles P. Johnson and Associates in Silver Spring, Maryland, is using the CST Program for several purposes. With the advances in equipment today, field crew personnel and survey technicians are not exposed to or taught a lot of the basics. Most surveyors have not taken any exams since they graduated high school. The CST Exam is a great tool to get them back into a test-taking mode. They have recently tested 13 individuals in their office. Over the last few years they have tested up to 25 people, and one employee is now a Level IV CST. Charles P. Johnson provides in-house training for their employees. Ron says, "We emphasize the idea that the more that you know and can do, the more valuable you are to the firm." He goes on, "I believe that this is the best tool that we have today to promote the profession within and to build a much stronger work force."

Evan Brown, Project Manager for Britt Surveying, Inc. in Venice, Florida, is using the CST Program to train and advance their staff. They are using in-house workshops for employees to share knowledge and learn from senior staff members, and also encourage staff to participate in educational seminars hosted by the Florida Surveying and Mapping Society (FSMS). Britt Surveying is a steadfast supporter of the CST Program. They also offer a financial bonus and opportunity for advancement to individuals who attain certification.

One of the major supporters of the CST Program has been McKim and Creed. They have tested employees from Florida, the Carolinas, and Virginia. They use the CST Program to provide a career ladder for their technicians. They currently offer bonuses for the different levels of achievement. Currently, more than 160 employees have taken the CST Exam from McKim and Creed. They offer study sessions for the staff and have created a study manual on all of the different levels.

Barry Savage, President and Adjunct Faculty at Cleveland State Community College and owner of Savage Surveying and Mapping, says, "The CST Program insures a standard skill-set for employees that I can depend on." He encourages all employees and students to take the CST. They have an education reimbursement program for employees to encourage certification.

As you can see, survey managers and business owners use the CST Program to help survey technicians with their career development. Certification also provides employers with credentials to offer clients and a means to evaluate and promote personnel. Those familiar with the CST Program know that it becomes more than just a test because of the training and development conducted by organizations in preparation for the exam. While studying, surveying technicians become familiar with the academic knowledge behind the field procedures they follow every day. By advancing through the CST Program, a survey technician moves progressively into more responsible positions. Having gained confidence, some technicians will hit the books even harder and go after the Fundamentals of Land Surveying Exam. This grassroots movement is a way to help technicians become professionals.

With the help of many volunteers across the county, the CST Board, and the leadership within NSPS in particular, the program has made great strides. This is a program that deserves to be encouraged and utilized by the surveying community.

Lee Canfield *is the Education Program Coordinator for NSPS and is responsible for the administration of the CST Program.*

By: Robert Fredricks, PLS

Building a Calibration Baseline

The local baseline in San Luis Obispo County fell victim to expansion at California Polytechnic State University sometime in the 1980's. Since that time, local surveyors were left to devise their own checks. Caltrans used existing control in project areas and finally developed a couple of control networks at District Offices through Global Positioning System (GPS). The networks were short distances and lacked the stability of a formal baseline. In September 2007, I approached my management with the idea of building a Calibration Baseline. Having access to a baseline with long distances, we could check that our equipment was calibrated correctly. Along with checking our equipment regularly, we would also be building a baseline that both public and private sector surveyors could use. My manager, Mike Wagner, Caltrans Supervising Transportation Surveyor, was very supportive with crew time and agreed to contribute to some of the expenses.

The subject of a new local baseline had been discussed countless times at the meetings of the local California Land Surveyors Association (CLSA) chapter. At the state level of CLSA, baselines were beginning to be a hot topic. While attending one of these meetings as a chapter representative, I decided to make an effort towards building a local baseline. Our local chapter was interested and a couple of members started looking for a site. I, too, looked at a lot of possible locations with no luck. I met with San Luis Obispo County and Santa Barbara County representatives to discuss the idea and to look at more locations. Both county contacts were enthusiastic. Santa Barbara Deputy Public Works Director, Thomas Fayram, had a location in mind. It was

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Marti's first visit to the proposed baseline site.

adjacent to the Santa Maria River levee. The area was flat, wide, and absent of unnecessary heat waves. Best of all, it was on the border of San Luis Obispo and Santa Barbara Counties. Surveyors from both areas would have easy access to the site.

A survey crew was sent to the site and did a quick topography check of the proposed area. NGS standards suggest that "the slope should not exceed a 1-percent grade between the 50-m segments of the 150-m section and should seldom exceed a 3-percent grade between monuments." The results looked good. I then contacted Marti Ikehara, the State Advisor for the National Geodetic Survey (NGS). Marti had me review documents NOAA Technical Memorandum NOS NGS 8 (Establishment of Calibration Base Lines), and NOAA Technical Memorandum NOS NGS 10 (Use of Calibration Base Lines). NOS NGS 8 helped with whether the area would be acceptable or not. Our site appeared to meet all of the criteria. We then had Marti visit the proposed site to get her input. She, too, liked the site and had a couple of good suggestions about the location.

Once the decision was made to use the site at the Santa Barbara County Flood Control property, we needed to set

Doug and Kathy digging monument holes

Bob Mackenzie hard at work.

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1) *Bob Fredricks putting the finishing touch to a monument.*
2) *Bob makes observations while Marti records the information.*
3) *The completed monument.*
4) *Jason sets a site and checks temperature and pressure.*
5) *Bob Zagota, Caltrans surveyor, sets fixed leg tripod.*
6) *Bob Brown, Caltrans surveyor, activates GPS receiver.*

some monuments. Marti and I discussed this and per NOS NGS 8, decided to set monuments at stations 0+00 meters, 1+50 meters, 4+20 meters, and 10+00 meters. We marked the rough locations and I assigned one of my crews to stake the monument locations with offsets. I then contacted Rick Tomasini, a supervisor with the Flood Control District. Rick made arrangements for Doug Walker, a maintenance supervisor, and Kathy Apodaca, an equipment operator, to help me. Doug and Kathy brought out a Gradeall to dig 1' diameter by 4' deep monument holes.

Marti then made arrangements to have baseline monuments sent from NGS. With monuments in hand, Bob Mackenzie, a Caltrans Surveyor, and I went to the site and set the monuments in concrete.

The County had requested to have small retaining walls built at each monument location. With the help of Nick Tatarian, Caltrans Senior Surveyor, we were able to salvage some old guardrail posts from a project on Highway 101 in Santa Maria. Nick even welded some rebar sections I could use to secure the posts. I drilled holes and drove the rebar deep into the ground.

With monuments set, it was time to do the required observations. The equipment was supplied by NGS. Marti Ikehara, Bob MacKenzie, Jason Keblesh (Caltrans Surveyor), and I were the field observation crew. In May 2008, those observations were made.

After three days the baseline observations were complete. The information was sent by Marti back to NGS to be reviewed, processed, and accepted.

We then decided to do GPS observations of the baseline monuments and tie them to the NAD83 High Precision Geodetic Network (HPGN), utilizing the state plane coordinate system.

The final values and how to reach data were published by NGS on October 31, 2008 and can be found at: http://www.ngs.noaa.gov/CBLINES/ BASELINES/ca

Records of Survey have been drafted and will be submitted in December 2008 to the County Surveyor's Offices for the County of Santa Barbara and the County of San Luis Obispo. Access to the baseline will be through the County of Santa Barbara for both public and private surveyors. A key to the access gate will be required and will be available through:

County of Santa Barbara
Public Works Service Center
620 West Foster Road
Santa Maria, CA 93455
Telephone: (805) 568-3440 ❖

***Robert Fredricks, PLS**, is a Senior Transportation Surveyor with Caltrans, District 5 in San Louis Obispo, CA. He has written previously for the California Surveyor about his development of CLSA's Scouting Merit Badge Program. He is a past president of the Central Coast Chapter.*

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By: David Biswanger

Volunteerism at Fresno State University; The Humanitarian Demining Initiative

One of the more remarkable attributes of the Geomatics Engineering Program at Fresno State University is its emphasis on providing leadership building skills through volunteerism in student clubs and external professional forums. At the onset of our education, our fearless leader Dr. Crossfield encourages us to work in teams, join as many professional organizations as possible and volunteer at professional conferences (such as our own Fresno State Student Geomatics Engineering Conference, January 22-24, 2008; for more information go to: www.csufresno.edu/geomatics/conference). Although Geomatics Engineering is a relatively small part of the Engineering School at Fresno State (please send us students!), there are no less than five student organizations: SAGE (Student Association of Geomatics Engineers), CLSA CSUF Student Chapter, ASPRS Fresno State Student Chapter, Lambda Sigma Fresno Chapter (a surveying honors society) and ACSM CSUF Student Chapter.

Humanitarian Demining Initiative

One of the best parts of running one of these clubs is that we are given a lot of latitude in their direction (pun, sorry). Let me tell you a little about the adventure I've had as president of ACSM CSUF Student Chapter. When I was first elected in the Fall Semester '07, I wanted to use the chapter for altruistic purposes, but I had nothing specific in mind. I mulled over a few options but nothing really inspired me. By chance I came across an advertisement for Schonstedt's Humanitarian Demining Initiative in the ACSM Bulletin (glad I had joined ACSM – thanks Dr. C). It was a promotion for their underground pipe and cable locators. It worked like this: for every TraceMaster II, or XTpc purchased, Schonstedt would donate a magnetic locator to the United Nations Mine Action Service. There are an estimated 15,000 to 20,000 casualties a year from land mines and unexploded ordinance, many of them children. The United Nations Mine Action Team operates in twenty-nine countries throughout the world clearing unexploded ordinance (UXO) and assisting victims with prosthetic limbs (for more information visit www.mineaction.org). Unfortunately, it is an under funded program that had a budget shortfall of 317.5 million dollars in 2007.

The demining initiative seemed like the perfect charity for a surveying organization. We use magnetic locators everyday; the same locators can be used to locate and eliminate land mines. Surveying is a land based profession so a land based charity seemed appropriate. Besides, surveying in a mine field could ruin your day! The other reason I liked it as a choice of charities is that land mines are an indiscriminate, insidious weapon; they hold the land hostage long after a conflict is over and forgotten, preventing agrarian use or development. By helping to remove them we also help alleviate hunger as well as boost economies. Land mine proliferation is a solvable problem. But the students at Fresno State didn't really have a need for an underground pipe and cable locator. So, I called up Schonstedt to ask if it would be possible to simply purchase a magnetic locator for donation. I was put through to Bob Ebberson, who is Director of Business Development for Schonstedt. He said that it would be fine to do that, and they would match our donation too. We were on our way . . . kind of.

Fundraising

The problem was how to come up with the money. The type of Schonstedt the UN was requesting was the top-of-the-line military-grade stuff (GA-72Cd). We would need to raise over a thousand dollars. We are engineering students; we don't have time to do car washes and bake sales. We needed a relatively painless way of raising money - no blood drives. I recalled reading a newspaper article about a company that recycled old cell phones. With a little searching I discovered that company was ReCellular. They refurbish old cell phones and resell them to countries in South America and Southeast Asia. If the phone is useless, they recycle it in an EPA approved manner.

That was a win-win situation. We would help eliminate the scourge of land mines and at the same time help keep e-waste out of the landfills. In addition, we would be doing a public service by helping people properly dispose of their e-waste and get rid of unwanted clutter at the same time. Many people have one or two old cell phones lying around (we had one girl bring in twelve – we don't ask questions), but don't know what to do with them. At this point you're probably wondering: "how much are you getting for these phones?" Well, it depends on the phone. Because cell phone technology changes so quickly, the older ones are worth close to nothing; but at least they will be disposed of properly. Newer models can bring as much as $50, but it is very rare to get them. We were told by ReCellular that a good drive might bring in an average of $3 a phone; our experience has been that it is even less than that.

Continued on next page

Continued from previous page

So, we had a good cause and a way to fund it. The next step in our plan to save the world was marketing. I contacted our local school newspaper, *The Collegian*, and to my surprise they ran a front page article on the drive. We then initiated "operation wallpaper", with every member of the ACSM Student Chapter coating the entire school with fliers. We hit up the dormitories. I even went on the radio. With a school of 22,000 students, even at a conservative estimate of one phone per ten students, that means we should have collected 2,200 phones! Right? Not exactly. We got maybe 200. We were going to need a lot more phones to raise the $1029 we needed.

CLSA to the Rescue

But were we discouraged? Well…..yes. But we were not going to give up. I told my CLSA Chapter (Monterey Bay) about the drive and was heartened when they supported it enthusiastically (thank you Devin Henderson, Chris Bateman, Lynn Kovach…et al). They are a small chapter, yet managed to come up with over fifty phones (and they're still coming). When the Orange County Chapter learned about the drive they brought us over a hundred and forty phones at last year's Fresno State Student Geomatics Engineering Conference. Steve Shambeck delivered them personally. Thank you, Steve! Meeting so many good people through this drive has been a real pleasure. Another

Continued on next page

Continued from previouspage 17

example is the President of Schonstedt, Mike Head, who I met at the ACSM Conference in Spokane, WA. If I may quote Angus Stocking, Mike has "…a heart of gold…" Not only did he start a cell phone collection for us at his manufacturing plant in West Virginia, but he also donated a GA-52Cx for our conference auction. Alan Frank helped get the ball rolling for us at the Orange County Chapter. Bob Ebberson has been nothing but supportive and helpful (and patient!). NCS-ACSM gave substantial financial donations (for the record we are not opposed to financial donations). I have certainly met and worked with more great people through this drive than the confines of this article will allow me to list.

A last minute donation of twenty mint condition Blackberries by graduating Senior Josh Ford put us over the top, and we were able to send Schonstedt a check. Josh gets the "largest contribution by a student" award. We didn't find out until later that our two magnetic locators (remember Schonstedt matches the donation) went to Katmandu, Nepal. The government's fight with communists rebels have left a lot of land mines and unexploded ordinance in the ground there. When we received letters from both the United States Department of State and the United Nations thanking us for our donations, it made all the hard work worth it. The Fresno Bee also ran a brief article about the campaign, but for the sake of brevity they unfortunately failed to mention all the organizations that had made our campaign a success.

Working as team with these CLSA and ACSM Chapters and my classmates on this project has been an unparalleled educational experience, and this project could not have been successful without them. I would like to take this opportunity to thank all of them and our officers: Dennis Drew (past vice-president), Nathan Cunningham (secretary), Joaquin DePaz (treasurer), Eric Finely (current vice-president), as well as Dr. Crossfield for providing this opportunity.

You can help too

Guess what? We're going try to repeat our donation again this year, next year and I hope for perpetuity. If you would like to start a collection for us, please contact us at acsm@csufresno.edu and we will send you a shipping label. All you have to do is throw the phones in a box with a little padding (they prefer bubble wrap), slap the label on and drop it off at a Fed Ex/Kinko's. ReCellular asks that there be a minimum of twelve phones per box. We have at this point mailed invitations to all the CLSA Chapters who have not been solicited yet, and I hope you will consider our invitation as well. It has been scientifically proven that altruism makes you feel good.

Common Questions:

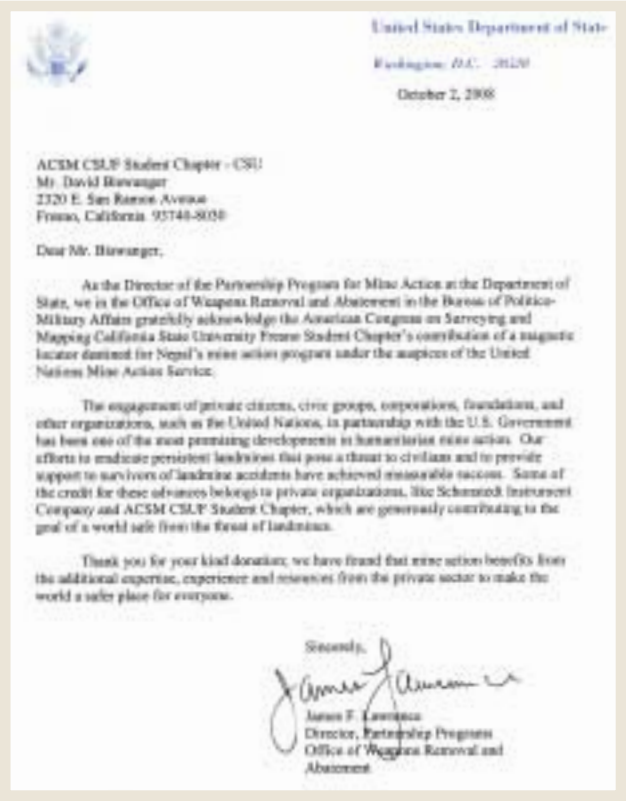
Do you want the charger?

We will take all the accessories you have to the phone, but it is not necessary if you don't have them.

What if the phone is broken?

We will take it in any condition, even in pieces. ❖

David Biswanger is a senior at CSU, Fresno in the Geomatics Engineering Program. He will graduate in the Fall 2009 semester, and plans to pursue a Masters in Boundary Control.



United States Department of State

Washington, D.C. 20520

October 2, 2008

ACSM CSUF Student Chapter - CSU
Mr. David Biswanger
2320 E. San Ramon Avenue
Fresno, California 93740-8030

Dear Mr. Biswanger,

As the Director of the Partnership Program for Mine Action at the Department of State, we in the Office of Weapons Removal and Abatement in the Bureau of Politico-Military Affairs gratefully acknowledge the American Congress on Surveying and Mapping California State University Fresno Student Chapter's contribution of a magnetic locator destined for Nepal's mine action program under the auspices of the United Nations Mine Action Service.

The engagement of private citizens, civic groups, corporations, foundations, and other organizations, such as the United Nations, in partnership with the U.S. Government has been one of the most promising developments in humanitarian mine action. Our efforts to eradicate persistent landmines that pose a threat to civilians and to provide support to survivors of landmine accidents have achieved measurable success. Some of the credit for these advances belongs to private organizations, like Schonstedt Instrument Company and ACSM CSUF Student Chapter, which are generously contributing to the goal of a world safe from the threat of landmines.

Thank you for your kind donation; we have found that mine action benefits from the additional expertise, experience and resources from the private sector to make the world a safer place for everyone.

Sincerely,

James F. Lawrence
Director, Partnership Program
Office of Weapons Removal and Abatement

United Nations Nations Unies

MINE ACTION SERVICE
SERVICE DE LUTTE ANTIMINES

08 October 2008

Dear Mr. Biswanger,

As the coordinator of the United Nations Mine Action Team, the UN Mine Action Service extends our greatest appreciation to ACSM CSUF Student Chapter for the generous contribution of a magnetic locator destined for the mine action programme in Nepal. This worthwhile initiative taken by Schonstedt Instrument Company is a wonderful example of public-private partnership for the benefit of some of the most under-funded mine action programmes in the world. Contributions such as yours are an integral part of this effort.

Over the past ten years, much progress has been made in eliminating the threat caused by mines and unexploded ordinance (UXO) to men, women, boys and girls around the globe. Nevertheless, much work still remains. Please be assured that your kind donation will be well utilized in the efforts to fulfil the vision of a mine-free world.

Yours sincerely,

Ignita Brady
Officer-in-Charge

Mr. David Biswanger
ACSM CSUF Student Chapter
2320 E San Ramon Ave
Fresno, CA 93740-8030

cc: Mr. Michael Head, President
Schonstedt Instrument Company

Photo of the Year Submissions

Photo of the Year Submissions

Photo 1

Photo 2

Photo 1 — "My Cubical" Caltrans Survey
Crewmembers Tim Hughes and Sunil Champaneria, Waddell Creek, Santa Cruz County.
Photo taken by Bob Fredricks.

Photo 2 — "Where are we working tomorrow?"
Caltrans Survey Crewmembers Tim Hughes and Sunil Champaneria, Waddell Creek Santa Cruz County.
Photo taken by Bob Fredricks.

Photo 3 —"Just hanging out?" Caltrans Survey
Crewmember Grant Krueger, on rope at Carmel Highlands, Monterey County.
Photo taken by Bob Fredricks.

Photo 3

TrigStar Success

By: Jerald P. Miller, PLS

TrigStar is a national annual high school mathematics competition based on the practical application of trigonometry. Students that participate are not only provided with an opportunity to earn awards, but also leave with a better understanding of the technical profession of Geomatics, which includes Land Surveying and Mapping!

CLSA has used the TrigStar program to advance communication with local high school students to explain how trigonometry is used to solve surveying and mapping problems. The local chapters of the CLSA, individual members and CalTrans employees make up the TrigStar program for California.

The purpose of TrigStar is:

- ☆ To promote excellence in the mastery of mathematics in high school.
- ☆ To honor high school students who have demonstrated their superior skill among classmates at the local, state, and national levels.
- ☆ To acquaint the high school students with the use and practical applications of mathematics in the Geomatics professions.
- ☆ To build awareness of Geomatics as a profession among the mathematically skilled high school students, career guidance and pathway counselors, and high school math teachers.

History of TrigStar

Russell E. Kastelle, RLS and member of the North Dakota Society of Professional Land Surveyors created the "Trig-Star" program. Russell was the ACSM Delegate / National Society of Professional Surveyors (NSPS) Governor from North Dakota, and in 1983 Russell was looking for something to accomplish during his tenure. The idea for Trig-Star came from the success of Engineer's Week. Russell thought there must be something surveyors could do to promote the profession, so he wrote a proposal for the "Trig-Star" program and presented it to the NSPS Board of Governors in Salt Lake City, Utah in the fall of 1983. The idea was embraced, and by the fall of 1984 Trig-Star contest packets were being sent to land surveyors across the United States. The contest is still run in much the same way as Russell proposed, and Russell still sponsors the contest at the local level every year.

Although Russell's vision was that the contest would be a local event, matching surveyors with high schools, the program has evolved into a national contest with scholarship awards. The initiative for the national contest began with a Trig-Star sponsor from the North Central Florida Chapter of the Florida Society of Professional Surveyors, Kent Green, who had been successful in promoting the program at the chapter level. In 1993 Kent proposed that NSPS sponsor the program as a national contest. Kent was assisted by Richard Lomax, then NSPS President, and NSPS began a national contest. The process of determining the national Trig-Star winner began. NSPS formed the Trig-Star Committee, and Larry Doss from Tennessee became the first chair of the Committee. Larry crafted guidelines and implemented the national contest format. He secured scholarship awards from NSPS, and money to bring the contest winner and their teacher to the ACSM annual convention.

John Chagnon took over as committee chair at the ACSM annual meeting in 1998. His first task was to standardize and improve the quality of the contest materials. With the help of Don Murphy of Cedar Rapids, Iowa the test has improved every year. The format is one that allows teachers to teach for the test, allows students of varying abilities to score, but also allows the best and brightest to be identified. With the help of the dedicated volunteers on the Trig-Star Committee and input from state societies like the Wisconsin Society of Land Surveyors, NSPS has developed complete and easy to follow instructions to insure the success of each local contest.

The Trig-Star Committee has also created the NSPS Foundation Trig-Star Scholarship Endowment Fund (a 501c(3) entity) in 2000. The purpose of the scholarship fund is to provide financial assistance to high school graduates who demonstrate excellence in the field of trigonometry and to enhance and expand the Trig-Star program. The 501c(3) status means that all donations are fully tax deductible. Scholarship fund distribution is limited to high school graduates who became the Trig-Star of their respective high school, became the state Trig-Star winner, and placed first, second, or third in the national Trig-Star competition.

The Trig-Star program operates on a budget of $12,000 per year, of which $7,000 a year is given out as awards. The program depends on the hard work of many volunteers at the national, state, and local level. All fifty states, the District of Columbia and Puerto Rico participate in this program.

What happens during TrigStar program?

The math departments from high schools throughout the state are contacted sometime between September and December. They are invited to participate in the TrigStar program scheduled in the spring. Some of the chapters have partnered with local community colleges to put on a full blown event. The Orange County Chapter, CLSA, and Santiago Canyon College co-sponsor a free, full day of activities with their program. Local chap-

Continued on page 22

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ters of CELSOC and CLSA from Sonoma County co-sponsor their event with the Civil Engineering, Surveying and Geospatial Technology program at Santa Rosa Junior College.

In Sonoma County, the math teachers are sent study materials, practice exams and a mentor. All the high schools are asked to participate. Scheduling the exam is somewhat tedious. Trying to shoehorn the event between SAT testing, STAR testing, proms, sporting and other math related events can be a little difficult. A short presentation is made about the Geomatics profession and how surveyors make Trigonometry "work" for them.

The exam is a timed exercise of sixty minutes, during which students must solve four trigonometric problems that incorporate the use of right triangle equations, the law of sine's and cosines, and other geometrical equations.

Winners are determined by the most correct answers in the fastest time. The State of California's TrigStar program has three levels of testing and awards. The first level is the local level. The second level is the state level and third level is the national level.

Sonoma County awarded over $1400; $300 for first, $200 for second, $100 for third place, $75 for fourth through sixth; $50 for seventh through tenth and $50 for first place at the individual high schools not in the top ten county-wide.

Continued from page 20

And the winner is...

For the second year in a row, Ian Vonseggern of Santa Rosa High School was Sonoma County's first place winner and the overall State Champion! He was the ***ONLY*** perfect score and finished in less than 60 minutes! Ian also placed second in the nation!

Ian, a senior, has participated in Sonoma County's TrigStar program for three years now and has placed in the top five all three years, winning and repeating the past two years. Is there a "three-peat" in our midst?

Ian was awarded $300 from the local contest, $1000 from CLSA and $1500 from NSPS. Not a bad haul for a couple of hours work!

So what kind of TrigStar are you?

Included with this article is one problem from this year's exam. You may use any study materials and a calculator (no programs) to answer it. The correct answers are also given separately. Just as an incentive, Ian finished the entire exam (a total of four problems) in 22 minutes and 20 seconds and scored a perfect 100! He only had a TI-86 calculator.

Get Involved!

I would like to encourage all members to join us in this opportunity to strengthen the land surveying workforce in California as well as promote public awareness of the land surveying profession. To volunteer or get more information, contact Aundrea Tirapelle, CLSA TrigStar Coordinator at atirapella@rbf.com ❖

Jerald P. "Jerry" Miller has been the program coordinator for the Civil Engineering, Surveying & Geospatial Technology program at Santa Rosa Junior College since 1993. A graduate of California State University, Fresno, in Surveying and Photogrammetry, he is licensed as a Professional Land Surveyor in the State of California. With over twenty-seven years of practical and professional experience in the civil engineering and land surveying professions, he has worked for many local firms and public agencies in Sonoma County. He has also operated a private consulting firm for surveying & mapping services, exam preparation, continuing education, professional & curriculum development since 1993.

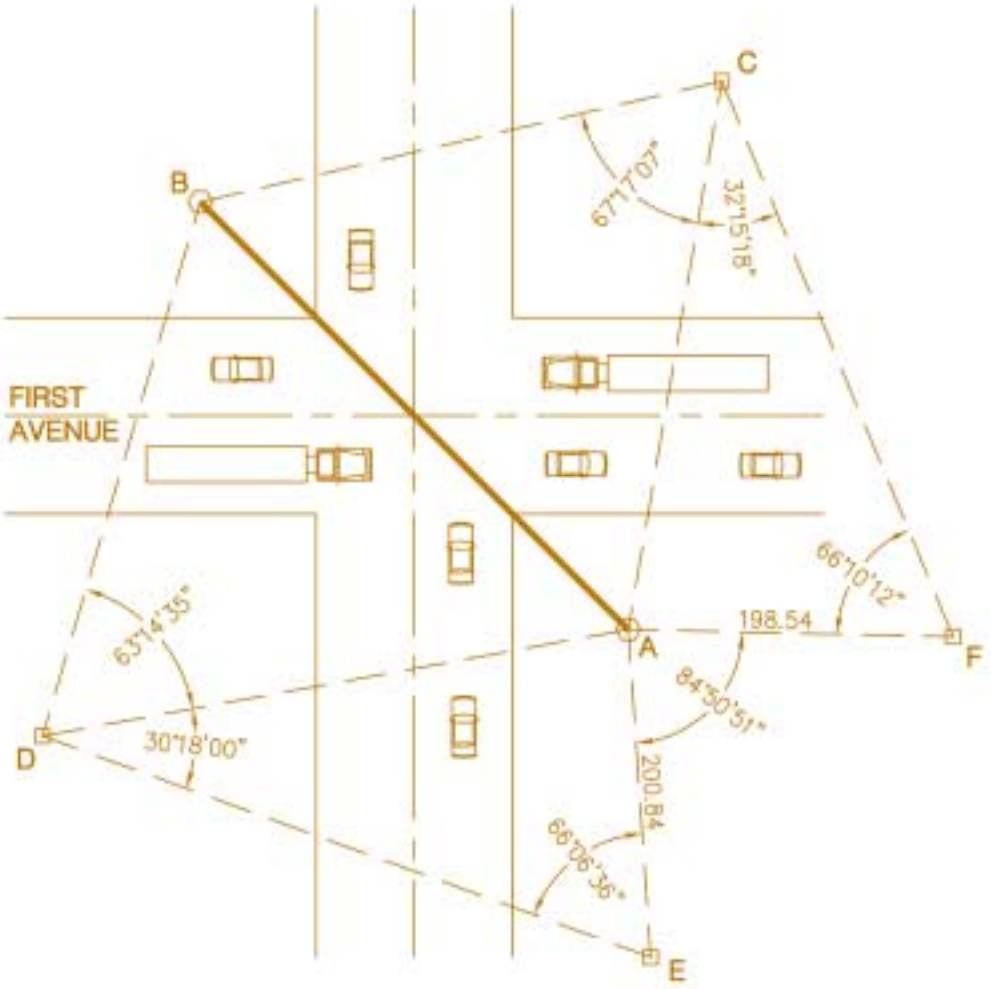
Jerry is the Vice Chair of the Northern California Section of the American Congress on Surveying and Mapping and is an active member of the Sonoma County Chapter of the California Land Surveyors Association. He is a frequent guest speaker for many professional engineering and surveying societies and organizations.

TRIG-STAR PROBLEM LOCAL CONTEST

TRIG·STAR

TRIG·STAR

A LOCAL TRAFFIC ENGINEERING DEPARTMENT HAS DETERMINED THE NEED FOR AN OVERHEAD SIGNAL LIGHT SYSTEM AT A VERY BUSY INTERSECTION. THE SUPPORT POLES NEED TO BE PLACED AT POINTS A AND B. DUE TO HEAVY TRAFFIC VOLUME, THE FIELD MEASUREMENTS BY THE SURVEY CREW WERE LIMITED TO THE FOLLOWING SKETCH:



FIND:

DISTANCE AC = _____ (6 POINTS)

DISTANCE AD = _____ (6 POINTS)

DISTANCE DC = _____ (6 POINTS)

DISTANCE BC = _____ (6 POINTS)

DISTANCE AB = _____ (6 POINTS)

TrigStar Answer Key on page 42

REQUIRED ANSWER FORMAT
DISTANCES: NEAREST HUNDREDTH

PAGE TOTAL: _____ POINTS

2007/2008 SHEET 3 OF 3

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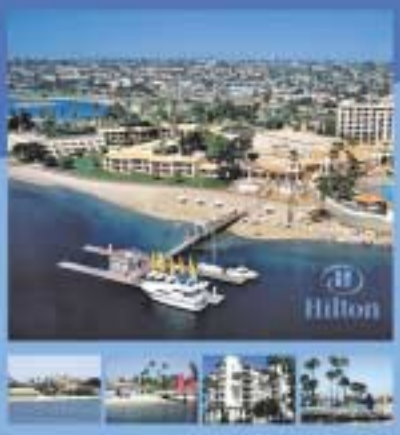

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REGISTRATION

CLSA STATE ASSOCIATION MEMBER

REGISTRATION	BEFORE Feb. 25	AFTER Feb. 25	AMOUNT
SMA Workshop (PreConference 8 hrs. - March 28th)	$125	$155	$_____
Conference (Includes Conference Registration, Monday & Tuesday Luncheons, IceBreaker Reception & Scholarship Auction)	$365	$435	$_____
Conference & Workshop (Includes SMA Workshop, Conference Registration, Monday & Tuesday Luncheons, IceBreaker Reception & Scholarship Auction)	$395	$475	$_____

NON-MEMBER

REGISTRATION	BEFORE Feb. 25	AFTER Feb. 25	AMOUNT
SMA Workshop (PreConference 8 hrs. - March 28th)	$155	$195	$_____
Conference (Includes Conference Registration, Monday & Tuesday Luncheons, IceBreaker Reception & Scholarship Auction)	$435	$525	$_____
Conference & Workshop (Includes SMA Workshop, Conference Registration, Monday & Tuesday Luncheons, IceBreaker Reception & Scholarship Auction)	$475	$575	$_____

OTHER

Spouse Registration (Includes tickets to IceBreaker Reception & Scholarship Auction)		$ 65	$_____
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CANCELLATIONS: To receive a refund on registration fees (less a $35.00 cancellation fee), all cancellations must be received in writing no later than February 25, 2009. Substitutions welcome - additional fees may apply, contact CLSA Central Office at (707) 578-6016 for more information.

By: Robert Reese, LS

LEVEL BUBBLES

One of the simplest – and most important – items in the surveyor's tool box is the level vial, either circular (bull's eye) type or tube type.

Below are some examples.

figure 1: tube level vial with graduations – bubble indicator

figure 2: circular (bull's eye) level vial with circular graduation – bubble indicator

GENERAL DESCRIPTION OF LEVEL VIALS

These level vials use a curved surface mounted to a reference surface that is normal to gravity as a way to measure level. In figure 1 & 2, the void in the fluid – the bubble - is displaced by the fluid being drawn down by gravity and always rises to the highest part of the vial as the reference surface is moved off level.

Single tube level vials can measure level in the direction of the tube only. Two tube level vials oriented at 90° to each other must be used in order to act as a two-axis level, or one tube level vial that can be rotated around a full circle can indicate level through 360°. The circular level vial has the advantage that it can indicate 2D level in all directions with one device. Older transits and levels had four leveling screws and either one or two tube level vials to indicate level adjustment. Increasingly, survey equipment is being outfitted with sensitive circular level vials for quick leveling of the instruments to be within the range of the compensators.

SENSITIVITIES

Level vials come with different "sensitivities." In a circular level vial, the sensitivity relates to the radius of the curved dome which contains the bubble. In the tube level vial, the sensitivity indicates the curve of the tube itself. Intuitively, the greater the radius of the curve, the more sensitive the level vial is to a given deviation from level.

The sensitivity of a level vial is usually specified as the angular amount, e.g. 30' (thirty minutes) or 1° (one degree), required to move the bubble a specific amount, usually 2 mm, but it can be more. This can be translated into a gradient value as well, much as 45° (angular amount) can be expressed as 1:1 (rise over run) or 100% (percent). The graduations on a tube level vial or the size of the circle on a circular level vial may or may not represent the unit for the sensitivity. The graduations may only provide a visual reference to gauge how much the bubble moves.

PRACTICAL EXAMPLE TO DETERMINE RADIUS

Let's use a single tube level vial as an example. Say it has a sensitivity of one degree and graduations on the tube that are 2mm apart. That means the tube vial can be inclined 1° off level and the bubble will move 2mm. OK, so with a little bit of trig (look in the back of any of your field books for curve formulae) and curve geometry -

equation 1: radius = [length of arc]÷[central angle in radians]

...OR...

equation 2: radius = [length of arc x 360]÷[angle in degrees x 2π]

Continued on page 28

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Continued from page 26

So we know that the radius of this tube level vial is about 115mm, or 0.38'.

To get a gradient equivalent for this particular level vial, ask the following question: how many millimeters must a 1 meter length be raised to move the bubble 2mm?

The answer is 17.46 mm or 17.46:1000, which happens to be the tangent of 1°.

WHAT'S THAT MEAN IN THE FIELD?

The real question is: What's this mean to you when you level an instrument or plumb a rod?

According to specs from the distributor, the circular level vial in that orange rod level (figure 3) you hold against a fiberglass rod has a 40' (40 minute) sensitivity. That means that if it were in perfect adjustment, moving the bubble 2mm (a little more than half of 0.01') would put a 2m rod out of plumb at the top by about 23mm - that's nearly 0.08'! My measure of the diameter of the circle inscribed on the circular level vial is 5mm. The bubble could be partially within the circle and still make the rod that much out of plumb.


figure 3


figure 4

By the way, this is the same circular level vial (sensitivity of 40' per 2mm) that is provided on some carbon fiber rover rods (figure 4) meant for GPS work. Better keep 'em in tight adjustment for good RTK work.

On the other hand, the circular level vial on a precise fixed height rod for GPS has a nominal sensitivity of 10'. This tightens things up considerably, making the top of a 2m rod about 6mm out of plumb if the bubble is off 2mm. This is still not acceptable for precise GPS work, but these fixed height GPS rods have the ability to rotate the rod during setup and to adjust the rod to compensate for bubble error as precisely as you can estimate it. This helps mitigate bubble adjustment errors.

PROPER FIELD PROCEDURES

This is a good opportunity to mention that for more accurate work, rotating a rod 180° between measurements and centering the bubble on both direct and reverse sightings (for optical equipment) or on multiple occupations (for gps equipment) is good practice. This will remove the errors in the bubble adjustment.

Situation 1: moveable rod, fixed bubble – A rod and level vial in this situation is shown in figure 4. The rod uses a fixed bubble to determine plumb. Set the bubble in the center. Take a shot from your total station, or record the first (or more) observations with GPS equipment. Rotate the rod 180°. Take a second shot from your total station, or record the second (or more) observations with GPS equipment. The average position between the two shots or observations is likely to be where a plumb rod with a centered bubble would be.

Situation 2: fixed rod, fixed bubble – A fixed height gps rod would be a good example. The top of the rod is fixed at the top by the legs and the rod can be rotated in place. Set the bubble in the center. Rotate the rod 180°. If the bubble is not centered, bring it back HALF the distance from the center. Rotate back to 0° and check the bubble. It should be in the same "un-centered" position in both directions.

Of course, the best procedure of all is to make sure the rod is straight, the bubble is centered when the rod is plumb, both before and after field work.

PARALLAX

One of the big problems with using a level vial is parallax, not so much with a tube level vial as with a circular level vial. If you are not looking directly down on the bubble, parallax causes an apparent displacement from center. After discussing this with a surveyor friend recently, I had a chance to try out a simple way to eliminate this problem.

figure 5

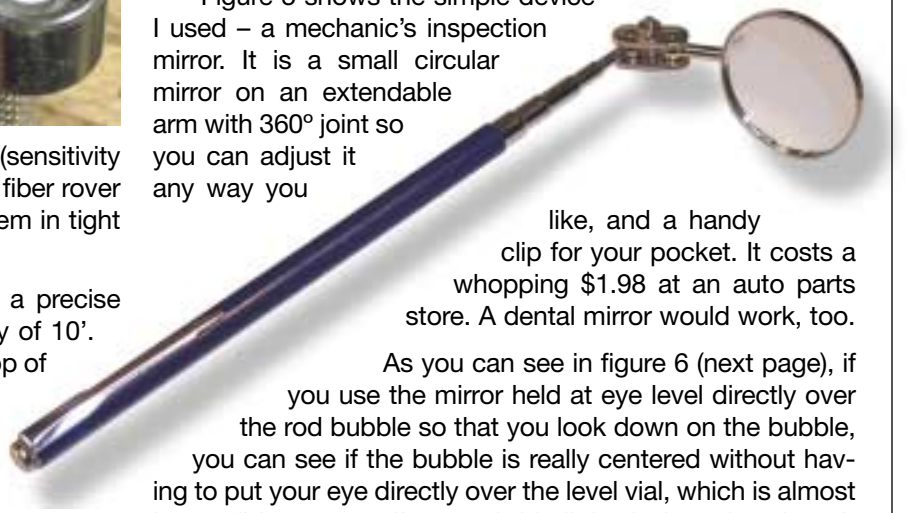

Figure 5 shows the simple device I used – a mechanic's inspection mirror. It is a small circular mirror on an extendable arm with 360° joint so you can adjust it any way you like, and a handy clip for your pocket. It costs a whopping $1.98 at an auto parts store. A dental mirror would work, too.

As you can see in figure 6 (next page), if you use the mirror held at eye level directly over the rod bubble so that you look down on the bubble, you can see if the bubble is really centered without having to put your eye directly over the level vial, which is almost impossible anyway. I've used this little device when I can't even see the bubble at all due to a high or precarious rod setup. This has got to be the best thing since sliced bread! (Okay, I guess I need to get out more often.)

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COMPENSATORS & LEVEL VIALS

It is important to realize that a circular level vial bubble which is out of center on an instrument having an automatic compensator (such as an automatic level or a total station) doesn't have the same effect as being out of center on a rod. If the bubble is within the circle on an instrument, the compensator will "automatically" correct the line of sight to level. So "close" doesn't apply to the rod bubble at all. But if the bubble on a rod is in the center when it is rotated 180°, chances are the rod is pretty plumb.

So if your rod is about half a bubble off, I'd say that's a pretty "vial" situation.❖

Robert J. Reese, PLS, is a past CLSA President and owner of Reese Water & Land Surveying Services, San Luis Obispo, CA

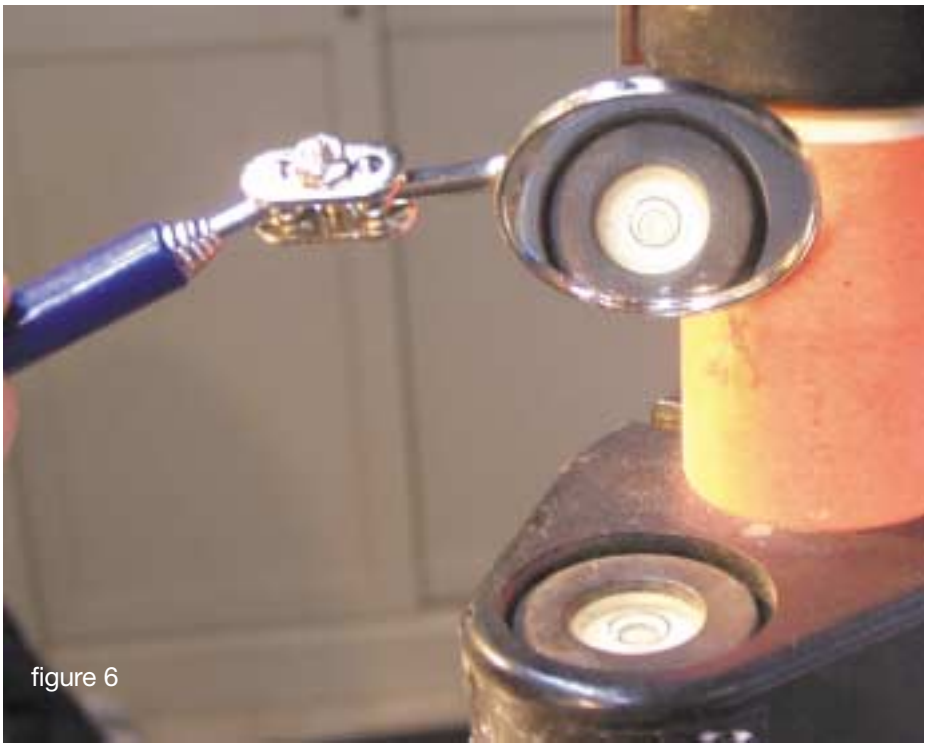

figure 6

Web Wanderings!

By: Levi Cox, PLS

Is the Devil in the EULA?

"Before turning to those moral and mental aspects of the matter which present the greatest difficulties, let the inquirer begin by mastering more elementary problems." This is a quote from one of the most famous of fictional detectives, Sherlock Holmes. What made Sherlock Holmes a great detective? If you have never read any of the novels, by reading the quote above you could discern that Sherlock Holmes was a detective of details. In the Land Surveying world, our profession prides itself on the art of decision making based on details. This is an essential trait to properly determining property boundaries or making redundant measurements to construct multi-story buildings. Sherlock Holmes could have possibly made a great Land Surveyor. Interestingly enough though, there were times, even with the great Sherlock Holmes, that by applying such a focused attention to the details, he missed the larger more obvious element of the mystery.

Do we need to protect our digital data? If so, what can we do to protect our data? Where do we start?

As Land Surveyors, by focusing so much on our business of details, have we neglected some important details of our business? The well known phrase, "The devil is in the details", illustrates how a small detail of a project can lead towards enormous failure. Illustrating the power of details is a reminder of the need to be conscious of the details of both our practice and our business model. Regularly examining our business model in the light of new technologies and trends can help prevent our profession from becoming obsolete. The Land Surveying and Civil Engineering professions have traditionally been thought of as service businesses to provide data. In contrast, the Internet has proven to us in the last decade, the concept that gathering data is a service and how you deliver that data can be a product. How you provide the data, the package, the appearance and the feel determine the appeal of the product. The question now is, how well of a job do we do protecting the digital data that we create? A larger perspective of our business is that we are not in the business of Land Surveying or Civil Engineering as much as we are in the business of generating, analyzing and manipulating data pertinent to these disciplines. Today, every product that we produce has digital content related to it. The product we generate, our data in all formats, is then sold completely, all mineral, water and underlying rights included, to the client. When requested, we also will deliver our digital data to the public agencies, no strings attached.

Providing a public agency with digital data to benefit the general population is not in itself an issue. I will ask, what happens when the data we give to an agency is turned over to a private company that uses the data to spawn revenue and profit? The optimal business model of a private company is when you can sell something of value for a profit that you received for free. Will this happen to the data we distribute today? Will the data that we generate in the future become more valuable than the data we generated in the past?

Put all these questions in your head, shake them up and then consider this. The digital data the Land Surveyors and Civil Engineers have traditionally produced is two dimensional data. In other words, CAD line work with no elevation component. That same two dimensional data has found itself into a number of larger GIS databases that are being widely used today. Even more valuable, is the three dimensional data that our profession is implementing into our routine workflows. Three dimensional data has a 'bling' factor to it, that not one industry, but many industries are demanding. Visualization directly from design is marketing made easier. Are public agencies asking for submittals of three dimensional models, pipe networks and surfaces yet? This request has yet to reach my desk.

If you have a few minutes, take a look at these two projects and then think some more about this article. The first project to do a search on is the 'Google Cities in 3D Program'. The specific statement that I was drawn to is this; "*…maybe you haven't yet produced a 3D model, but you've collected the geospatial data necessary for producing a model*." Closely followed by that statement was this statement: "*More than 350 million Internet users have turned to Google Earth to better understand and navigate their world. They use the tool to observe their community from above, but also to consider a real-estate investment, to plan a travel itinerary, or to look at a cityscape from a new perspective."* The basic version of Google Earth is free to the public. Google's support for this product comes from advertisement revenue and name recognition. The professional version of this software does have a fee associated with it. We use this software to be more efficient in our business as do many businesses. Think though for a moment, how many services has this product already retired? As this product grows, how many more services will it continue to retire?

The second search should be on a project by Autodesk named Metropolis. Sneak previews and glimpses of this project were first shown at the Autodesk University in Las Vegas in

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November of 2007. This project is a compilation of several data sets to compose a virtual city. A quote found on Cadalyst.com, by Autodesk Jonathan Knowles, Director of Worldwide Market Development, describes this project further: *"This is more than just the 3D view. It's also about the data behind the images; these intelligent city models integrate data from architectural models, utility networks, transportation networks, asset management systems, and much more."* There is a lot of data from many sources being compiled and made easily available by this one product. Autodesk has not made public the business plan for Metropolis. How it will be marketed and where the data that populates this environment will come from is unknown. This is however, a great example of what the software companies envision as the future of, possibly, our data.

Do we need to protect our digital data? If so, what can we do to protect our data? Where do we start? This is open to discussion. What is known is that the software companies have went to a great extent to protect their data. The next time you install software on your computer, before you press the 'I Agree' button, take a look at the words in the box. This is called an End User License Agreement, or as an acronym, the EULA. This license allows you to use the software, yet not own the rights to the software. The software code, the rights of resale, copying of, etc., are limited by the EULA.

The EULA, as a licensing vehicle, may be a model that our profession could adopt to protect the data that we distribute. In May of 2007, in San Jose at an ACEC COPS summit, a well-known architect from the east coast spoke on the future of the housing market. A large portion of his discourse addressed the specific types of data the large land developers would require from their consultants in the future. In response to a question from the audience, he made an interesting observation pertaining to digital data protection. He noted that Land Surveyors and Civil Engineers may be one of the last professions to place any kind of protection on their digital data. This was an eye-opening observation. Ask yourself, when was the last time I tried to get a paper set of architectural plans out of my local agency's building department? Have you ever been able to get a building department to give you a digital set of architectural plans?

Taking a look across the professional design industry, the mechanical and architectural disciplines have been protecting their data for a while.

The Devil may be in the EULA in the sense that this may seem to be a small detail of our business presently with a potential to become a larger issue in the future. The vehicle to protect our data through licensing or copyrights may not yet be determined. The need to protect our digital data though, seems sensible. Technology has eroded the barriers of entry to many industries. The future is about data and we are in the business of data. How well we compete in the future, will involve, to an extent, how we manage our data now. ❖

For questions, comments or suggestions on future articles, email Levi Cox at lcox@rbf.com.

By: Ric Moore, PLS, BPELS Land Surveyor Consultant

Who Established the Boundary?

Pat: Hey Ric, I heard there was an issue about determining the location of a boundary and recording a map. What was that all about?

Ric: Well, there was a disagreement about Who surveyed the boundary and whether it was established or retraced. In the meantime, No one is taking responsibility for filing the Record of Survey.

Pat: That's what I want to find out.
Ric: I told you.

Pat: Are you the Staff Land Surveyor?
Ric: Yes.

Pat: Are you going to review the enforcemen case?
Ric: Yes.

Pat: And you don't know the licensee's names?
Ric: Well, I should.

Pat: Well, then who established the boundary?
Ric: Yes.

Pat: I mean the surveyor's name?
Ric: Who.

Pat: The first surveyor?
Ric: Who.

Pat: I'm asking YOU who established the boundary?
Ric: That's the surveyor's name.

Pat: That's who's name?
Ric: Yes.

Pat: Well go ahead and tell me.
Ric: That's it.

Pat: That's who?
Ric: That's right.

Pat: All I'm trying to find out is what's the surveyor's name who established the boundary?
Ric: No, What came later and resurveyed it.

Pat: I'm not asking who resurveyed the boundary.
Ric: Who established the boundary.

Pat: One survey at a time!
Ric: Well, don't change the surveyor's around.

Pat: I'm not changing anyone around!
Ric: Now you know why there's a disagreement.

Pat: What's the guy's name that established the boundary?
Ric: No. What resurveyed the boundary.

Pat: I'm not asking who resurveyed the boundary.
Ric: Who established the boundary.

Pat: I don't know!
Ric: He's the County Surveyor, we're not talking about him.

Pat: Now how did I get to the County Surveyor?
Ric: You mentioned his name.

Pat: I did? What's his name?
Ric: No. What resurveyed the boundary we are talking about.

Pat: Who's the County Surveyor?
Ric: Who established the boundary.

Pat: Sounds like no one is filing the map.
Ric: Yes.

Pat: Who is filing the map?
Ric: No, No one is.

Pat: Well, don't you think someone should?
Ric: Yes.

Pat: Well, who?
Ric: Yes.

Pat: What?
Ric: No, Who.

Pat: I give up!
Ric: No, I Give Up is the one that didn't file a Record of Survey and the complaint is about.

Pat: Who?
Ric: I Give Up.

With credit (and apologies) given to Bud Abbott and Lou Costello, the preceding exchange is not too far removed from some of the conversations we have at the Board while attempting to unravel the complexities of some of the enforcement cases. ❖

Postcards

Above: Kurt Hoehn, PLS, CLSA past-president and member of the Orange County Chapter, in Baghdad, Iraq.

Right: Sunset over Utah Lake near Provo, Utah. Photograph by Tim Case, PLS

SMA Expert Q&A

By: Mike Durkee, ESQ

Question

I submitted a tentative map application to a city a few months ago and the city still has not acted on the map. I believe there is a section in the Subdivision Map Act that requires a city to take action on a map within a certain amount of time or the map is "deemed approved." Is this correct?

Answer

Yes, IF, and *only* if, several key pre-requisites take place! Having a map "deemed approved" due to processing delays by the local jurisdiction is not as simple as it may seem. Map Act section 66452.4 provides as follows:

> If no action is taken upon a tentative map by an advisory agency that is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map or by the legislative body within the time limits specified in this chapter or any authorized extension thereof, the tentative map as filed, shall be deemed to be approved, insofar as it complies with other applicable requirements of this division and any local ordinances, and it shall be the duty of the clerk of the legislative body to certify or state his or her approval.

However, Section 66452.4 is not the only applicable law. Case law interpreting the Map Act likewise has established additional hurdles that must be cleared before a subdivision map will be deemed approved.

First, the tentative map must comply with three primary requirements:

(1) The local jurisdiction must make an express finding that the tentative map is consistent with the local general plan. (*Youngblood v. Board of Supervisors*, 22 Cal.3d 644 (1978).)

(2) The local jurisdiction must have provided notice and an opportunity to take public testimony concerning the proposed tentative map. (*Horn v. County of Ventura*, 24 Cal.3d 605 (1979).)

(3) The local jurisdiction must comply with the California Environmental Quality Act ("CEQA"). This means that the local jurisdiction must complete whatever environmental review may be required by CEQA for the tentative map, *i.e.*, certify an EIR, approve a negative or mitigated negative declaration, or adopt an exemption.

Second, once those three requirements have been satisfied, the applicable Map Act timeline must expire. The Map Act sets forth three different timelines:

(1) If the local jurisdiction's advisory agency has final decision-making authority over the map, then the advisory agency must act on the map within *50 days* after the CEQA process is completed. (Gov. Code § 66452.1(b).) However, if this decision is appealed, up to 80 days could be added to the process (10 days to file an appeal, 30-60 days to schedule a hearing, and 10 more days to issue a decision). (Gov. Code § 66452.5.)

(2) If the advisory agency does not have final decision-making authority, but makes a recommendation to the legislative body, then the advisory agency must make its recommendation within *50 days* after the CEQA process is completed. (Gov. Code § 66452.1(a).) The legislative body must then approve, conditionally approve, or disapprove the map within *30 days*. (Gov. Code § 66452.2(a).) of that recommendation.

(3) If there is no advisory agency, the map must be submitted directly to the legislative body at its first regular meeting after the CEQA process is completed, and then the legislative body must approve, conditionally approve, or disapprove the map within *50 days* after that meeting. (Gov. Code § 66452.2(b).)

The California Attorney General has opined that if all of the requirements set forth above are satisfied, then the tentative map is deemed approved, and as such, the deemed approved map should be treated the same as a map actually approved by the city or county. (81 Ops.Cal.Atty.Gen. 166 (1998).)

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Yet, readers may wonder: "In reality, given all of these hurdles, what is the likelihood of a tentative map ever being 'deemed' approved by operation of law?" Well, consider the following: Suppose a local jurisdiction approves a specific plan for a project, as well as an EIR for that specific plan development. Then suppose the developer subsequently applies for a tentative map, and the local planning commission, which is the decision-making authority for the map, holds a properly noticed public hearing "workshop" to discuss and consider the map. The staff report for the planning commission hearing contains a determination that the tentative map is consistent with the general plan and with the specific plan, and explains that no additional CEQA work is needed given the recently certified EIR. The "workshop" hearing is conducted, but no decision is reached. A new hearing is set for further discussion at a date in the future.

In this situation, all of the pre-requisites have been satisfied. Therefore, if the planning commission does not make its decision within 50 days of the date that the EIR was certified, the tentative map will be "deemed approved" by operation of law!

As the discussion above reveals, important hurdles must be cleared, but a deemed approval of a tentative could take place in the right circumstances! ❖

About the Author

Michael Patrick Durkee, a partner in the Walnut Creek office of Allen Matkins, represents developers, public agencies and interest groups in all aspects of land use law. Mike is the principal author of Map Act Navigator (1997-2008), and co-author of Ballot Box Navigator (Solano Press 2003), and Land-Use Initiatives and Referenda in California (Solano Press 1990, 1991). 415.273.7455 mdurkee@allenmatkins.com

"Mike wishes to thank Tom Tunny, Senior Counsel at Allen Matkins, for his assistance in writing this article."

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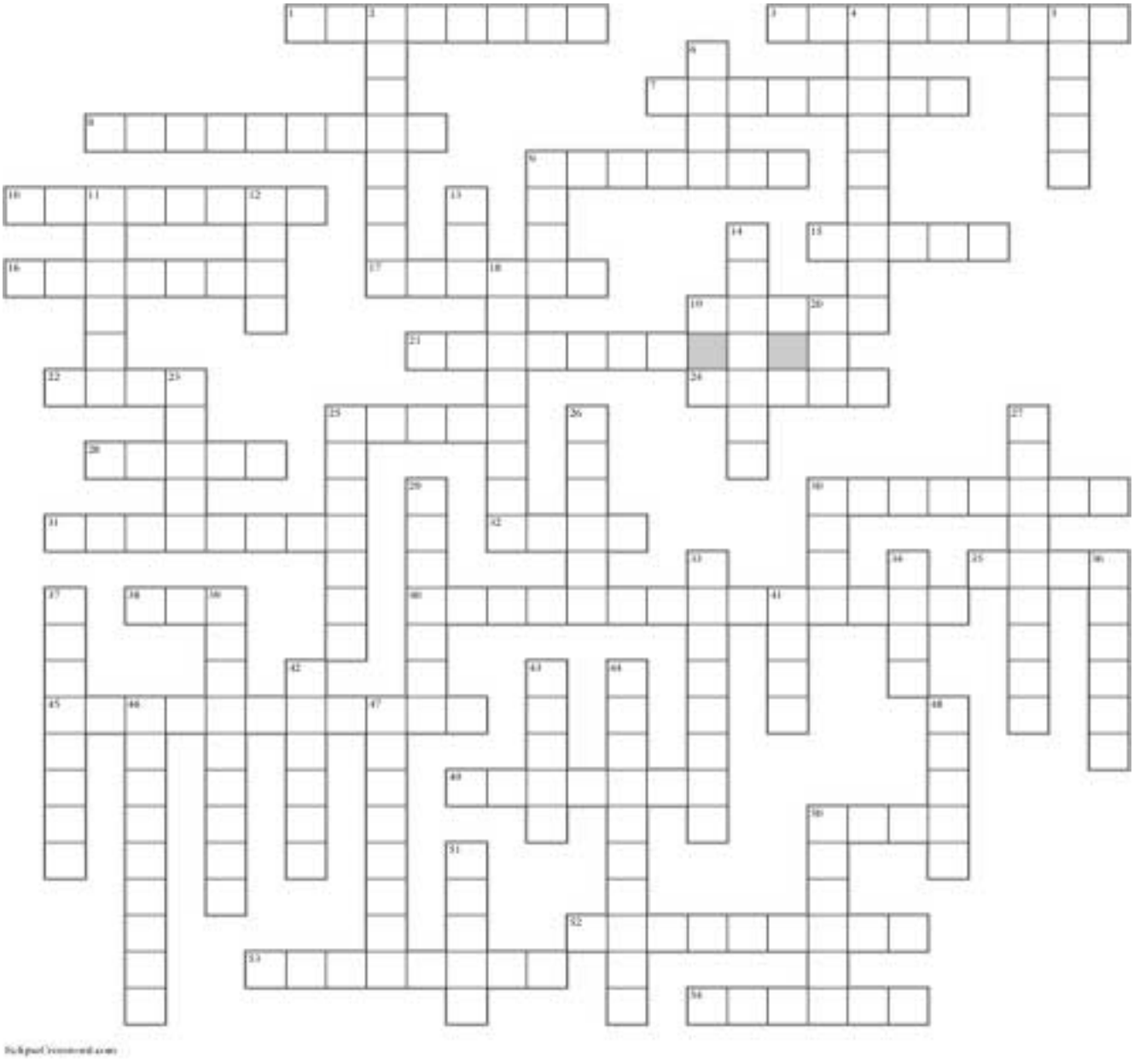
Crossword Puzzle

By: Ian Wilson, PLS

CLSA Crossword Puzzle #10



Ian Wilson, PLS *is the Director of Survey for WRG Design, Inc. in Roseville, CA. As well as being a licensed land surveyor, he and his wife, Laura, are avid SCUBA divers. They are looking forward to "getting wet" on future trips along coastal California and around the world.*

Across

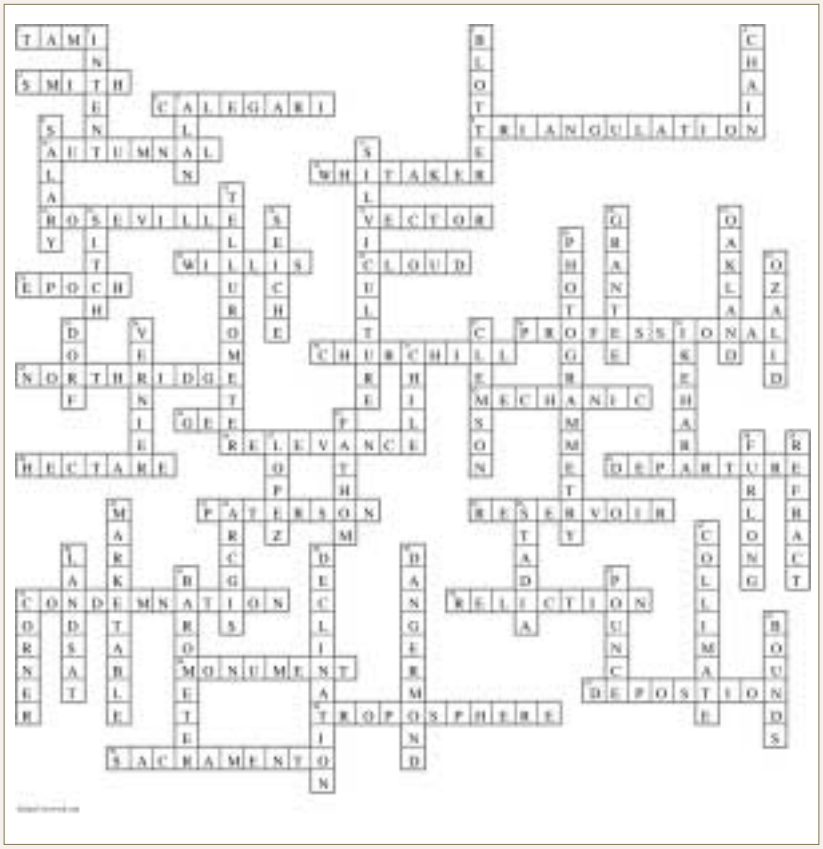
1. OUTSIDE
3. TYPE OF INSURANCE THAT COVERS LOSSES TO RETIREMENT & PROFIT SHARING PLANS
7. GENIUS OF LONGITUDE
8. FIRST HAND AUTHENTICATION OF A FACT
9. PEPENDICULAR TO RADIAL
10. CREATOR OF THE TRIGSTAR PROGRAM
15. PAUL CUOMO'S WIFE
16. ACSM TRIGSTAR COMMITTEE CHAIR
17. ALLUVIAL DEPOSIT
19. NUMBER OF YEARS PAUL CUOMO'S LAND SURVEYING CAREER SPANNED
21. ADVANCED LAND DESCRIPTIONS AUTHOR
22. PRESIDENT'S WIFE AND QUILTER
24. PLS 4136
25. RADIO DETECTION AND RANGING
28. PARCEL OF LAND
30. DISPLACEMENT DUE TO SEPARATION BY DISTANCE
31. HONORARY MEMBER OF CLSA
32. PAUL CUOMO'S SON; PLS 6042
35. A REFERENCE IN A DESCRIPTION
38. PERCH
40. POSITIONAL CONVERSION PROCESS
45. MAN MADE STRUCTURE
49. EVIDENCE NOT BASED ON PERSONAL KNOWLEDGE
50. FROM THE ARABIC WORD, SIFR, MEANING NOTHING
52. GRADUAL ACQUISITION OF LAND DUE TO RECEDING WATERS
53. STELLAR!
54. SIX FEET

Down

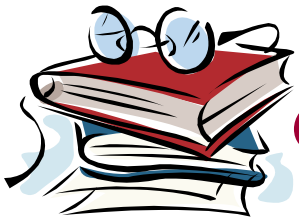
2. 36 SQUARE MILES
4. DISCLOSURE OF PERTINENT FACTS
5. TIER OF TOWNSHIPS
6. ONE STEP
9. TYPE OF LEVEL VIAL WITH GRADUATIONS
11. GRADUATED ROD
12. 1/25 OF A ROD
13. REESE'S SITUATION
14. ARC OF HORIZON; FROM ARABIC AL SUMUT "THE WAY"
18. REQUIRED UNDER 8759 OF THE PLS ACT
20. PAUL CUOMO'S SON
23. MARK ON A TREE
25. 57°17'44.8"
26. DEFINITE BOUNDARY MARKERS
27. ADVANCED LAND DESCRIPTIONS AUTHOR
29. 1/36 OF A TOWNSHIP
30. DIAGRAM TO SCALE
33. CUOMO'S BIRTHPLACE
34. 1/4 ACRE
36. BEING LEGALLY RESPONSIBLE FOR THE DAMAGE
37. EXEMPTION FROM EXISTING ZONING LAWS
39. OUT-OF-COURT TESTIMONY MADE UNDER OATH
41. 160 SQUARE RODS
42. MAGNITUDE AND DIRECTION
43. LASER RANGING
44. CALIFORNIA'S TWO-TIME FIRST PLACE TRIGSTAR WINNER
46. NEARNESS TO EACH OTHER
47. SOMETHING THAT FURNISHES PROOF
48. OBSERVED VALUE MINUS COMPUTED VALUE
50. INTERSECTION OF PLUMB LINE AND CELESTIAL SPHERE; FROM THE ARABIC "SAMAT"
51. THIRTY NINE POINT THREE SEVEN INCHES

Key to CLSA puzzle #9

(Surveyor Issue # 155)



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

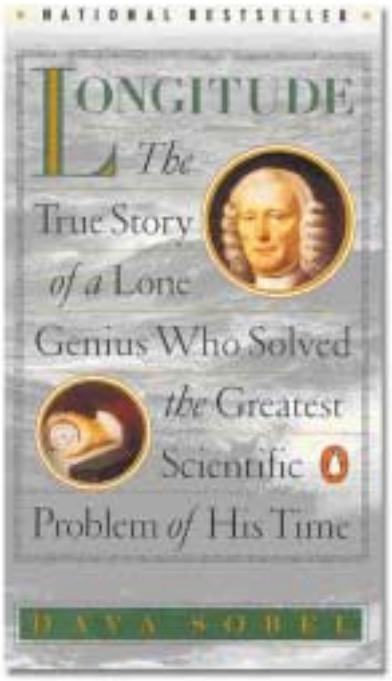


CLSA Book Review

By: James M. Herrick, PLS

LONGITUDE

The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time
By Dava Sobel



Dava Sobel has written about science for "Audubon," "Discover Life", and "The New Yorker". She has also written "Galileo's Daughter," "A Historical Memoir of Science, Faith and Love," which chronicles the lives of the Astronomer Galileo Galilei and his daughter. **Longitude** has been published in twenty three languages and has been an international best seller.

The search for a method to determine longitude began as early as 150 AD. This book examines parts of this search, in particular the search for an accurate method of keeping time which leads to accurate determination of longitude. It also looks at the competing lunar distance method of determining longitude. The book takes you through the trials and tribulations of John Harrison and his journey to solve this mystery. It chronicles his ingenious solutions to the many problems that came up throughout this search.

While the search for longitude had been ongoing for centuries, the event that really pushed it to the forefront happened on October 22, 1707. As described in the book, Admiral Sir Clowdisley Shovell was returning home after a victorious skirmish with the French. There was still no accurate method developed to determine longitude and because of that the Admiral made an inaccurate guess at his position. This inaccurate guess lead to four of his five ships running aground and sinking. Two thousand troops lost their lives because of the lack of an accurate way to determine longitude. This huge loss of live inspired the Longitude Act of 1714. Parliament offered a prize of 20,000 pounds (equal to millions in today's dollars) for the discovery of the solution to the longitude problem. This Act lead to John Harrison's determination that he would solve this problem by inventing a clock that would keep accurate time thereby allowing ships' Captains to accurately determine longitude. As early as the 1500s astronomers were trying to use the movement of the heavenly bodies to determine longitude. These methods proved to be Harrison's biggest competition for the longitude prize. This book takes you through the development of some of these methods and shows how the preferences of the members of the Longitude Board for this method plagued Harrison and his work during his entire life. John Harrison was born March 24, 1693. He built his first pendulum clock in 1713. In 1722 Harrison completed a tower clock for Brocklesby Park. This clock is still operating today and has been for over 280 years. This clock never needs lubrication. You need to read the book to discover the facts and ingenuity behind this mystery!

Starting in 1730 Harrison built his first accurate clock and designated it H-1. It took him five years to complete. It weighed 75 pounds and it worked! It is still running today, with daily windings, at the National Maritime Museum in Greenwich! In 1737 he built his second clock, H-2. It was better than H-1 but he still was not satisfied. Harrison's third clock, H-3, took him many years to complete. It contains 753 separate parts and weighted about 60 pounds. It contains several inventions that are still in use today! This clock still did not meet his approval and in 1759 he completed H-4. This was a much smaller clock. It was only 5" in diameter. It incorporated many new and untried methods and materials. Also all during this time the book takes you through the lunar distance method attempts and improvements and helps you see the tremendous odds that John Harrison was up against.

In 1761 H-4 was finally taken to sea for a trial. It passed with flying colors but because of the opposition from supporters of the lunar distance method Harrison and now his son met with stiff opposition when trying to claim the reward for determining longitude. It was not until 1773 through the intervention of King George III that the monetary reward was paid in full. Even with that Harrison was not given the recognition of solving the longitude problem. The majority of the members of the Board of Longitude were entrenched in their support of the astronomic solution and resisted Harrison at every opportunity. The Harrison's continued to work against the odds to garner the recognition that John Harrison deserved until John's death March 24, 1776. At the time of his death he held martyr status among clock makers.

Ironically in the 1800's the Board of Longitude's chief duty gradually became the testing of and the assignment of chronometers to ships captain. Marine time keepers went from one in 1737 to 5000 in 1815. The Board of Longitude was disbanded in 1828. These facts exonerated John Harrison's efforts and indicated how

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correct he was. However, they came too late for him to see. Incredibly H-1, H-2, H-3 and H-4 are all on display at the National Maritime Museum in Greenwich. H-1, H-2 and H-3 all continue to operate with daily winding. H-4 could still operate but because of its status as the most prized clock it is not allowed to operate in hopes that it will be preserved forever.

This book is very well written and entertaining to read. As stated in the book it is "a popular account not a scholarly study". For me this made it more readable and entertaining. It was a story rather than a book of just facts. The book takes you through the struggles of John Harrison and shows you what a true genius he really was. He was decades, possibly even centuries, ahead of his time in the development of accurate time pieces. There was no one else even close to his incredible thought process and ideas in this area. He was dedicated to the development of an accurate clock to a fault and spent nearly all of his life working on that endeavor. I recommend this book to anyone interested in general history, land surveying, maritime history, or just reading about what it took to solve the navigation issue of determining longitude. Determining longitude today is easy with all of our sophisticated equipment but I would encourage you to leave all that in the office and walk outside with nothing and think about how you would figure out your longitude. It must have been a daunting task to contemplate. This book explains in part how this problem was solved and the dedication it took to see the solution through to the end. ❖

James M. Herrick PLS 5616 is Survey Department Manager and Vice President of NorthStar Engineering in Chico, CA and served as the 2008 President of the California Land Surveyors Association.

CLSA Remembers...

Paul A. Cuomo, PLS (1937 - 2008)

We are all deeply saddened by the recent passing of Paul Cuomo. The surveying community has lost a friend, teacher and one of the driving forces in bringing quality educational opportunities to the profession that he loved. Paul has contributed greatly to the survey profession in many ways. Paul was licensed in 1973 and began teaching survey classes at Santa Ana Jr. College (SAC). He has been a mentor to many in the profession who have taken his classes at SAC and Santiago Canyon College in addition to his review courses.

Some of his accomplishments include:

Served as CLSA President (1989)
Served as President of the CLSA Orange County Chapter
Initiated the 4-year Surveying Option program at Cal-Poly Pomona
Supported Cal-Poly Pomona's successful effort to obtain ABET Accreditation
CFLSE's Board has also served as the Surveying Advisory Committee for Santiago Canyon Community College.

A "Paul Cuomo Memorial Fund" has been established. Donations made through the next five years will be matched dollar for dollar.

Please make your check payable to:
California State University Fresno Paul Cuomo Memorial Educational Fund

Please mail your checks to:
Tony Cuomo
2832 Tigertail Dr.
Rossmoor, CA 90720

By: Richard Hertzberg, CPCU, ARM, Vista International Insurance Brokers

Why Are There So Many Types of Liability Insurance?

What can you do when you don't understand all the liability manifestations? Insurance policies? Certificates of insurance? Requirements for bids and good jobs? Liability Insurance gets complicated because there are so many different forms of liability coverage. Since it's so confusing we'll go back to basics and get some Insurance 101.

First, a dictionary definition: liable means being legally responsible for the damage caused by your action. Liability insurance is that insurance that covers you against losses arising from injury or damage to another person or property. There are different types of liability coverage. The basic essence of them all is that you have to have a legal obligation for monetary damages.

What kind do you need?

When you're asked to get liability insurance you need to know what kind you need to get. Is it general liability that covers slips, falls or job site injury and damage? Or is it professional liability that covers your errors and omissions like malpractice insurance? These two are the basic insurances you will probably deal with unless you have an automobile accident. Then you will need automobile bodily injury or property damage liability coverage. You may hear about employer's liability if you have workers and workers compensation insurance. Of course, there's umbrella liability coverage that gives you higher limits over your general liability and auto coverages and excess liability that will give higher limits over your professional liability policy. If you run a big company you probably should consider director's and officer's liability, fiduciary liability and employment practices liability insurance.

Is that all?

Yes, for now. There are probably some liabilities that no one has discovered yet. But they will be found eventually because people are always looking for ways to get money by suing other people. So you ask, with all these different liabilities, why can't they all be lumped into one big liability policy that puts an end to all this suffering and turmoil?

Why can't we have all risk liability coverage where you buy a policy, pay your premium and forget about it? Then if you have an unforeseen liability loss the policy pays. That would be great but it's too simple and reasonable and it would probably put a lot of insurance and legal people out of business. There's vested interest everywhere.

So let's get going and explain this stuff.

Tell me more

Professional Liability is malpractice insurance covering errors and omissions in the professional pursuit of your land surveying business. For things such as bad boundaries, faulty construction staking and error-laden maps, the insurance company has the legal obligation to pay damages for claims caused by your negligent acts: those errors or omissions from the professional services rendered by you or that should have been rendered by you.

General Liability covers your legal liability due to damage to someone else's person or property because of something you did wrong. It has to be your fault and you have to be responsible. Other things like slander, false advertising, products and contractual liability fall into this liability coverage. Of course, all insurance coverage is tempered by exclusions where other forms of insurance are more appropriate or where you intended to cause damages. It's always important to read your policy forms and know what you have and what you don't have.

Pollution Liability coverage is a separate form of coverage that some contractors might require of you, the land surveyor.

Employer's Liability is part of a worker's compensation policy and covers the employer for employee suits that fall outside the no fault provision of the policy.

Automobile Liability is for bodily injury or property damage when you crash into someone or their vehicle or their property. Buy at least $1 million in limits. Think CEO-driven Ferraris and school buses with children and consider umbrella coverage.

Umbrella Liability is the coverage you need to get your liability limits up to $2, $3 or $5 million more than you can buy in your general, auto or workers compensation policies.

Directors and Officers Liability is essentially professional liability or errors and omissions for the directors and officers that run your company.

Employment Practices *Liability* covers things like wrongful termination, age discrimination, retaliation, and sexual harassment. Claims for this and directors and officers liability coverage are occurring more often in today's tough economic environment.

Fiduciary Liability covers you and your company for claims from losses to retirement and profit sharing plans for which you are responsible.

You need to be careful because you never know where and when your claims are coming and how much they will cost you. You should always be aware of your liability possibilities and have proper and adequate general, professional and automobile liability coverage. ❖

TrigStar Answer Key
DISTANCE AC= 340.30'
DISTANCE AD= 363.97'
DISTANCE DC= 577.02'
DISTANCE BC= 327.27'
DISTANCE AB= 370.00'

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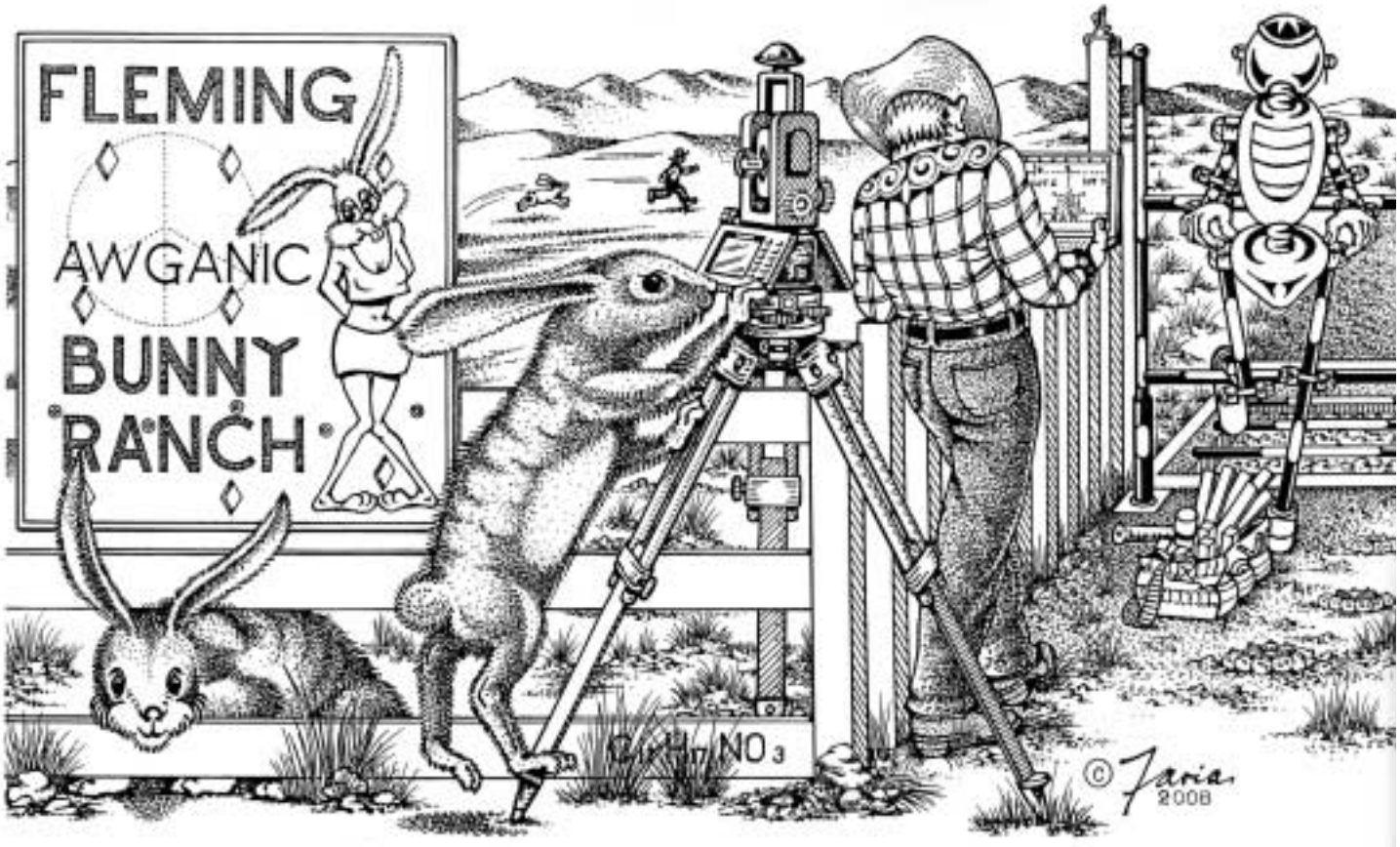
SUSTAINING MEMBERSHIP

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

CLSA Central Office
526 So. E Street, Santa Rosa, CA 95404
Tel: (707) 578-6016 Fax: (707) 578-4406

Sustaining Members



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2009 Complete Package (as above) plus CD	$40.50	$57.00	$80.00		
2009 Refill Package includes: PLS Roster, PE & PLS Act with Board Rules, Subdivision Map Act ***and Index*** and Misc. Statutes	$26.00	$36.00	$52.00		
2009 Refill Package (as above) plus CD	$32.50	$45.00	$64.00		
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