

SURVEYOR

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Broadband Linking In American Samoa Using Terrestrial Mobile LiDAR Scanning

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Broadband Linking in American Samoa, by Cyn Rene Whitfield



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

John works for the California Department of Water Resources in Sacramento, CA.

From the Editor

Interview with Raymond L. "Larry" Hyder, RPF

Larry Hyder is a Registered Professional Forester with a passion for finding survey monuments. In over 50 years of service he has recovered thousands of original Government Land Office (GLO) corners throughout California and the western states. Consequently, he is recognized nationally as a seminar instructor on cadastral research, survey procedures, and corner recovery. He has consulted and acted as an expert witness for U.S. and state agencies, private land surveyors, timber companies, attorneys, and title companies. The two most important mentors in my surveying career, Bud Uzes and Emerson Smith, both recommended (many years ago) that I make the effort to meet him. I finally took their advice and in June I met Larry and his wife Geri at their home on Indian Rock Tree Farm in El Dorado County. I asked him about his life of service and the reasons for his success.



Larry Hyder with collection of original PLSS monuments. The corner positions have been perpetuated with durable monuments.

John: Thank you for meeting with me today, Larry. I've heard many good things about you from surveyors I respect.

Larry: It's nice to meet you too, John. I enjoy working with surveyors; they are some of the best people to work for.

John: Why is that?

Larry: What could be better than helping a man retrace boundaries surveyed way back in the 1800s? What better way is there to be of service?

John: How did you get started?

Larry: When I was boy in Idaho I loved to walk the canyons and retrace Indian trails and emigrant trails. I found my first arrowhead when I was about ten years old and that hooked me on finding things on the land that other people miss. High school and college math provided the basic understanding of surveying. I received training in the technical aspects of surveying, photogrammetry, land modeling, and military-style measuring in Officer Candidate School while in the U.S. Army during the

Korean War. I used the training extensively during combat.

My first research jobs for finding corners were with the U.S. Forest Service in the 1960's. The Forest Service people said to me: "When you have run to your area of probability, spend two hours searching and write up your findings." That was the contract. That's where I had a chance to shine because I didn't care how long it took me to find the corners. I just wanted to find every corner that I possibly could. I'd go out into the field and come back maybe several days or a week later. When I turned in my cards, I'd found more corners than they ever expected me to find.

John: You have a reputation for finding corners that other people can't find. Tell me about a job of yours where the corners were thought to have been lost or never set.

Larry: There have been so many it's hard to pick one. There was a job where J. M. Anderson did the original survey of the south boundary of a township in the 1860's or '70's. Contracts were given for interior surveying of the township and these were awarded to Benson Syndicate surveyors. In one instance, the surveyor started from an Anderson corner on the south boundary but instead of going due north he ran north 45 degrees west about one-half mile. He then turned west, ran one mile and set three corners. Calls were good on this line. The remainder of surveying in his portion of the contract was fictitious. Please imagine the difficulty to locate these corners.

John: Yes, I imagine they would be difficult corners to find.

Larry: They weren't where people were looking for them. Of course that doesn't matter because the federal law is the position of the original corner is unalterable, even if it's not where somebody thinks it should be. The Bureau of Land Management contacted me because they were doing a dependent resurvey of the township. They had surveyed for miles and they looked for corners along lines where corners were supposed to be. They contacted me after viewing my records with the U.S. Forest Service, and they said "we know these corners are original, but how did you find them?"

With jobs like this I would often go to the oldest people in the area that are connected to the land. People like ranchers, farmers, and loggers. They can tell you things that you won't find in the survey notes. The Manual of Surveying Instructions speaks of the value of "dependable local residents." This job was near Georgetown so I went there and asked around for the oldest logger. When I found him I said, "I'm out there at such and such place looking for the section line and there isn't anything there." The old logger said to me, "Well, I'll tell you where those survey monuments are." You see he found one of those corners years ago and it was a half-mile out of position. He had the lumber company surveyors run through and pick up the other corners on the section line. They found the section corner, quarter corner and section corner and all of them were way out of position, but they were there and they were the original corners. They were found before I was there, but time was leaving very few "dependable local residents" who knew where to look.

Continued on next page



Scribed bearing tree.

After that I went out on the ground again and of course I had the original field notes with me. The east-west calls were good, with good land features. I stayed on the topo calls and ran the line with a compass. I followed the needle and found all three original monuments. Most of those oldest surveys were done with compass and chain so a compass is often the only way you can pick up the magnetic anomalies that affected the original surveyors. Another thing you have to understand when you're retracing these old surveys is that the surveyors worked under a contract and were paid by the mile. They made very little money and they had to get their work done as efficiently as possible because they had to pay their people. These are facts of life. So you have to take this into account when you're trying to figure out what they did and how they did it. For example, let's say they had to cross a canyon, which J. M. Anderson did right down here in Mosquito. They were sup-

pose to pull and level chain (link chain) everywhere, including canyons. You know what he did when he came to that canyon? He sent a man to the other side with a flag who was waved to alignment and to mark the point for continuing the line. With his base leg out, he was ready to triangulate. More accurate than chaining the canyon and the original corners were located.

When you're in this line of work you have to search for and study everything that you can get your hands on. You start with the original notes and plat but you keep looking for anything that might have useful information. Here's an example. Anderson had a contract to go down and survey a big part of Yosemite. In my research, I found a personal diary that one of the crew members kept during the survey. I located this diary through a newspaper article. A relative had this precious artifact and allowed me to copy it. It contains entries every day saying what they did and how many miles they ran, where they camped, what they ate, how they got their food. It tells all about the tricks they used when they did their work. By the way, they averaged 5.3 miles a day.

Anderson was a good surveyor but it took him a long time to pay his men and that was in the diary, too. His crew waited and waited to get paid. You have to understand what those surveyors went through if you want to find the corners they set. Listen to this (reading from the diary) "Today we went three miles east, one-half mile north, a mile south and a mile west." If you didn't know that, you'd have a hard time finding the corners they set. That's because if you follow the instructions in the Manual they were supposed to start here (pointing to a map) go over and tie this corner and then set that corner and then keep going and going. But in this case, they went three miles east, one-half mile north, a mile south, and a mile west, all in one day. You know why? Because they started the day on the top of an east-west ridge and that was the easiest and quickest way to get the most corners set in the shortest time. You have to look at all the facts. The government field notes showed the normal procedure. Eventually you get to know those old-time surveyors and understand how they did their work. That's the way you come to find their corners. I know J. M. Anderson better than I know you, because I've followed his work for so many years. I've followed him and know the idiosyncrasies of what he did and how he did it. He actually did one mineral survey on magnetic north in which he did not offset the declination. It was patented land and no one had put it on the ground correctly. Of course, it was the object of a fine law suit. I found the corners easily when I realized what he did.

Mr. Anderson lived in Placerville. Many years after death, his granddaughter came from Pennsylvania to attend to the matters of property and possessions. Somehow, I found out about her being here and scooted down to meet her. I suspected she was not overly fond of her grandfather. She did let me see many things, including his solar compass. It had been left in its case behind the house where blowing rain had badly damaged it. I can't describe my feeling. She showed me his 1855 manual and boxes of "papers". One box contained what a person dreams about finding. Mr. Anderson surveyed as many mining claims as anyone. The box was full of pieces of brown wrapping paper, each having the preliminary survey notes of a mining claim, including ties to section corners. Most, if not all, of these mines were not patented. You realize I was looking at the only record of that mining and survey history, including the super-valuable ties, to original corners. She gave me paper and allowed me limited time to copy. I made as many notes as I could. Some of his "peg" books were also there. Most surveyors know first-hand, or have heard, that peg books contain field notes of a township survey. They were then used to prepare the surveyor's records for submittal to the General Land Office. I had the opportunity to take these notes and compare them to BLM notes later. One interesting observation: The BLM record for a corner was "mound and pits." The peg book said "rock mound." I am forced to conclude with an unpleasant report. My attempt to purchase the survey records, manuals, or equipment failed. I am still mourning.

John: Your observations about the men behind the surveys raise an interesting question: What can you learn about somebody's character by retracing their work?

Larry: A great deal. Several original surveyors come to mind in regard to that question. One of the first would be James Freeman, in the 1860-'65 time frame. That man was so good, his notes were so descriptive. All his work defined perfection and attention to detail. Mr. Freeman was one of the few that reported all the magnetic anomalies, how many degrees, where they were encountered and what point he had back-sighted through them. I retraced portions of several of his townships and found every corner of his surveys. I have thought of Freeman many times, it was as if he drew me a map, exactly where to go. I will gladly tell you more while sitting by the campfire.



Rock scribed for quarter corner.

Figuring things out is the fun of it. Understanding the dullest details can help you find the real corners and save you from setting a new one in the wrong place. One time I was studying a GLO map for a court case in Orinda. I saw one little mark across the line that was not referenced in the notes. I thought, "Wait a minute. There are notes that I don't have or that mark would not be there because that's a call." I went back to the BLM office and started digging and sure enough I found another set of notes that turned out to be the key to retracing the survey. Because of one little squiggly line on a map, I found the corner and the "other side" did not. It was a beautiful rock scribed "1/4" in a rock mound. It decided the case. In a court of law, very often, if one point is incorrect, the entire survey is incorrect. This is the kind of research you need to do if you want to understand what those boys did on the ground and recover the corners they set. You have to get absolutely everything on the survey of that township that you can. Not just the field notes and the plat but the introductory notes too, and the resume of the township.

Continued on next page

John: The resume of the township?

Larry: The resume of the township.

John: I've never heard of that.

Larry: Well, shame on you. You want the resume that the surveyor made of the township because he tells you everything about it. In addition to soils, vegetation, the terrain, he tells you about the timber, he tells you about people living in the township and where their house was and sometimes even what they were doing. Some of that information is in the field notes, but you'll also find things that are not in the notes. You can get the resume of township when you do your research at the BLM. The introductory notes can be very valuable too.



John: I see you have an extensive collection of the Manuals of Surveying Instructions in your library.

Larry: Yes. They cover all the years of the surveys I've retraced. I wonder how many surveyors today actually read the old Manuals? You need to read the Manual that was in effect when the survey was done because it's important to know the instructions that the surveyors were working under, even if they didn't always follow them to the letter. And when you go to court to testify about an original survey you need to have anything and everything that's in the Manual that pertains to your survey. You've got to have that ready. I put markers on the pages for everything that I'm going to testify about and when it comes time, I open up the book and I read it. There have been some changes in the Manuals over the years. I think they have watered it down over time to make it easier for a surveyor to resolve surveys mathematically. Maybe that's not unreasonable but I would advise against rushing to mathematical solutions because many times evidence of the original corners can still be found if you know where to look and you know what to look for. I've worked with surveyors who were convinced they were in a fraudulent township because they couldn't find any corners and the original survey was done by the Benson Syndicate. But not all of the Benson work was fraudulent. (Editor's note: For more information on the Benson Syndicate see *Chaining the Land*, 2nd Edition, available on the CLSA website.)

By federal law, the positions of those original monuments are unalterable. It doesn't matter if the surveyors didn't set them the way you think they should have. My job, and your job too as a surveyor, is to find them. Unusual problems or difficulties should be reviewed by the BLM. The problem you run into, and this is heartbreaking, even though you have the truth and the facts sometimes the judge and the attorneys don't listen.

John: Can you elaborate?

Larry: The best example I can give is when my friend Emerson Smith (a surveyor in Placer County) had a case and he called me and said, "Larry, I'm going to trial in a couple of days. I don't think there's going to be a problem because I found the original corner. The neighbor's surveyor set a new corner in a different place, but I'm sure I have the original monument and I was hoping you could come over and take a look and confirm it for me." I said, "Absolutely, I'll be right over tomorrow." So, I went over and I looked at it and sure enough Emerson had the original corner and three of the bearing trees. I found a fourth bearing tree and dug it out so then we had all four bearing trees around this original corner. We also had a tie in the notes to a ditch and that fit too. But the neighbor's sur-

veyor didn't find or didn't accept any of that so he reestablished a new position, set a new corner way up the hill, and his client sued Emerson's client for \$2 million.

Emerson asked me to testify in court as to what I'd seen on the ground so I said, "I will." I went to court and brought the topog sheet and explained to the judge: "Your honor, this ditch that's called for in the original notes is still there. It's six or seven feet wide and it's been there for over a hundred years. And this original corner with four bearing trees is still there and it's tied to that ditch in the notes and it's the right distance. Here's something else I'd like to show you. Your honor, according to the topo calls in the original notes the new corner can't be in the right place because, if it was, the ditch would have to run water uphill and that's impossible". When I got through, the other attorney said, "Your honor, your honor, I move you strike his testimony." The judge turned to the clerk and said, "Strike his testimony." The man lost his land. He lost the case for \$2 million and the original corner was sitting right there. One of the great lessons to learn is the importance of locating an attorney qualified for your problem. In this case, it was our client's attorney's first trial. I could write a book on that trial.

John: That's a sad story.

Larry: It broke my heart. Justice was not done.

John: Before we wrap up I'd like to talk to you about your property a little bit because it is absolutely beautiful. It's obvious that you are inspired by a love for the land.

Larry: We sure are. We have about 40 acres of timber land here at Indian Rock Tree Farm and we take great pride in how we manage the land. Our property is home to many species of wildlife including deer, bears, mountain lions, foxes, coyotes, raccoons, rabbits, turkeys, and trout. A creek runs through the property and we've done extensive improvements on it over the years by removing woody debris, deepening pools and so forth. Today we operate a school to teach people how to fly-fish. The land didn't look anything like this 50 years ago when we bought it. It was a mess. It had been logged extensively and was very poorly managed. But today we can show our place as an example of the good can be done with the right land management practices. We have a motto that we've always had and always will have as long as the good Lord gives us the opportunity to manage these things: Leave it better than you found it. We love the land and the streams and everything that lives here.

John: Tell me about your Trees for Troops program.

Geri Hyder: We've been very fortunate and one way we try to give back to the community is to sponsor a program called Trees for Troops. We grow Christmas trees on our property and each December we send a little silver tip fir tree to each of the service men and women from El Dorado County deployed outside the United States. One year we mailed 85 packages but last year we were down to 40, which is good because it means many of our soldiers are coming home. The silver tips are very hardy and they do well with the mailing. Along with each tree we include cards and letters from the community, paper ornaments made by the Boys and Girls Clubs, candy, and other homey things for Christmas. Then we get these beautiful letters back from the soldiers saying how nice it was to



Scribing

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Left to right - Karen, Larry, and Geri Hyder.

have a real Christmas tree so far from home. They put the tree in their common room and the whole unit gets to enjoy it. So it's been a blessing to receive all those returns from the boys and girls. It really means a lot to them to know they're remembered. We've been doing this since the Vietnam War.

John: Thank you very much Larry and Geri. I'm so glad I finally got to meet you. ❖

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Kids Korner

Cris Foster at age 8 reading the rod so his father could set forms for a room addition at their home. Two years later his father had him turning T-2 angles for a job on Pelican Hill in Newport Beach. The company's Chief of Parties had an interesting reaction when he walked up with the notes and asked who instrument man was. Chris graduated with honors with a BS in Civil Engineering from Fresno State in 2000. Today he is both a licensed Professional Land Surveyor and licensed Professional Engineer.

Submitted by proud father, W. Tom Foster, PLS

We think this may be the largest plumb bob ever.

We discovered it outside the Wellington E. Webb Municipal Office Building in Denver, Colorado. Our research indicated that the plumb bob was a "Larry Kirkland Structure". Kids in the picture are (from left to right): Ian McDougal, age 5; Allison McDougal, age 8; Stephanie McDougal, age 10; Nicholas Toutges, age 7; and Alisha Toutges age 4. Our thanks to Jennifer McDougal, wonderful wife of John McDougal, PLS, Wayne Toutges, PLS, and Sherry Toutges, PLS were busy ogling the monument. The kids are also shown sitting next to the Mile High Mark on the west steps of the Capital building. Both photos were taken during a summer road trip to Denver, Colorado.



Submitted by Sherry Toutges, PLS



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.



U.S. Forest Service v. Newcomer Retracing a Benson Syndicate Survey

Some years ago I was hired by the U.S. Forest Service (USFS) to do survey research in the state of Washington. I was told the job was to help resolve one of the worst, if not the worst, survey problems they had in the USFS. Many townships were involved and all were surveyed by the Benson Syndicate. Some were partly good, others not even that. Early families had patented ranches and homes all over the townships. They managed to obtain descriptions from whatever or wherever. Some descriptions seemed to start from corners that were miles away from the property being described. Dependent resurveys eventually got under way and the records I was furnished were truly great. The Bureau of Land Management and their dependent re-surveyors set closing corners at private boundaries and monumented exterior property corners to protect the integrity of all private lands. Of course, the result was that old aliquot part descriptions did not fit the new aliquot part. However, that did not (or should not) affect the rights and lands of the homesteaders or the location of their home in the west.

Enter one gentleman whose father owned a patent on which he farmed and harvested timber. Some remnants of improvements on the property indicated someone lived there, maybe gardened. I could only guess and surmise. He willed the property to his son and in time, the son came to take his new possession. The son subsequently went to a U.S. Forest Service employee to learn where his "aliquot part property" was so he could see his land. The employee mistakenly directed the son to a section corner of the dependent re-survey, a corner which had nothing to do with the actual lands of his father. None of the few syndicate corners located in the township matched the dependent re-survey corners by location. The homesteaders were given aliquot part descriptions by the best knowledge and "guess and by golly" available at the time. Nothing of the father's land, corners, terrain, or description would match a description of the new dependent re-survey. The USFS employee, with a copy of the dependent re-survey in hand, performed his service in good faith and directed the son to land with the same legal description as his father's patent, but it was in a different location; the land was closer to the river and owned by the USFS. The son, we will call him Mr. Newcomer, liked what he saw and from then on he insisted that this was his property, even though others knew it was not and told him it was not the land his father had previously occupied. All attempts to explain the truth to him were to no avail. A lawsuit ensued and the Washington State court found in favor of Mr. Newcomer. The Forest

Service knew this precedent could not stand because every property in Washington with the same circumstances could, theoretically, move to a different location. For instance, some ranches on the river would move to steep forested hillsides. Another lawsuit to the higher court was sure to cure the problems, or so it was hoped. It did not. Mr. Newcomer prevailed again and at that point there was nowhere further to go under Washington State law.

It was at this point that a fine gentleman, a Washington State Forest Service employee, a surveyor, and a Christian man with a family to be admired, entered my life. His name is Steve Johnson. He explained this could only be solved by a Federal Court decision in favor of the true facts. My job was to do miles of retracement, but more importantly, they hoped that I could (1) find evidence that was not known in previous trials so as to convince Mr. Newcomer he was directed incorrectly, and (2) qualify the problem for a new trial in Federal Court. I accepted the job and my first move was to ask the government to agree to pay the fees of anyone I decided to bring in. They agreed. First, I knew I needed forester and surveyor Emerson Smith to help in the forestry research that I could see was ahead of me. He would be just the man for stump cruising and dating of logging operations on the property. Second, I wanted surveyor Homer Banks to help me analyze all survey information. I had worked on many research projects for Mr. Banks. I knew his qualifications from several years of association and he was the type that was never intimidated by anything or anyone. He passed away several years ago and I miss the man dearly. Any really tough survey work that comes my way, his memory appears again. Third, I asked Curtis Brown to be a helper and he agreed. I wanted any analysis he thought worthwhile. I knew we needed to get Mr. Newcomer away from Washington State and here at my place for a long conversation and I wanted Mr. Brown to join us. The government agreed to everything including Mr. Newcomer's travel expenses. The name "Curtis Brown" speaks volumes to anyone in the field of surveying. It was my privilege to be associated with Mr. Brown on numerous occasions, including testifying in court.

I knew Mr. Newcomer's father had logged the property and with Mr. Smith's talents, finding and dating log skidding injuries on trees, we determined when the property was logged. Emerson also stump-cruised the property and determined how much timber was cut. With the date and the amount, the search was on. The lumber company that

Continued on next page

logged and purchased the timber was no longer in business, but we found where their records were stored and gained access. We found records with Mr. Newcomer's father's name as owner and seller of the timber in 1946. Further, I was able to find the canceled check for the money his father received. This information was not known at the time of previous trials.

And so we had our meeting at my ranch with Mr. Newcomer, Curtis Brown and Homer Banks. Everyone knew our evidence would decide the case, but still Mr. Newcomer was not ready to let go. There were many twists and turns to the case, too many to mention, but in the end the USFS prevailed and everyone was very happy, except Mr. Newcomer. My own senior forester, Rodger Thompson, was invaluable on this project. Together we retraced many miles of Benson Syndicate surveys, most of which had not been dependently re-surveyed. It was a great learning experience. (We also fly fished the Entiat River.) We traveled back and forth for several years searching and researching. Mr. Thompson testified in the federal trial. I must say, the real hero of all this was Mr. Steve Johnson. He had really suffered through all the previous trials, consoling land owners, convincing his superiors what was necessary and how he proposed to move on. His meetings with Mr. Newcomer had not been entirely pleasant, but he never gave up and he pulled all the information together for trial. Mr. Steve Johnson, wherever you are and whatever you are pursuing, congratulations. You were the real hero. It was great to believe we might have helped. May God Bless you and yours. ❖

Letter to the Editor



Dear Editor,

I did a boundary survey this year where I thought that a corner record would be an acceptable document to file with the County Surveyor for the monuments I found and set in a record subdivision. There was a steep area of the parcel in the back that had not been built on or fenced for the 60+ years that the subdivision had existed. There were signs of ground movement in the area, cracked and displaced retaining walls 30' away or so, and settlement of nearby houses had been an ongoing problem according to my client.

Some of the original iron pipes I found were no longer in the correct position. I believed that they were correctly placed originally but had moved over time due to soil creep. All other monuments in the subdivision and outside of this steep area did measure correctly, according to the recorded map. When my corner record came back from first check at the County Surveyor's office it was accompanied by a letter which said that I was required to file a record of survey instead of a corner record due to the "physical change" my survey discovered. The record of survey was triggered by Section 8762(b)(1) of the PLS Act.

I made a request to the Board for Professional Engineers, Land Surveyors, and Geologists (BPELSG) to review this determination. It did and now I would like to share what I learned. Ric Moore, Executive Officer of BPELSG, responded to my request with a letter in which he answered several important questions, one of them being this: "What is the meaning of "...or physical change..." as stated in Section 8762(b)(1) of the PLS Act?" Ric also confirmed that a record of survey map is indeed required in cases like the one at hand. This letter, although it's addressed to me, contains information that I think any practicing land surveyor ought to find useful. I am, therefore, sharing it for the benefit of all.

Regards,
L. Paul Cook, PLS

Editor's note: Ric Moore's letter to Paul Cook is posted under "Articles" in the CLSA Members Site at www.californiasurveyors.org. ❖



Geography Quiz

By: Anne Hoppe, PLS and D.Germar Berthard, Ph.D.

Question:

Longitude is a function of time. Where are we?

Answer on page 34





By: Michael S. Butcher, PLS - President

Michael is Vice President of SB&O, Inc. in San Diego, CA. In addition to serving as CLSA President, Mike is also the CLSA Legislative Committee Chairman.

President's Message

With the year coming to a close, I would like to take this opportunity to thank those that have volunteered their time to CLSA and the profession. While I can't name everyone that has contributed over the past year, I would like to recognize the following individuals that served as committee chairs or liaisons:

Howard Brunner, NCEES-POLC Liaison

Curt Burfield, CalTrans Liaison

Dorothy Calegari, Conference Committee Chair

Jim Dickey, Scout Merit Badge Chair

Roger Hanlin, BPELSG Liaison

Greg Helmer, Advanced Technologies Committee Chair

Bill Hofferber, Education Foundation Chair, Membership Committee Co-Chair

Anne Hoppe, Monument Conservation Committee Chair

Ryan Hunsicker, GIS Committee Chair

Frank Lehmann, Nominating Committee, Past Presidents Council, Public Awareness Committee

Ray Mathe, WFPS Delegate

Michael McGee, CSRC Liaison

Rob McMillan, Education Committee Chair

Robert Reese, Professional Practice Committee Chair

Linda Richardson, Bylaws Committee Chair

Greg Sebourn, TrigStar Co-Chair

Jay Seymour, ACEC Liaison, Membership Committee Co-Chair

Aaron Smith, WFPS Delegate

Jeff Steffan, CEAC Liaison

Aundrea Tirapelle, TrigStar Co-Chair

Matt Vernon, NSPS Governor

Ryan Versteeg, Workshop Chair

John Wilusz, Cal Surveyor Editor

And, of course, I am happy to serve as the Legislative Committee Chair.

CLSA continues to serve as the premier voice of the land surveying profession due to of the many individual members that come together to form a team. The team keeps CLSA moving forward. Please make this coming year one of increased participation/involvement.

There are many ways to participate. Here are a few examples:

- Attend your local Chapter meetings and get involved. There are many opportunities to volunteer at the local level. Serving on a Chapter committee or as an Officer are just a few ways.
- Serve on one of the state committees listed above. Committee Chairs are always looking for new members.
- Get involved in outreach activities. Volunteer to attend career fairs, provide presentations to community groups, get involved with TrigStar, Scouting Merit Badge or Soccer Field Layout Programs. All of these help to provide public awareness of the land surveying profession

I personally encourage you to increase your participation with CLSA. My volunteer experience has made a positive impact on my life, both personally and professionally. ❖

CLSA
CALIFORNIA LAND SURVEYORS ASSOCIATION

Bay Area Career Fair

By: Theo Martinez, PLS

On Wednesday September 4, 2013, the Santa Clara San Mateo chapter of CLSA participated in the "Putting the Bay Area Back to Work" career fair at AT&T Park in San Francisco. The event was sponsored by KGO AM 810 Radio. The event also coincided with a live broadcast of the Ronn Owens show, including interviews with career experts. In addition to four licensed professionals from the chapter, the CLSA table was also hosted by representatives from California State University Fresno and Evergreen Valley College. Four student volunteers from Fresno State were also on hand to promote their school, their program, and their career of choice. In addition to hosting a table in the main career fair hall, a team of CLSA volunteers set up an interactive demonstration of land surveying in action. From the comfortable position of an AT&T Park luxury box, our team collected data for a topographic survey of the park itself. Overall, the career fair was a good learning experience for our chapter. We plan to participate in more career fairs in the future, especially those at high schools in our county. ❖



CLSA-BPELSG Hosts Delegation of Surveyors and Engineers from China

In September the California Land Surveyors Association (CLSA) facilitated a meeting between a group of surveyors and engineers from Jiangsu Province, China, and a group of professional experts from the Sacramento area. The Chinese group was led by Guisheng Yuan, Director of the Division of National Land Surveys, and consisted of 25 professionals from multiple Chinese jurisdictions. The group was visiting the United States as a cultural and information exchange event. Director Yuan contacted the CLSA as a result of searching the internet. CLSA and the Board for Professional Engineers, Land Surveyors, and Geologists (BPELSG) arranged the meeting at the Department of Consumer Affairs on September 27th. An interpreter bridged the language barrier, translating for the Chinese delegates and presenters.



Director Yuan

The California group consisted of the following:

- Ric Moore, PLS, BPELSG – Executive Officer
- Roger Hanlin, PLS, MHM, Inc., – CLSA Treasurer
- Rob McMillan, PLS, Chief, Training – Caltrans
- Kin Yen, Senior Development Engineer – UC Davis
- Joe Feyder, PLS, R.E.Y. Engineers – Mobile LiDAR Expert
- Patrick Tami, PLS, R.E.Y. Engineers – BPELSG Member
- John Wilusz, PLS, PE – California Surveyor

Roger Hanlin kicked off the meeting with a presentation on the purpose, structure, and history of CLSA. Joe Feyder, Mobile LiDAR expert with R.E.Y. Engineers, followed with a presentation entitled "Surveying Technology in Private Industry." Joe's presentation highlighted recent projects employing advanced technologies, including mobile LiDAR, combined mobile LiDAR and bathymetric surveys, and R.E.Y.'s real-time monitoring of the Labor Day 2009 Bay Bridge "Bridge Move." Rob McMillan of Caltrans and Kin Yen of UC Davis made a presentation about using LiDAR for analyzing the load transfer of the self-anchored suspension span during the construction of the new Bay Bridge. They also talked about using laser scanning to create as-builts for future bridge maintenance, and gave an overview of the partnership between UC Davis and Caltrans for the evaluation of emerging technologies and the development of survey standards in California.

Following the hour-long meeting, the Chinese delegates left Sacramento bound for San Francisco International Airport and their return flight to China, each with a copy of the California Surveyor, Issue #174 and a CLSA lapel pin. ❖



Surveying professionals from China enjoyed the presentations.

By: Cyn René Whitfield



Cyn René Whitfield is a nationally published journalist who has been involved in marketing for land surveying and 3D/4D laser scanning documentation for the past 29 years. She has a Bachelor of Science degree in Broadcast/Journalism, an Associate's Degree in Electronic Imaging and a Master's Degree in Managerial Business Communications. She is currently the business development coordinator for Terrametrix LLC (www.terrametrix3d.com), Omaha, Neb. She can be reached at cwhitfield@terrametrix3d.com.

Broadband Linking In American Samoa Using Terrestrial Mobile LiDAR Scanning

When the tsunami hit Japan in the spring of 2011, crews from Terrametrix, LLC and 3D Laser Mapping (3DLM) were in American Samoa setting targets and scanning for the design and placement of fiber optics for the American Samoa Telecom Authority (ASTCA). Terrametrix is a provider of terrestrial mobile LiDAR scanning (TMLS) and 3DLM is the developer of the StreetMapper mobile LiDAR system. The crews were working in the tsunami "red zone fallout" and not only had to prepare for a potentially life threatening natural disaster (a tsunami in 2009 killed 119 Samoans) they also had a project deadline that involved cultural considerations and limited resources.

A Long Trek to the Job

Despite American Samoa's remote location (it was one of the last island groups in the Pacific to be discovered) the trek from Terrametrix headquarters in Omaha, Nebraska was easier than it would have been for most mobile platforms because of the versatility of the StreetMapper system. The nearest major city is Auckland, New Zealand, 1,600 miles away. Honolulu is 2,300 miles away and there are only one or two flights a week so all tools used on the project had to be strategically flown in. "StreetMapper's portability is one of the main strengths because its adaptable platform allows installation on a variety of vehicle platforms in less than an hour," explained Michael Frecks, PLS and President of Terrametrix and a land surveyor for more than 35 years. "These expanded mobility options aid in efficiency and speed allowing clients to take advantage of Midwest cost-of-living rates for projects world-wide." Street Mapper's portability and versatility allowed it to be checked as baggage at the airport. This was invaluable for documenting American Samoa because of the remote location.



The islands of Samoa are the only U.S. territory south of the equator located in central South Pacific between longitudes 171° and 176° west and latitudes 13° and 15° south, what geographers refer to as the Samoan triangle. Seven islands make up American Samoa, five volcanic and two coral atolls, with a total land area of 76 square miles. Mount Pioa on the island of Tutuila is 1,718 feet high and is famously known throughout the world as "the rain-

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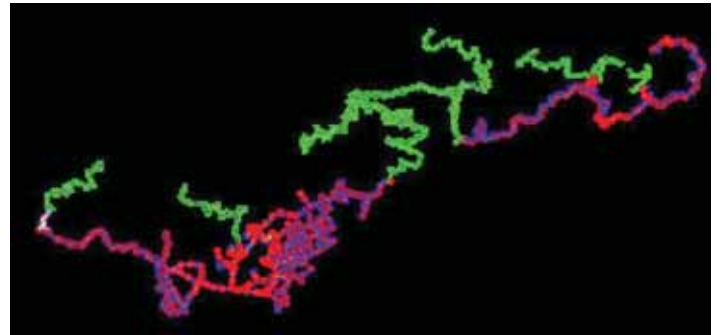
maker." The topography of Tutuila compared to the other Manua islands (Ofu, Olosega and Ta') is rugged with limited flatlands and few beaches.

The pace of growth and development in American Samoa has been accelerating in the 21st century. Cable television arrived in 1995, followed by internet service on 1996, and wireless communication in 1999. Now scheduled for completion in September 2015, the "Broadband Linking American Samoa" (BLAST) Project will replace ASTCA's old deteriorating legacy copper infrastructure with a more robust and weather durable fiber optic network. One of the conditions of the BLAST grant is that ASTCA must improve broadband capacity up to three times greater than it currently offers, at the same price it presently charges. This new fiber network allows ASTCA to better to withstand extreme weather conditions, enable advanced early warning systems, and provide reliable services to the country's anchor institutions, including local government offices.

Project Planning and Scope

The Terrametrix/3DLM team had 11 days in March of 2011 to place more than 900 targets and scan the roads to document 120.7 miles on three islands for the purpose of updating the islands digital infrastructure. In 1900, roads were mere trails around the coastline of the bay area. It isn't much different today than it was in 1907, when Governor Moore declared that America Samoa had over 30 miles of "fairly good" roads (including the McKinley Memorial Highway completed that year.)

"What we saw in infrastructure was a combination of dirt paths and urban paved streets," said Todd Gnuse, Data



Color coded phases of targeted areas for LiDAR scanning.

Acquisition Manager for Terrametrix. "It was evident that our mission plan and targeting would require a surveyor's approach and a lot of footwork." Therefore, communication was key to coordination of targeting and collecting xyz coordinates. Daily morning meetings provided the LiDAR data acquisition plan with the route provided by the client. The goal: to obtain one (1) foot contours and 75 foot width each side of the centerline without cultural interference. Cultural considerations also required communication using a local guide and pre-publication of activities to the public prior to the work.

Cultural Considerations

Samoan's are very religious. They have a rich culture of Polynesian descent developed over some 3,500 years and have largely withstood interaction with European cultures. The team needed to be non-invasive. Each day a "sa" (curfew) is imposed

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Targets placed for TMLS data acquisition had to be modified to a version that looked less like a cross in order to be sensitive to Samoan culture.

during the evening prayer. Sunday is their day of worship, so no work could take place out of respect to the people. They are deeply committed to the teaching of Christianity. The basic unit of the culture being family living in villages of relatives supporting land tenure practices. The 65,000 Samoans that populate the island use the Samoan language in daily exchange; English, however, is the official language. "The interpreter assigned to us on the island of Ofu was a crucial part in making sure we didn't inadvertently place a target on a sacred area," said Frecks. "Local customs included the proper dress, nothing exposed below the knees or on the shoulders. Even moving a coconut that had fallen had cultural and spiritual significance."

Setting Targets for Scanning

All targets placed throughout the island required consideration of GPS availability in a tropical environment. These ground truth points were used as control for scan data for detailed mapping of the entire corridor to a planning grade of 6" absolute accuracy. "Our approach to acquisition was similar to an urban environment because of the steep hills and foliage that limit GPS," said Frecks.



Target and scan plan meetings took place between Terramatrix, 3D Laser Mapping, Mid-States Consultants and the American Samoa Telecom Authority every morning and every evening.

"GNSS multipath can cause large errors that are difficult to solve, but a significant reduction in accuracy arises when there is no GNSS signal at all. Yaw, pitch and roll data supplied by the IMU aids traditional GPS navigation via intelligent algorithms. When there is no GPS, the system relies on the IMU and DMI for short periods of distances." In addition, Direct Inertial Aiding (DIA) technology has been developed to improve the accuracy in these conditions. DIA works by configuring the IMU to send real-time posi-

tional information to the GNSS receiver. It is similar to dead reckoning in real time but requires only 1 second to reacquire lock as opposed to 6 to 10 seconds. Procedures employed by Terramatrix to maintain the accuracy of the scans included strategic target spacing: Approximately 1,320' in good GPS areas; 660' in less than optimum GPS; and 330' in areas of dense overhead vegetation.

Deliverables

The Terramatrix/3DLM team collected 500 GB of laser scan data for a visual record of corridor conditions for engineering and construction work post-processed and geo-referenced to control targets. From this data a detailed planning grade GIS 0.5' accuracy model with visual inventory of all right-of-way features in AutoCAD plan & profile sheets were developed.

Notes from the Author's Journal

Following are excerpts from the journal the author kept during her stay in American Samoa.

Day 1, Friday, March 4, 2011

Arrived in American Samoa last night after a two hour flight Omaha to Phoenix, a six hour flight Phoenix to Hawaii, then a five hour flight into American Samoa crossing the international date-line.* Mike and Todd are having network connection problems with their computers, giving insight as to why we are here. I find I left the chargers for my personal camera in the states. There is nothing on the island but a run-down Costco in an open air warehouse and an Ace Hardware. I can see now why we had to fly in our target paint.



One of the better roads. Graffiti on the palm tree indicates the pride that American Samoan's have in being a U.S. territory in the middle of the Pacific Ocean.

The team took a project tour of half the island. The island communities (wards) are similar to our western divisions of counties each governed by a chief who decides who may build a residence. The chief retains the rights to the property. Members can be ostracized at any time if rules are not followed. The natives bury their relatives in crypts, mini-cemeteries at their front doorsteps, often covered with mattresses where the living sleep, staying close to their deceased. The food at lunch was a local fish, Hope (not the Oka fish we were warned to steer clear of), and it was pure and fresh. It saddens me to think how much flavor we lose in the states

Continued on page 18



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- when it has to be **right**



in the name of preservatives. The roads are in worse condition than we saw in the preplan permission footage. I truly believe we are the only team in the world that can pull this project off given the conditions. Hotel is nice, The Trade Winds, roosters crowing at sun-up. I am on main floor, Todd and Mike on 3rd floor. The client provided me a cell phone for island use and GPS tracking, grateful they took the extra step to ensure my safety and location. As the only female on the crew it is something the culture is not accustomed to but the crime rate here is practically nonexistent. Traditionally, women are skilled at raising children, weaving mats, making siap (island bark cloth), sewing (lots of sewing businesses), tending gardens and fishing for shellfish on the reefs. There is a military base where the Apollo 13 astronauts were first taken after their eventful "successful" failed mission. Last night the hotel hosted a junior high school prom. It was a kick to see a native prom. The fashion was typical island flair and flip flops with their lava-lavas, a native wrap fabric worn by the men.

**Editor's note: The International dateline was moved to the west side from the east side of the dateline skipping December 30, 2011*

Day 2, Saturday, March 5, 2011

Colorful laundry swaging in the breeze, tribal school uniforms identify each ward by the color of the laundry on the line. Tomorrow we start painting targets doubling the anticipated number of targets because of GPS issues. I am learning much about the culture here, asking probably too many non-project related questions wanting to learn about this amazing place. The beaches are black lava of very large composites. Finished last project tour on the eastern shelf of the island today. It was slum-like conditions with trash littering the roadside, much like we had in the 50's and 60's until Ladybird Johnson made America aware of their environment. In 2010, American Samoa became the first state territory in the United States to ban plastic bags to help protect marine life. The real species that warrant protection lies off shore in the magnificent coral reefs, having the greatest coral biodiversity in the world with more than 200 different varieties of coral and 890 species of fish. Weekends, like in the 1950's back home, are family time. I am learning much about the people here but even more, so much about myself, who I am and how I got here.

Day 3 Sunday March 6, 2011

Running behind this morning, third day time difference caught up with me. Today was a sacred day for the communal land so only four of us worked half day targeting the commercial areas. The closer we got to the churches the more anxious our guide got. Daily rain starts around 11:30 lasts about an hour, lunch time. When it rains it rains hard. April through November is considered the rainy season contributing to the 200 inches of annual rainfall. Temperatures average 80 degrees. We set about 114 targets out of the 1000+ we perceive we will need for control.

I talk to everyone. There is a joke at the office that I know more people than the natives. Working lunch was at Sadie's by the Sea, the only resort type hotel remaining from the 60's when American Samoa was a US tourist destination accessed by Pan Am. Pan Am stopped service and tourists now frequent Western Samoa, about 60 miles north but it is not American owned. American Samoa still has the support of a monthly cruise ship promoting local tourism. We are not staying at sea level, instead at a higher elevation to protect the equipment. Anything higher than a 25 foot surge will cause concern. These are not usual project planning considerations. Lunch today was taro in creamed coconut sauce, a local root prepared tastes like a cold scalloped potato. Excellent!

Day 4, Monday March 7, 2011

Target total up to 300 today. In bad GPS area we set targets every 300'. Age plays a role in the hierarchy of an organization. The older you are the more respect given. Todd says his crew has that testosterone work thing going. On my crew, Sasaji (Junior)



and Galen, were both so polite and over accommodating not accustomed to a woman on the crew. It was refreshing, at first, but then it started to interfere with the job I was here to do. It is the way they are brought up with respect to their elders and women. They call me "Big Mamma" (ugh). Lunch today was a locally caught Wahoo grilled fish sandwich. All the laundry on the lines in every ward was mostly white because at church yesterday they wore pristine white, so of course Monday's laundry is all white. I had to laugh thinking if it had been mine laundry back home it wouldn't see my washing machine for at least a week!

Continued on next page

Day 5 Tuesday March 8, 2011

The StreetMapper guys with 3DLM flew in last night and had the system installed on the vehicle and running by noon. We have a total of 526 targets set, will finish the main island tomorrow. Small buses with colorful graffiti style-paint take workers and school children in their color coordinated school uniforms to and from town. There is no schedule and no set fee for the buses. Local families run the buses at leisure. You just hop on, pay the driver whatever! Today, so far was my favorite, yet most challenging day. Started the day with a 7:30 am planning meeting... in the field by 10:00... worked until dark. We worked next to the beach and then up the hills walking at times a 14% grade. Darkness brought out fruit bats the size of chicken hawks in Omaha. Despite the tropical environment, there is no threatening wildlife. A local boy caught a baby bat, wrapped it in an island leaf and was carrying it around like a pet! Lunch today was at the commercialized Carl's Junior. I wanted more island flavor. Junior was thrilled. I don't think they eat out much. Junior is American Samoan native who spent seven years in San Francisco. He taught us the traditional Samoan hello wave and an excellent guide interpreting Samoan language for us. This morning 70 GI's from the Air Force stationed out of Des Moines, Iowa, invaded the recluse of the hotel! Their C5 lost an engine flying from Port Prince, Australia and made an emergency stop. How bizarre that, in the middle of the Pacific, we are surrounded by neighboring hometown lowans. It was a sharp cultural contrast: the brashness of Americans versus the politeness of the Samoans.

Day 6, Wednesday March 9, 2011

The plan is to target the other two islands Friday where there is no internet or cell communication. We have had to refresh some of the targets for the StreetMapper scan crew in certain areas of Tutuila because of blowing sand and rain. Tutuila done today... 723.



StreetMapper TMLS system at the legendary "Turtle and the Shark" Tutuila along the black lava coast of Vaitogi village

Today, a dog wanted to take my leg off. We were warned about the wild dogs on the islands; they are our biggest safety concern. Do not approach them or turn your back on them. Junior gets out of the truck with the sweep broom, using the broom for protection not for sweeping. They seldom sneak up on you however, as their bark is first warning. I learned about the most famous legend of Tutuila along the black lava coast of Vaitogi village. Though there are many different versions, the most popular relates the story of a blind lady and her granddaughter, who during an extreme time of hardship and starvation, leapt from the cliffs into the ocean to avoid starvation after being turned away from other villagers. Magically, they turned into the turtle and the shark. School children today gather at the legendary site and stand on the cliffs looking out over the ocean at Vaitogi and sing the legend of the turtle and shark.

Day 7, Thursday March 10, 2011

We walked five miles setting targets every 300 feet because of the tropical tree canopy. Junior told us about the day the tsunami hit his village running uphill for safety at a fence holding on for dear life. You can still see the devastation on the west end of the island consisting of five 15 - 20 foot waves and multiple aftershocks that hit the south side of the island. Galen told us about how his grandmother died in Zone 5 in the same 6.7 off-shore earthquake that surged 50 feet. They carried out the dead placing them in refrigerator freight cars. Some Samoans are still living in FEMA tents, a dichotomy to see such worn conditions in a beautiful environment. Ironically, I came back from targeting the main island turned on the television and CNN was reporting that a Japan earthquake generated a huge tidal wave up to 33' high at peak point sweeping across the northeast shoreline of Japan, emanating to areas as far as Hawaii and American Samoa. When the crew arrived back to the hotel we watched in horror knowing Todd was taking data back to the states through Hawaii tonight on the 11:00 pm flight.

Day 8, Friday March 11, 2011

Todd safely stateside. The Pacific Tsunami Warning Center (PTWC) issued tsunami watches for our area. We had to postpone our trip to Ofu. ATSC members from our crew were on emergency response throughout the night and until 9:30 pm tomorrow. Spent the morning refreshing targets on the western side of Tutuila. We had just finished lunch at McDonald's in the harbor port of Zone 5; the Samoan burger (double cheese burger with a fried egg). Mike had noticed local police scanning the sea horizon all through lunch. After lunch, we uncovered the system and the scan crew (consisting of Galen and Andy) were in front of us headed to check the base station located on the harbor docks. Galen likes to blare the radio with Lady Gaga when they work; "Just Dance" was playing. Junior, Mike and I were in another vehicle. I had the windows down running video without the radio to capture the local sounds. Then... civil defense loud speakers announced "move away from the water and seek higher ground immediately". I saw fear in my Samoan's guide eyes. The locals had no clue what these warning sirens were as this was their first sounding since the deadly tsunami in 2009. They hadn't even been tested yet. To Junior's credit, he immediately took us straight up the mountain safely at the Community Christian Church of Samoa. Its gleaming white cross was a calming sight at the top of the mountain with our eyes

Continued on next page

peeled on the horizon. Blue Sky wifi that services the island was strong here allowing us to let everyone know we were safe though email. Junior was antsy. I told him we were ok and if he needed to go to his family he should. He insisted we were his responsibility. He would not leave. "No mam. My crew is where I must be. Boss man, (what he called Mike) needs me here." After many reassurances Big Mamma told him to go and he did. When he returned we learned his sister and aunt were in Zone 5 and he went to get them. Amazingly, we would have had time to grab them on our way, but his duty was to us. He is an honorable young man. Samoans have amazing loyalty.

We are on hold. The internet is jammed. Expecting a surge here around 5:30 our time. We are very concerned about Chris Cox, from 3D Laser Mapping, who is in the southern Tokyo area. In the end, on the island of Tutuila we encountered a 15 inch surge recorded in Pago Pago Harbor at 4 am and then another 19.6 inches surge an hour later. The damage to the island was nonexistent but to our crew it was an experience that will haunt us forever.

Day 9, Saturday March 12, 2011

After a very emotional day there is a calm here... no rushing... no sirens sounding. We headed to the smaller island of Ofu, a twin island of Olosega, about a 30 minute flight. Junior says the island white beaches are haunted supposedly from crushed bones of previous battles, a story perpetuated no doubt because all the surrounding beaches are grey or black from volcanic ash. One of the local marine specie abundant off-shore, the parrot fish, is responsible for the white beaches. The coral consumed by the parrot fish is excreted as coral sand which makes up the magnificent but selective beaches on the island. There is a strict protocol what we can and cannot do when we are on Ofu. All foliage is sacred. Even purposely moving a fallen coconut is messing with spirits and strictly forbidden. There are numerous stories about strange events that happen on Ofu. I thought the tsunami was my



biggest fear!!! Not one of the 26 residents on the island speaks English, except the caretaker of the American Park Service of American Samoa. It didn't take long to target and scan the three miles of Ofu so we watched the 3DLM guys play with a shark in shallow water. Returning to Tutuila Junior took us to the bay to watch long boat practice, an annual major sporting event on the island to take place next month. It is quite a site, 45 guys in unison in a boat rowing. The whole community comes out every Saturday night to watch, families gathered everywhere. Spontaneous football games, volleyball games, the parks were full, people sitting on their front steps. It was a throw back to our culture in the 50's before garages replaced the front porch and people retreated to their back yards and inside air conditioning. What a sad society we as westerners have become. The people here are poor, the nature is spectacular, the environment is challenged, yet there is united sense of community.

Day 10, Sunday March 13, 2011

A stand down day. I have yet to touch the water. We attended a two hour communal church service in native Samoan that was very spiritual. I will never forget the kindness, the white hats, the heat and the sense of family. The preacher introduced us to the congregation. We stood out like westerners in our colored garb. Junior interpreted much of the ceremony but we were able to follow along even without his help, some things are universal. Junior secured a palm leaf fan for me as the open air was stagnating. Many of the people came up afterward to talk and it was a fabulous morning.



Day 11, Monday March 14, 2011

Today, for the first time I stepped in the Pacific Ocean off Samoa into 6' to 12' waves. At lunch I saw a primitive tattooing, the oldest form of Samoan art, being applied with native ink, a stick and a mallet. I have made many connections, both spiritually and kindred, and will be saddened to leave them behind. Some will always carry with me but most grateful I am involved in a profession that allows such experiences. These people know what is important. It is bittersweet what we are here to do: Provide documentation so telecommunication lines to remote areas may interfere with the way of life I experienced here.

Postscript

A year after the Terrametrix/3DLM team documented the islands, the broadband firm, Calix Professional Services, of Petaluma, California, was awarded the network engineering, furnishing, and installation services. Samoa News reported the project was funded with a \$91 million grant and loan stimulus money from the U.S. Department of Agriculture's Rural Utilities Service through the Broadband Initiatives Program as part of the American Recovery and Reinvestment Act of 2009 (ARRA). In addition, ASTCA matching funds of \$4.462 million, elevating the project approved budget of \$95,496,763. ❖



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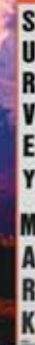
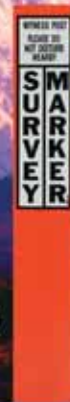
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By: Greg Helmer, PLS

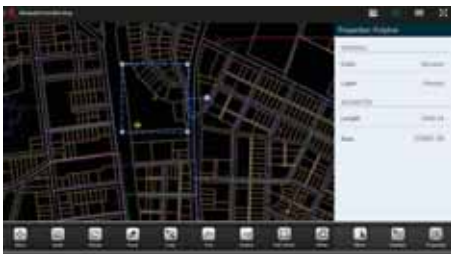
Mr. Helmer is a Professional Land Surveyor in four states with over twenty-five years of experience in geodetic control, surveying geomatics and GIS. As a Senior Vice President with the firm of Michael Baker, he has been an innovator for advanced technologies. He is nationally recognized for his contributions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

Geospatial Mobile Apps

App Name: ArcGIS
Developer: esri

"The ArcGIS App is a part of the ArcGIS platform and is a great way to:

- Discover and share content by browsing map galleries from ArcGIS Online or leverage services from your existing enterprise GIS.
- Collect, edit, and update features and attributes.
- Use tools to search, identify, measure, and query.
- Develop a custom application or brand your own application specific to your business needs."



App Name: AutoCAD 360
Developer: Autodesk

"AutoCAD 360 is a free*, easy-to-use drawing and drafting mobile app that allows you to view, edit, and share AutoCAD drawings—anytime, anywhere. Simplify site visits and fieldwork with powerful design review and markup tools—available online and offline. Seamlessly share drawings with others across desktop, web, and mobile devices. Easily access drawings from web browsers using the free companion AutoCAD 360 web app. AutoCAD 360 Pro subscription plans further expand the functionality of the app, bringing additional capabilities to the field."



App Name: Clinometer
Developer: plaincode

"The clinometer * app is the (hopefully most accurate) slope finder tool for any mobile device. It can be used for simple applications like aligning a frame as well as for more sophisticated fields of applications where an arbitrary slope needs to be measured exactly. It is designed to be as accurate as possible (normally in the range of ± 0.1 degrees, although this might depend on the device).

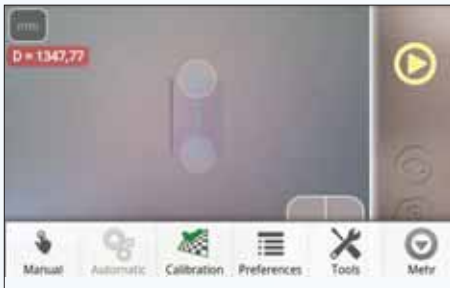
With this tool, the slope can be measured by all edges of the device in every direction. When the device is put flat on the table a bubble view will fade in."



App Name: Mobile Data Collection
Developer: GIS Cloud

"With the addition of this app, enterprises can instantly create media rich, mobile applications that manage, analyze, share and publish field data and make it instantly available to co-workers on other job sites on tablets, supervisors in the field on laptops, or managers in the office at their desk."

Continued on next page



App Name: Laser Distance Meter
Developer: Vistech.Projects - Android OS only

“Laser Distance Meter is a camera distance measure tool for quick estimation of distances and length. You can use any reference object with known size for measurements. Laser Distance Meter has also automatic mode with image processing where you can make a measurement with only one click!

Any android camera device, phone or tablet, can be used for measurement. Just follow the procedure to calibrate your device and you are ready to measure distances to any object with your camera.

Using standard objects like car, window, golf flag, human height, etc. as a reference you can measure distances to them - just select custom option and enter an object size value.

LaserDistanceMeter has a list of commonly used reference objects like credit card, Letter or A4 sheet, coins, DVD disk, etc.

The App shows measurement results in different units: meters, millimeters, centimeters, feet, inches based on user settings.

There is an option to make a picture and work with the still image instead of live camera view, Zoom View feature helps to align object boundaries accurately.”



App Name: NGS Control
Developer: Software Workroom - Android OS & Windows Phone only

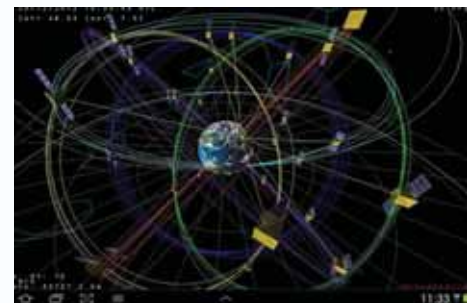
“NGS Control Points from Software Workroom helps you find nearby survey control points by utilizing your current location on a map to perform searches in the field directly against the National Geodetic Survey’s station database. Find survey control points using a radial search from the map’s center point or use the bounds of the map to determine the minimum and maximum latitude and longitude to define the search criteria. Use the on-board GPS receiver, the map results and a “current location marker” displayed on the map to aid in finding control points. View details of any selected survey control point by tapping on its pushpin on the map and then jump directly to the NGS datasheet if additional details are needed.”

App Name: SimGPS3D
Developer: JTO - Android OS only

“SimGPS3D is an application that gives a view of global navigation satellite systems (GNSS) in 3D. GNSS, such as US GPS or European Galileo or also GLONASS...”

The application depicts and simulates such systems in a 3D environment. Different modes allow to have a real-time representation of the system, with:

- computation of the visibility for each satellite with respect to the user position. You can find out exactly which satellite is flying above your current position (provided a GPS is available and enabled on the device)!
- computation of the precision (DOP).
- computation of satellite attitude control (earth pointing and solar panel rotation to maximize illumination and power as it would be done in reality).
- update the constellation status with almanacs (the app downloads the latest almanac on user request).
- use the touchscreen to zoom in or travel around Earth, or the Moon! As you travel around, take a minute to observe the sky and identify some constellations...
- click a satellite to have its information.
- (NEW) Add your customized spacecraft constellation!



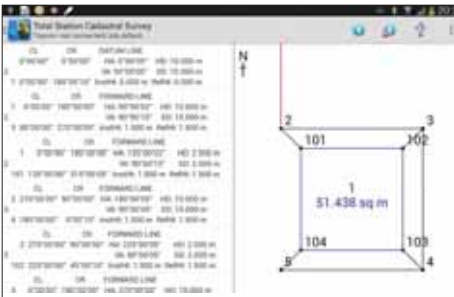


App Name: Theodolite
Developer: Hunter Research & Technology - iOS only

"Theodolite is a multi-function augmented reality app that combines a compass, GPS, map, photo/movie camera, rangefinder, and two-axis inclinometer. Theodolite overlays real time information about position, altitude, bearing, range, and inclination on the iPhone's live camera image, like an electronic viewfinder."

App Name: Total Station Cadastral
Developer: Systranova Software - Android OS only

"Total Station Cadastral Survey Apps is designed to assist Land Surveyors to perform Cadastral Surveying. [Using USB or Bluetooth connectivity to an existing total station instrument.]



Features in this Demo version:

1. Measurement using CL or CL and CR (circle left & circle right).
2. Adding Station for survey or start of survey.
3. Using/Adding Code/Mark.
4. Defining Lots or Land Parcel.
5. Measuring Topo Points.
6. Stake Out.
7. Survey Data Observation view and Survey 2D Map View.
8. Export Observation Data to GTS7 and CSV file formats.
9. Export Stations Data to Coordinates XYZ file format
10. Export Topo Points and Lot Information to CSV file format.
11. Backup/ Restore to XML file format.
12. Create Points by Point Offsets, By Line Offsets and by Line intersect.

Connectivity:

1. Bluetooth
2. USB Serial Adapter Cable. Please goto www.systranova.com on use usb serial connection.

Supported Total Station:

1. Topcon. including Topcon-Sokkia and Topcon-Gowin.
2. Nikon
3. Leica
3. Sokkia SETX"

App Name: Metes and Bounds
Developer: Sandy Knoll Software

Metes and Bounds is a COGO App developed from Sandy Knoll's more comprehensive desktop software. It runs traverse closures and plotting with several features specifically focused on deed descriptions.



The foregoing descriptions and commentary are excerpted from each software developer's posting, so obviously no endorsement is offered by the author, the Advanced Technologies Committee, or CLSA. Frankly, some of these apps are little more than survey-related diversions, but that's not the point. The significance comes with the potential that is revealed as developers apply ever more capable data capture, processing and communication capabilities

to familiar tasks. Surveyors are a mobile workforce, so by definition the more enabled they become through remote access to critical data and through integrated imaging and measurement sensors, the more effective they can be onsite in real time. We would all do well to experiment and play just a little more, with the idea of understanding better where mobile technology is advancing.❖

By: Dan Gregory, PLS and David Karoly, PLS

Dan Gregory and Dave Karoly work for the California Department of Forestry and Fire Protection (Cal Fire) in Sacramento.

Cal Fire Surveyors Build Cool Toolbox

Editor's note: Through the grapevine I heard that two Cal Fire surveyors did a great job building a toolbox for their survey rig. I went to go see their handiwork for myself and was not disappointed. Here is what they had to say about it.

What sparked the project is that we were unable to find a commercially built truck organizer that would accommodate the diversity of our equipment; we use many different tools because of the great variety of projects we take on. Another incentive for building our own toolbox was the high cost of commercially available products: A basic organizer starts around \$2,000 and skyrockets up from there; NOT IN OUR BUDGET! Given all that we felt that building our own box would be the best option for cost and function, especially since we were willing to use our own per-

sonal tools to construct it, and we didn't mind donating some personal time to the effort as well. Dan started experimenting with designs at home and periodically brought his ideas into the office to collaborate with Dave. We finally settled on the design shown. We ran the idea up the flagpole, waited for a couple rainy days and built it in Dave's garage. When it was all said and done, we had less than \$400 in materials in the entire project. The biggest expense was 6 sheets of 3/4" plywood, none of which was wasted; we finished with just a few crumbs left. ❖



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Geography Quiz Answer From page 13

By: Anne Hoppe, PLS and Germar Berhard, Ph.D.

Right: 0 Degree Longitude
Monument in Greenwich,
England

Below: Flamsteed House



In 1833 the Time Ball was set on the roof of the Flamsteed House in Greenwich. It was originally a visual time signal for navigators on the River Thames. Greenwich became responsible for the distribution of time. The ball drops at exactly 1:00 pm GMT everyday (except in windy weather). GMT was based on celestial observations from the Prime Meridian until 1954.

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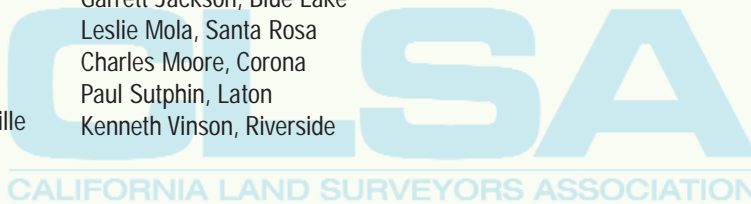
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September 20, 2013

Veterans Affairs Approves CFedS Program

The Certified Federal Surveyor (CFedS) Program has been approved by the U.S. Department of Veterans Affairs (VA) for reimbursement of the fees for the Program's final examination and continuing education tests.

You can receive GI Bill reimbursement after you submit proof of payment to VA. Past, current, and future CFedS Program-eligible participants should contact VA for additional information at: <http://www.gibill.va.gov/> (The Facility Code is: 46002309.)

The above is posted on the Certified Federal Surveyor Program website at: <http://www.cfed.org/>

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RISK MANAGEMENT FOR LAND SURVEYORS

Why You Should Care About Obama Care (Or At Least Check It Out)

Obama Care, also known as the Affordable Care Act (ACA) is, as you all know, the focus of major government disputes but for now it is the law and is moving forward with sign ups. It would be a good idea for you to check it out and see what it's all about. It might work for you and your employees. Log on to covered-ca.com and see for yourself.

The web site is a bit confusing since there are a good number of companies offering 14 options from bronze to silver to gold to platinum, with deductible ranging from \$0 to \$5,000 and paid coverage from 60% to 90%. In California the coverage depends on geographic area, the company and plan selected, deductible, income, and covered members.

You can rate it yourself. Take your time, review all your choices, be careful and remember that, in spite of what everyone says, the program may not go forward right away. Here's what I found. For a 45 year old male that doesn't smoke and earns \$50,000 a year and wants a mid range Silver plan with a \$2,000 deductible and 70% coverage, the premium will be around \$500 a month.

Don't forget, there can be penalties and subsidies that are available. Some say this is the most complicated health insurance plan ever devised. There are, however, good things: kids can stay on their parent's health insurance until they are 26 and there are no restrictions for pre-existing conditions. Because of these, and other broadened coverages, the plans may not be properly priced and underwritten but we know the government is used to writing and paying for insurance that loses money, such as the flood and terrorism insurance plans.



Tail Coverage

What is this tail coverage you've been hearing about? It's officially called Extended Reporting Period and it's something you should consider buying when you retire. It's based on your final professional liability insurance premium. The first 12 months will cost 100% of your total annual premium and, if no claims are filed, 24 months will cost 150% of your annual premium, 36 months will be 200%, 48 months will be 225% and 60 months will cost 275% of your total annual policy premium. How much should you buy? It depends on the kind of surveys you do, how you feel about your clients and if you suspect that there may be any suits pending. Remember, you might not be specifically sued but may be part of a suit against your contractor or client and because your name shows up on the contract, you will need legal help to get out of the lawsuit.

Life Insurance - Who needs it and why?

There are many good reasons to buy life insurance: for your family, for your business and to help you borrow business money. For yourself, you should consider insurance worth 7 times your annual salary or income to provide for dependent's education, final medical bills and estate taxes. For your business, especially a partnership, consider the cost to fund a buy-sell agreement, so that the surviving partner can buy the business without having to liquidate it. Also, having adequate life insurance can often help you get a good business loan.

Insurance Premiums Going Up? Yes, Again

Guess what? They keep going up. Consider adding another 7-10% to your premium costs when budgeting for your next renewal period. And, as always, don't forget to continue your good, careful risk management and loss control practices which add to your overall professionalism and continued success. ❖

San Francisco Treats



The adage is: "Never meet your heroes." Following is an excerpt from an article published in the San Francisco Chronicle, June 8, 1887:

Charles Holcomb who was supposed to have held the contract for the surveyor and who should have made it, testified before the Grand Jury that he was paid \$100 by Benson to go up to the place and put stakes in and that

he got them as near right as he could, but he had never been in that section before he made that trip. The same man, Holcomb, testified that he was in the employ of Benson for several years in this city in a back room, making up field notes for surveys supposed to have been made in the field.

Special Agent Conrad compiled a list of J.A. Benson associates and employees and his list shows that Charles Holcomb was an employee for eight years and that Holcomb had worked on 6 contracts for a total amount of \$45,634.12. The USFS determined that the Entiat Valley surveys were in fact surveyed by Charles Holcomb. Holcomb had his signature notarized by Harry

A. Clarke on another township nearby. Holcomb stated that he had never been a Deputy Surveyor. Although, there were over 70 township contracts in his name.

Date line: San Francisco, 1892 Charles H. Holcomb testifies in the Benson Syndicate trial. This testimony is given only a short time after Mr. Holcomb became licensed in the first group surveyors to be licensed by the State of California, in 1891. Holding LS no.5, Mr. Holcomb worked for the City and County of San Francisco for 34 years. He was Assistant City Engineer and head of the Divisions of Surveys and lead the effort to re-survey San Francisco after the 1906 earthquake and fire. ❖

Endowment Donors (as of OCTOBER 2013)



Thank you to the following individuals and companies for helping to raise **\$292,224.32** for the CSU Fresno Endowment Fund!

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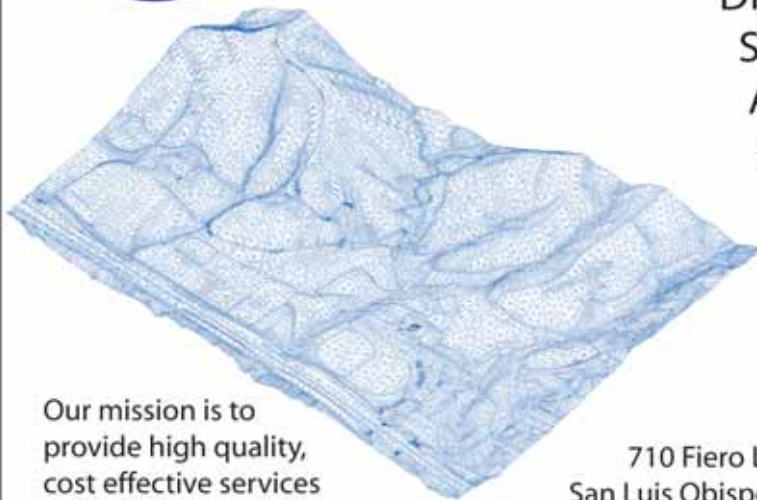
*Several companies and individuals made generous contributions to the Fresno GME Foundation. Their donations to the Fresno GME were used to help fund the endowment. Those donors include:

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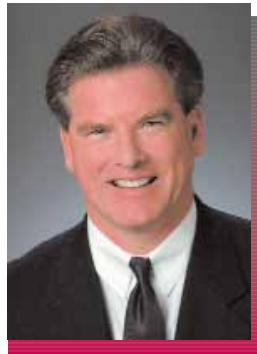
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Michael P. Durkee, is a partner at McKenna Long & Aldridge where he represents developers, public agencies and interest groups in all aspects of land use law. Mike is the principal author of Map Act Navigator (1997-2013), and co-author of Ballot Box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

mdurkee@mckennalong.com

Q&A SMA Expert

Question

A client of mine owns 100 acres. It is currently one legal lot. She is considering entering into a contract to sell 50 acres of that 100 acre total. What are the Map Act “rules” that would apply to that purchase/sale contract? If she has already executed the contract in violation of the Map Act, can she fix that violation and bring the contract into Map Act compliance?

Discussion

Great questions! Here are my thoughts.

Generally, lots (parcels) are “created” when they are shown on the face of a recordable document and that document is recorded (See, e.g., Govt. Code section 66412.7 for recorded maps, and *Gardner v. County of Sonoma*, 29 Cal. 4th 990 (2003) for recorded conveyance deeds). Contracts for the current sale of parcels that have not yet been legally created pursuant to the Map Act are generally illegal and void, not voidable. Government Code section 66499.30(b) of the Map Act provides:

No person shall sell, lease or finance any parcel or parcels of real property or commence construction of any building for sale, lease or financing thereon, except for model homes, or allow occupancy thereof, for which a parcel map is required by this division or local ordinance, until the parcel map thereof in full compliance with this division and any local ordinance has been filed for record by the recorder of the county in which any portion of the subdivision is located.

However, Section 66499.30(e) creates an exception to this general rule:

Nothing contained in subdivisions (a) and (b) shall be deemed to prohibit an offer or contract to sell, lease, or finance real property or to construct improvements thereon where the sale, lease, or financing, or the commencement of construction, is expressly conditioned upon the approval and filing of a final subdivision map or parcel map, as required under this division.

In other words, a contract for the sale of real property may concern a parcel that is not yet legally created, as long as the sale, lease or financing, is expressly conditioned upon the creation of that parcel by a subdivision map prior to the close of the escrow and the transfer of title to the new parcel. The parcel must be created before the contract can conclude and title can change hands.

In *Black Hills Invs., Inc. v. Albertson's, Inc.* (2007) 146 CA4th 883, the court reviewed a contract between a landowner and a developer, whereby the developer was buying a portion of the property (a parcel) that had not yet been “created.” Under the contract, the developer had two years to secure and record a parcel map creating the parcel he was buying, and then to purchase that parcel. However, the contract had a clause that allowed the property owner to force the developer to buy the

parcel at the end of two years, even if the developer had not secured and recorded the parcel map creating the purchase parcel. As it turned out, the developer was successful in getting the parcel map recorded within the two year time period. When the developer went to “close” under the contract, the landowner refused, arguing that the purchase/sale contract was illegal under the Map Act. The court agreed with the landowner. At the time of the execution of the contract the parcel in question did not exist and the contract was not made contingent on Map Act compliance. The court found the contract “void” at inception as violative of Section 66499.30, and hence against public policy.

Several court decisions since *Black Hills* have examined what constitutes an “express condition” of legal parcelization under Section 66499.30(e). (See *Toll Bros., Inc. v. Lin* (N.D. Cal. 2009) 615 F.Supp.2d 100 (“Toll”); *Am. Nat’l Red Cross v. United Way Cal. Capital Region* (E.D. Cal. 2007) 2007 WL 4522967.) One legal practitioner (See *Miller, Black Hills Revisited: Repercussions and Defenses* (Cal. Real Prop. Jour., Vol. 28, No. 3, 2010) p. 45) has summarized the holdings in those cases as follows:

The purchase agreement must recite that the recordation of a map in compliance with the SMA is (1) an “express condition” of the closing, as required by *Black Hills*; and (2) a covenant of the party with the obligation to subdivide, as provided in the federal cases like *Toll and Red Cross*. For example, the contract could include the following: “This contract is expressly conditioned upon the approval and filing of a final subdivision map or parcel map as required by Government Code section 66499.30(e).” The Toll court also provides a road map of potentially acceptable language, where it approved the following: “Seller shall, at its sole cost and expense, cause the City to record a parcel map or other map or maps . . . in order to create the Property as legal parcels that can be conveyed consistent with the requirements of the Subdivision Map Act and the City’s Subdivision Ordinance.” The *Red Cross* decision approves of the following language: “Upon execution of this AGREEMENT, [seller] will . . . promptly apply for, and diligently take all reasonable and necessary steps to obtain, approval and recordation of the FINAL MAP [that divides the property and complies with the SMA].” Of course, the contract must not allow either party to waive this condition.

And finally, in the recent case of *Corie v. Holoway* the original option contract violated Map Act section 66499.30(b) and would have been considered void under *Black Hills*. However, later amendments to that option contract fixed that problem, transferring the parcel in question was made contingent on Map Act compliance, and the newly amended contract was treated like a “new” contract. As a new contract, it complied with the Map Act and was found valid.

The lesson learned under *Corie v. Holoway* is that if the original option contract violates Map Act section 66499.30(b) and therefore would have been considered void under *Black Hills*, the cure is to supercede that contract with a new contract that is Map Act compliant.

Thanks again for the great questions! ❖

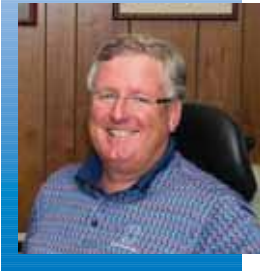
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By: Chris Grammar, Allied Brokers

Chris Grammar works for Allied Brokers. Allied Brokers is leading the way to provide education on Biggert-Watters to their clients and the land surveying community. For more information, email Chris at chris@alliedbrokers.com or call (650) 328-1000

BW-12: New Flood Insurance Reforms Bring Opportunities for Land Surveyors

The National Flood Insurance Program (NFIP) is getting a huge makeover. It has been 45 years after the program was established by Congress to protect the property owners across the nation against the cost and consequences of flooding. However, the originally assessed risks and premium rates have stayed the same over the years, while the cost and consequences of flooding have been continuously on the rise. The result is unrealistic, sometimes extremely subsidized premium rates being paid by property owners.

The government realized the need to make the program financially more stable and in 2012, Congress passed a law signed by the President.

Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12)

Purpose of the Reform

The primary aim of the reform is to increase the fiscal soundness of the NFIP – by addressing rate subsidies to more accurately reflect flood risks, and by starting to assess a new Reserve Fund charge. Given the potential of the changes that are underway, a flood insurance policyholder may see up to 25% annual increase in their policy's premium rates, until they reach to be full-risk premiums.

However, there's a catch. About 80% of all flood insurance policyholders (representing approximately 4.48 million of the 5.6 million policies in force) are already paying full-risk premiums. Of the remaining 20% policyholders, those who meet certain criteria will face the huge premium increases.

Elevation Certificate is Necessary

These policyholders will have to pay 25% increased rates annually **until the premiums are full-risk premiums**. Inevitably, of the many factors that will determine the full-risk rate of a structure, **the single most important factor is the elevation of the structure** in relation to the Base Flood Elevation (BFE).

The most affected properties by this reform are the ones that are located within a Special Flood Hazard Area (SFHA), were constructed before their community adopted its first Flood Insurance Rate Map (FIRM) and have not been elevated.

So, in order to know the elevation of a structure and to determine the full-risk rates accurately, a property owner must obtain an elevation certificate. Also, failing to obtain an elevation certificate in time might cause the flood rate to go from \$1,500 to over \$6,000. Recently, a Floridian couple bought a home expecting to pay \$1,500 for flood insurance, but ended with up with a final rate of \$12,000. They're suing, but that's another story.

What does It Mean to the Land Surveyors' Community?

Apparently, **an immediate increase in the demand for elevation certificates**; a huge one at that. Property owners across the nation are soon going to be looking for land surveyors in order to get their elevation certificates in time. The anxiety towards the yet unknown, but inevitable, increase in their premiums will fuel the pace of the demand.

The early-birds will certainly recognize the upcoming waves of demand, **and there will be urgency of jobs** – more in number too. ❖

CLSA Central Office is receiving several calls each day requesting referral for land surveyors that can provide an elevation certificate. CLSA Central Office refers these individuals to the online Find a Surveyor.

Are you listed on the Find A Surveyor?

Have you updated your listing to include your areas of practice?

Log on to the CLSA Member's Only Website and update your listing today.

Questions?

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Photo of the Year Entries

Submit Photos to CLSA@californiasurveyors.org Deadline: December, 31st 2013



Clockwise from the top:

At Tiburon looking northeast with the Richmond Bridge in the distance.

Submitted by Tim Case, PLS

We are training our new puppy to rescue monuments in peril. This disc is a San Francisco Water Department right-of-way point in Alameda County. It is in danger due to the failure of the sidewalk. See how our very special dog points to this monument in need of conservation.

Submitted by Janine Hampton, PLS



John Knox surveying/establishing the 566' contour line in Prado Basin. The photo was taken by Richard Elgenson. Smelly job for an urban surveyor like myself.

Submitted by John Knox, PLS

Retracing Kingsbury's Survey on the Sonoma County - Napa County line near the peak of Mount St. Helena.

Submitted by Adam Rivera, PLS



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Members Only Articles

You can find additional articles on the CLSA Members Only Website

New! What is the meaning of "...or physical change..." as stated in PLS Act Section 8762(b)(1)
Letter from Ric Moore, PLS, Executive Officer, BPELSG, to L. Paul Cook, PLS, dated June 26, 2013.



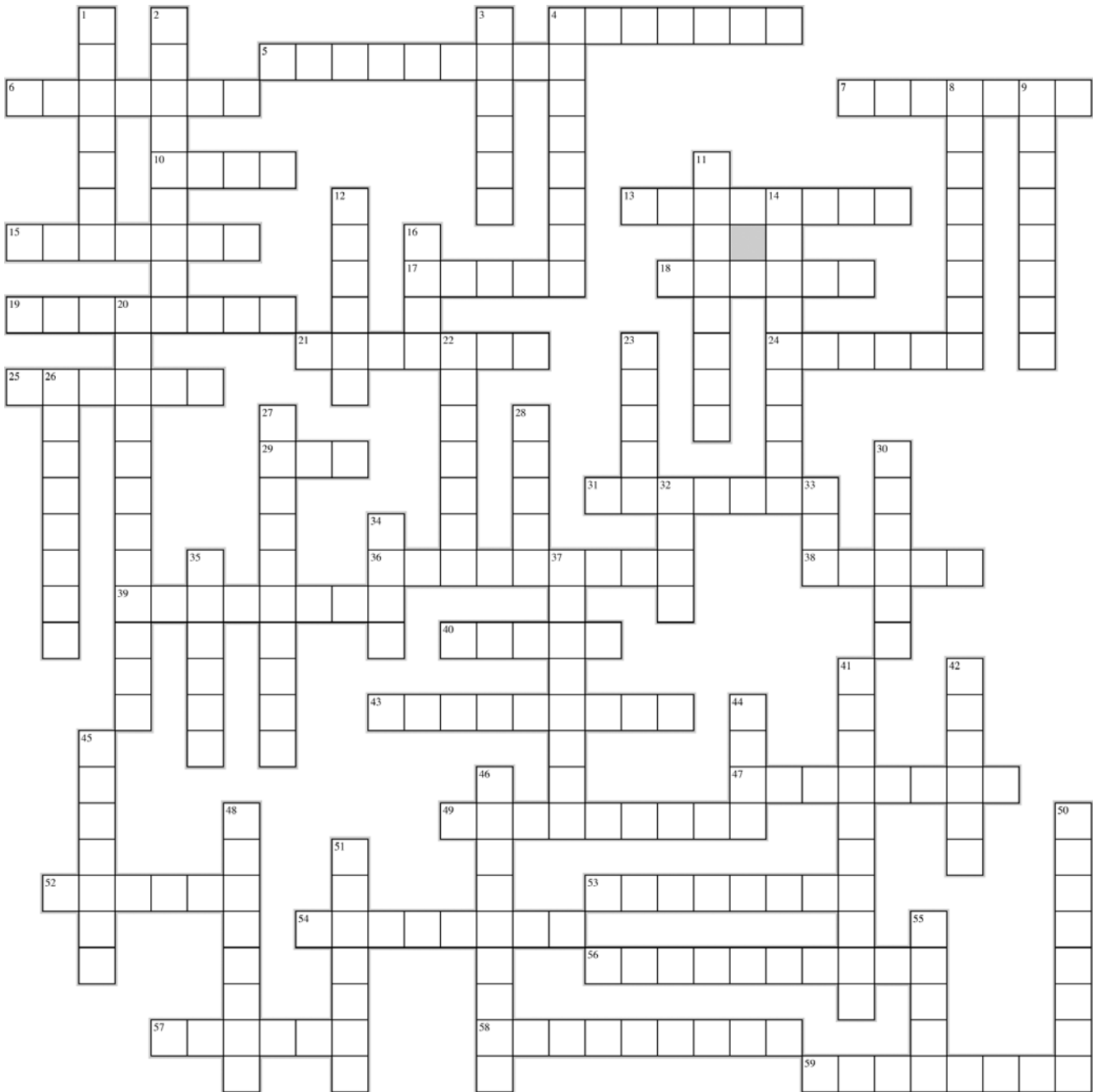
Crossword Puzzle

By: Ian Wilson, PLS

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

CLSA Crossword Puzzle #28

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




Across

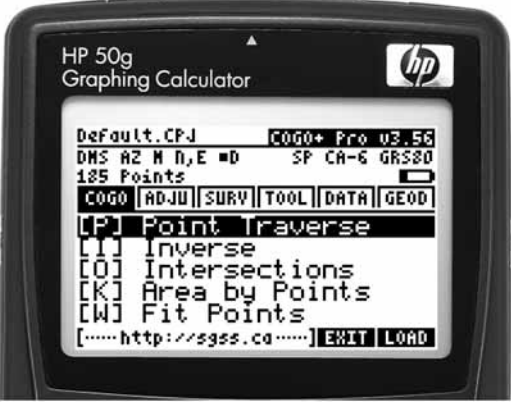
4. THOSE TO WHOM PROPERTY IS TRANSFERRED
5. DIVISION
6. MAGNETIC DIRECTION
7. LAND ABOVE THE OHW LINE
10. SLANG FOR COORDINATE GEOMETRY
13. TESTIMONY
15. ZONED OFFSET FOR BUILDINGS
17. 66 FEET
18. TO DEPRIVE
19. INTEREST
21. DEPARTMENT CREDITED WITH DEVELOPING GPS FOR USE
24. AFFIRM TO BE TRUE
25. PIECE OF LAND
29. INHERITABLE ESTATE
31. HORIZONTAL ANGLE IN QUARTERS
36. ANOTHER CHARACTERISTIC OF A GOOD PROPERTY DESCRIPTION
38. ORAL EVIDENCE
39. IMPORTANT NORTH-SOUTH LINE
40. REFERENCE SURFACE
43. DEGREE OF REFINEMENT
47. BAR OF DENIAL
49. SECTION MORE THAN 85 CHAINS LONG
52. 2013 TREASURER
53. DIRECTION TYPE
54. PROMISE
56. SMARTPHONE SURVEY APP WITH AN ANGLE
57. AGAINST LATIN?
58. NEW POINT OR FRESNO MAGAZINE
59. ENFORCEABLE AGREEMENT

Down

1. ANTIQUE SURVEYOR'S INSTRUMENT
2. RELEASE DEED
3. SPECIFIES INSURANCE COVERAGE
4. BENSON SURVEYOR FROM PLACERVILLE
8. NEAR
9. WRITTEN INSTRUMENT
11. CONTEST IN LAW
12. OUTSIDE 1-INCH ON A RECORD OF SURVEY
14. HEIGHT ABOVE DATUM
16. 160 SQUARE RODS
20. INTRUSION
22. V-SHAPED INDENTATIONS
23. TREE MARK
26. DIRECTION FROM NORTH
27. FIRST A IN ACA
28. RPF NOW IN EL DORADO
30. 1/360TH OF A CIRCLE
32. HIGHEST POINT
33. SPACE BETWEEN DESCRIPTIONS
34. JUST LESS THAN 8 INCHES
35. SURVEYOR'S DOG WITH THREE LEGS
37. VIOLENT LAND ACT
41. SMART PHONE SURVEY INSTRUMENT
42. SYMBOLIC TABLES
44. CONVEYANCE DOCUMENT
45. DIVIDE
46. PERSON OF ACTION
48. LINE OF EQUAL ELEVATION
50. MARK OF A CORNER
51. DIRECTOR'S CHINESE PROVINCE?
55. PATCH OF LAND



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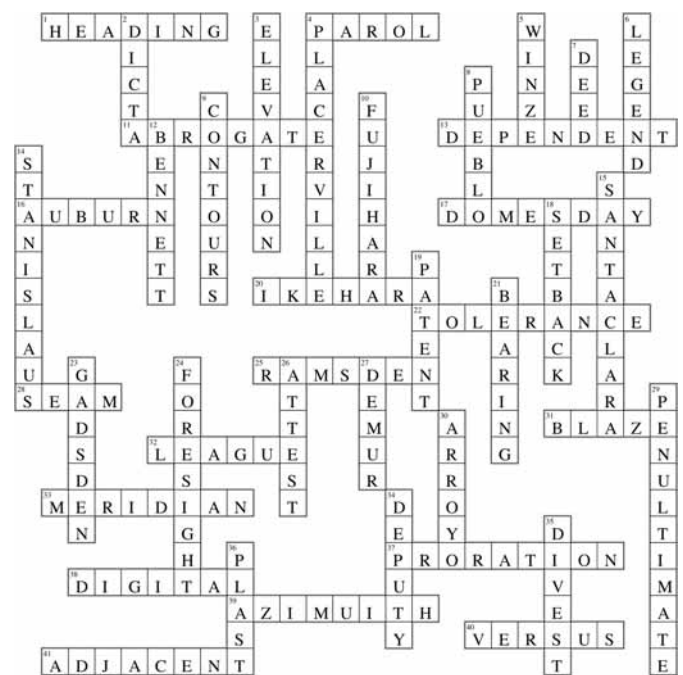


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Key to CLSA puzzle #27 (Surveyor Issue # 174)





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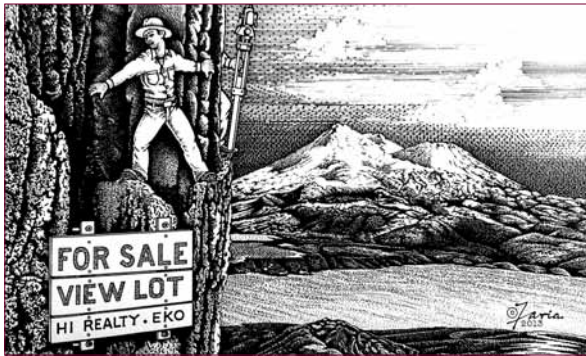


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Top Captions for issue #174 Cartoon



"The early years in the career of Sir Edmund P. Hillary... as the rumor goes."

Submitted by B.J. Tucker

"Hey Bob...know any Navajo looking to build their dream home?"

Submitted by Erik Heldfond

Submit your caption for the below cartoon to cls@californiasurveyors.org by January 10th. Our favorite captions will be published in the next issue of the California Surveyor.

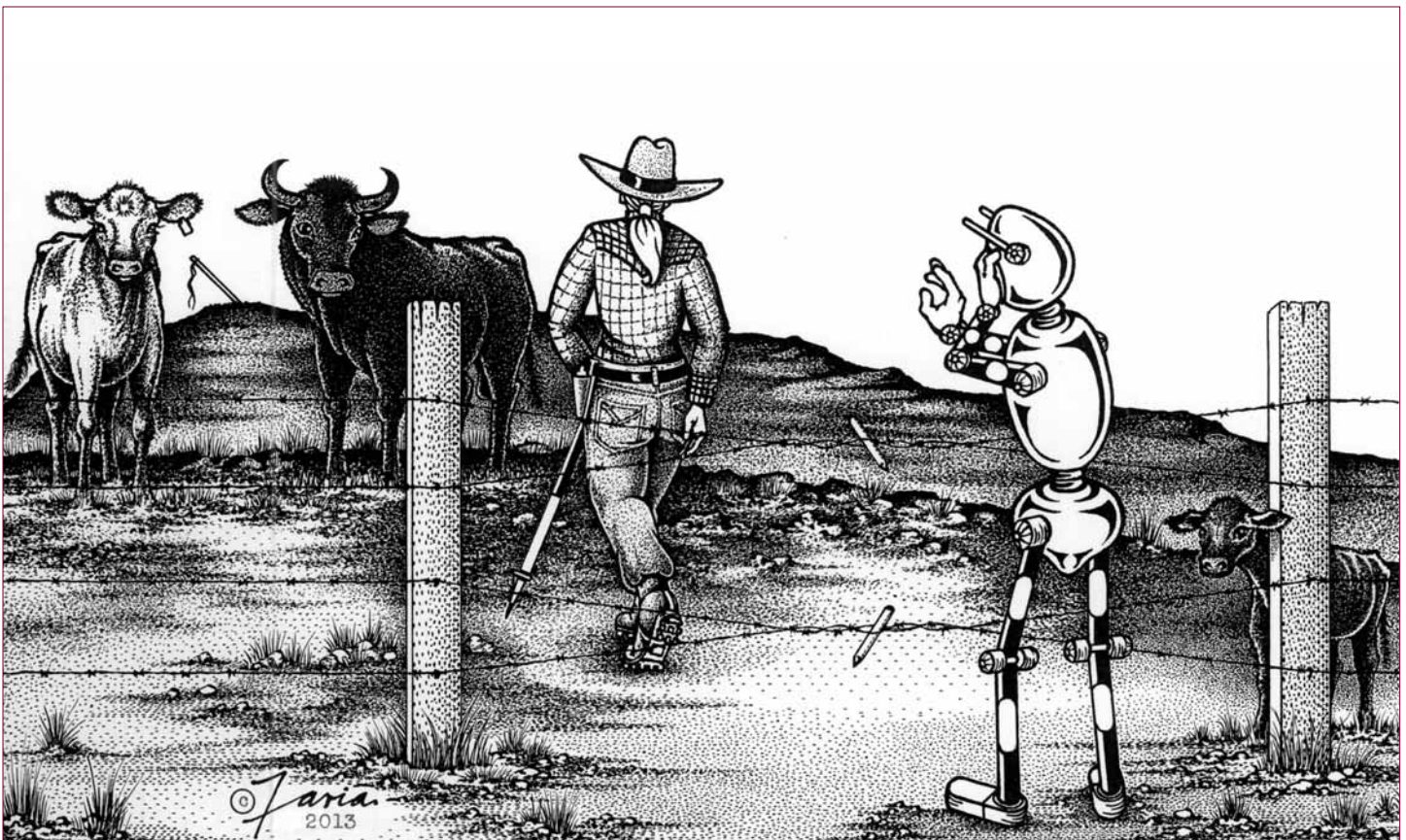
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By: Carl C. de Baca, PLS

Carl is Principal of Alidade Surveying in Elko, Nevada, the current NSPS Area 9 Director, and a past editor of the California Surveyor. He can be reached at: alidade.nv@sbcglobal.net.

Bad Backsights

Here Come the Drones

Dear Engineering Journal of Greater Ireland,

I am writing regarding the recent article in your publication submitted by Gerald Fitzpatrick, Surveying Engineer and Patrick Fitzgerald, Engineering Engineer. The article addresses the use of UAVs (drone aircraft) for aerial mapping to gather all the various types of data that an engineer would need for design, including topographic, vegetative, and surprisingly, cadastral. While the version I read was found in your pages, an online search yielded a nearly identical version published elsewhere with only minor differences:

http://uav.ie/PDF/Accuracy_UAV_compare_RTK_GPS.pdf

The gist of your article is that UAV-based aerial photogrammetry is now a mature technology poised to eliminate troublesome and insufficiently detailed surveys done by more conventional methods. How exhilarating!

The authors assert that they routinely achieve accuracies with digital data sets extracted from this photography equal to GPS RTK methods but with infinitely more "richness of data". I found it quite interesting that they lay out the flight lines for each mission perpendicular to the direction of the wind to keep the plane direction and speed constant. Since the article's lede indicated that the drone could also be used for boundary purposes, I read with a close eye, searching for passages that would discuss using the drone to produce cadastral information. I think it's fantastic that the authors' CV indicates that they produce the "World's Most Accurate Aerial Photogrammetry", and I applaud the assertion that this marvelous piece of technology can finally assign the lowly surveyor to the dust bin of history alongside lamplighters, gas station attendants and the guy who used to ride in the caboose, not to mention the caboose itself.

I do have some questions and thoughts that perhaps the authors could touch upon in a future article:

- Does the wind in Ireland always blow in the same direction? That would certainly be most helpful to mission planning.
- I understood that the British Isles, though relatively tectonically stable, were in fact still rebounding from the last ice age. Is Ireland's cadastre rebounding as well?
- I'm curious to know more about achieving sub-pixel accuracy in the post-data collection and pre-processing stage. Are the pixels smaller than a centimeter? Would that not then imply achieving sub-centimeter accuracy with centimeter-accurate surveying methods?
- What profession in Ireland would now be responsible for setting the highly accurate ground control if the need for surveyors has been truly eliminated, as alluded to in the article?
- It must be a wonderful feeling to have a digital cadastre of the entire country such that boundary surveying is reduced to a data set of coordinate values. However, this remarkable tool would need some minor

enhancements to be used for similar applications over here across the pond, where many varieties of unwritten rights need to be considered, not to mention that portions of our continent are moving in different directions at different speeds. I confess no small curiosity as to who might be employed to write the particular piece of software that could retrace the footsteps of the typical GLO surveyor of the 1800's, or better yet, the footsteps of one of the Benson Syndicate's collaborators. That would truly be a marvel to behold!

Now that my profession has been mooted, I look forward to seeking gainful employment in the field of lawn maintenance or the janitorial arts. I will look longingly to the skies as my replacements flit back and forth "revolutionizing the world of engineering surveying."

Best Regards,
Carl C.de Baca soon to be ex-Surveyor (U.S) ❖

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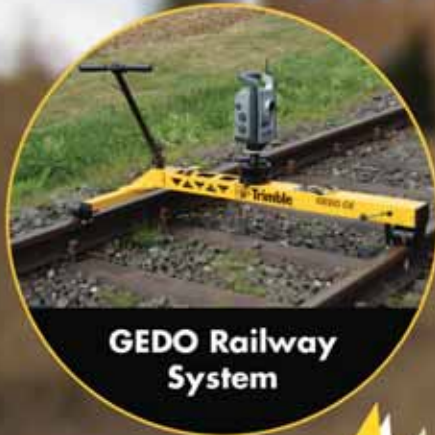
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