Central Valley Chapter - California Land Surveyors Association
www.californiacentralvalleysurveyors.org

Central THE PRISM Valley Chapter

Volume 3, Issue 6
November 2013

2013 Chapter Officers

President: Bill Koch
Vice President: Kevin Genasci
Secretary: Rich Brown
Treasurer: Bill Jones
Chapter Rep: Keith Spencer
Chapter Rep: Landon Blake
Alt. Chapter Rep: Mike Turnrose
Alt. Chapter Rep: Bill Koch

2013 Chapter Committees

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

2013 Chapter Programs

Boy Scout Merit Badge:
Scott DeLaMare (Coordinator)
TrigStar:
Bill Koch (Coordinator)
Workshops:
Chris Martin (Coordinator)

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Up Coming Meetings!

Date: December 4, 2013
Time: 6:30 p.m.
Location: Perko's @ 901 North Carpenter Road, Modesto
Speaker: Ric Moore, PLS - BPELSG
& Ray Mathe, PLS - BPELSG
Topic: BPELSG Enforcement vs. JPPC

HAVE A HAPPY THANKSGIVING
MERRY CHRISTMAS
& SAFE NEW YEAR!
FROM THE STAFF OF THE PRISM

Announcements

Incoming 2014 Central Valley Chapter Officers

- President - Kevin Genasci
- Vice President - Landon Blake
- Secretary - Rich Brown
- Treasurer - Tom Price
- Chapter Rep. - Keith Spencer
- Chapter Rep. - Bill Koch
- Alt. Chapter Rep. - Landon Blake
- Alt. Chapter Rep. - Kevin Genasci

SB-184 Passes into Law

SB-184 was signed by the Governor and goes into effect on January 1, 2014. **Click her for the complete Senate Bill**

2014 Membership is Approaching

You should be receiving your 2014 membership bill from State CLSA shortly. When you send in your dues, please don't forget to send in your Central Valley Chapter dues. You can also pay **online through the chapter website.**

Chapter Waives 2014 Dues for Unemployed Members

At the October, 2012 meeting the Central Valley Chapter voted to waive chapter dues for any members (or new members) who have become victims of the current economic downturn and are unemployed. Please fill out the Membership Application, enter "Unemployed" on Line 7 for the Name of Firm, Agency or College, submit your application, and your 2014 chapter dues are waived.

Click here for the 2014 Membership Application

California State University, Fresno Presents:
53rd Annual Geomatics Engineering Conference

January 24 & 25, 2014
The Clovis Memorial District
808 4th Street
Clovis, CA 93612

Mark Your Calendars

Classes, training, and continuing education

CAD Masters — AutoCAD Level I (3-Day Course)
- December 2-4, 2013, Fremont
- December 9-11, 2013, Walnut Creek
- December 9-11, 2013, Sacramento
- January 6-8, 2014, Sacramento
- January 27-29, 2014, Walnut Creek **Register here**

CAD Masters — AutoCAD Level II (2-Day Course)
- December 12-13, 2013, Sacramento
- December 19-20, 2013, Fremont
- January 6-8, 2014, Walnut Creek
- January 21-23, 2014, Walnut Creek **Register here**

CAD Masters — AutoCAD Level III
- January 9, 2014, Sacramento **Register here**

CAD Masters — Civil 3D for Surveyors (2-Day Course)
- November 25-26, 2013, Sacramento **Register here**

Land Use Navigators — Subdivision Map Act
- January 17th, 2014, Davis **Register here**

Cal State Fresno — Geomatics Engineering Conference
- January 24-25th, 2014, Clovis **Register here**

CLSA-NALS Conference 2014
- April 12-16, 2014, San Diego, CA **Registration Opening Soon**

If you have information about a training or class, please submit to: **editor@californiacentralvalleysurveyors.org**

President's Corner

I can't believe it has been two years already. It seems like just yesterday that I was sitting down and writing an article as the new President. It has been an incredible two years. I personally believe that the speakers have been the best they have ever been, a special thank you to Keith Spencer for scheduling them. The Prism has excelled and is a wonderful informational tool as well as bringing in sponsorship funds, thank you Rich Brown for your endless work. Our chapter has begun hosting seminars locally for the benefit of our membership. As well as hosting our first "LS Instructional" course for helping the surveyors of tomorrow pass the exam.

I would like to thank all the members who have contributed their time and resources the last two years in making all the meetings and events run smoothly. We may not be the largest chapter, but we can and have accomplished great things. I know the chapter will continue to grow and prosper.

I began as an officer back in 2004 and was a little nervous about the task that I signed up for. Now that I have progressed through the ranks, I would highly recommend to the members to become an officer. It has allowed me the opportunity to see other elements of surveying that you just don't get at the office. I have also become friends with so many more surveyors and have had the opportunity to be mentored by so many more surveyors with so much experience. This alone is priceless.

I look forward to the next two years as your Chapter Representative. Thank you, Bill Koch

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

National News

A New Brand of Expert - The Role of the Surveyor in the Geospatial World

Written by Chris Gibson

Over time, the practice and processes of surveying have generally changed slowly. Since the 1950s, however, progress in technology and methodology has accelerated. Today, this progress is changing—and expanding—the scope of the surveyor's work.

With no end in sight for this increasing pace of advancement, the change is affecting more than technology; the role of the surveyor is evolving as well. Even the name is changing. In the coming years, it's likely that "geospatial professional" will be used more often than "surveyor" to describe the practitioner of surveying and related activities. To understand why, let's examine how the industry is evolving.

Points, More Points, and Mass Data

Surveyors historically collected data point by point and then converted the points to lines, planes, and volumes. Topographic maps and other surface representations have long been a strong suit of surveyors. Surveyors create these maps using measurements of the horizontal locations and elevations of points.

Sometimes these measurements were made using multiple technologies such as level and stadia or level and steel tape. The resulting system of points can be processed and analyzed, but the results are primarily based on point-to-point comparisons.

In many of today's surveying activities, point-by-point measurement and analysis remains useful. But for mapping, design, and a host of other activities, the need to collect and evaluate mass data is growing rapidly. Certainly, basic measurement processes advanced slowly over the centuries, largely driven by technological

Continued on page 8

CAD Tips & Tweaks

Design of the SurveyLISP Route Alignment Manager: Part 2

By Landon Blake, PLS

Introduction

In this installment of CAD Tips and Tweaks we are going to take a look at a couple simple principles of functional programming. Then we will look at some of the key data structures that we will need for our SurveyLISP Route Manager software.

A Brief Overview of Functional Programming

In functional programming the software created is built from two main parts. The first part is a set of data structures, or collections of individual data elements. The second part is a set of functions that perform operations on those data structures. One important facet of those functions is that they perform their work independently of one another. They accept an input data structure, perform their operations, and return a data structure as a result. To design a program in a functional programming language, a programmer defines the data structures that will hold and transport program data between functions, and then defines the functions. That is the same process that we are going to follow in the design and implementation of the SurveyLISP Route Manager software.

The Important Data Structures

What important data structures do we need for the SurveyLISP Route Manager? I can think of three (3) main data structures to start:

1. A data structure to hold information about the location described by a station/offset pair.
2. A data structure to store information about a segment in a route alignment. This includes the start and end station of the segment and some type of link to the CAD entity that represents the alignment segment.
3. A data structure to store the route segments in each alignment.
4. A data structure to store the station/offset pairs associated with each route alignment.
5. A data structure to store the route alignments in each drawing.

The Data Structure for Station Offset Pairs

How do we design and implement the data structure for station/offset pairs? Let's think about the data elements that we need to include in our data structure:

1. A text value that identifies the type of the data structure.
2. The station value.
3. The offset value.
4. The offset direction (left and right).
5. A short description of the location identified by the station/offset pair.
6. A feature code or identifier for feature type.
7. A group code.
8. A unique identifier or name for this station/offset pair.

The last two data elements in the list will allow the user to organize station/offset pairs.

We can organize all of our data elements in a list structure.

What type of operations do we need to work with this data structure in our program? We need a function to create the data structures when provided all of the data elements. We can also write a simple set of functions to access the elements of the data structure. (These aren't strictly necessary, but they will make our source code more readable.)

Defining a Function to Create Station Offset Pairs

Our next step is to define a simple function to create a station/offset pair data structure. This is going to be a simple list data structure with the elements we described above. Here is the function to create the data structure:

```
(defun surveylisp_station_offset_pair_create ( station offset direction description feature_code group_code identifier)(list "SurveyLISP Station Offset Pair" station offset direction description feature_code group_code identifier))
```

This function is named "surveylisp_station_offset_pair_create". It takes 7 arguments which it packages into a list. The list is returned from the function.

How would this function be used on our route manager software? We could use it to create a station/offset pair from information the CAD user enters into a graphical user interface (dialog box) or we could use it to create station/offset pairs from information in a text file.

Sneak Peek

In our next installment of CAD Tips and Tweaks we will create a few simple functions to work with this new data structure we have defined for station/offset pairs.

State News

Surveying the Southern California Coast, Pt. 2

Retracing the Thirty-Ninth Parallel...

By Jay Satalich, P.S.

LOS ANGELES SE BASE (NGS PID DX4752)

During the classical era of geodetic surveying, triangulation was the most efficient method to both extend and densify horizontal control networks over large areas. Positions can be determined mathematically through such a system if one knows the position at the point of origin and can reduce the heights of all the stations to a computational surface (an ellipsoid); triangulation networks also require two other key elements to determine the positions of the other stations in the network: scale and orientation.

In larger triangulation networks, scale and orientation is provided by periodically measuring base lines connected to the scheme of triangulation. Astronomic observations are also made at the respective ends of those same base lines to determine the orientation of that line, thereby strengthening the triangulation network regionally. Triangulation base line stations are somewhat analogous to initial points in the public lands survey system.

The role of the Los Angeles Base Line was to provide local scale and orientation to the national system through the `Thirty-Ninth Parallel to United States-Mexico Boundary Arc' of primary triangulation in southern California.

During the 1870s, it became the USC&GS's mission to establish a unified system of triangulation throughout the United States and the agency decided that two base lines would be required in California: one in the north and one in the south. Throughout the early era of coastal triangulation, similar base lines were measured but for various reasons, these older base lines were not considered suitable from the perspective of building a national triangulation network. Therefore, new base lines would need to be marked and measured in California.

These two new base lines in California would be located in Yolo County (west of Sacramento) and southeast of Los Angeles. The task of surveying these base lines and connecting them to the primary network of triangulation was assigned to George Davidson of the USC&GS. Sent to the Pacific frontier in 1850 along with a few other "energetic young men" with "reputation to make", Davidson would spend forty-five years along the Pacific Coast performing geodetic surveys and making nautical charts for the USCS and its successor agency, the USC&GS. During the `Thirty-Ninth Parallel Arc' survey, he extended triangulation westward across the Sierra Nevada Range towards the Pacific Coast using sights that were in some cases over one-hundred miles long, earning these surveys the nickname `Davidson's Quadrilaterals'.

Assistant Davidson was a renowned scientist but amongst his greatest technical achievements were the measurements of the Yolo Base Line and Los Angeles Base Line. During the 1880s, these were the longest measured base lines at the time in geodetic surveying with accuracies of better than one part-per-million. Both lines measured at just over 11 miles in length each.

Davidson measured the Yolo Base Line in 1881 and he decided that similar procedures would once again be used for the Los Angeles Base Line in 1889. Davidson describes for us the mark set at LOS ANGELES SE BASE:

"... in 1889 underground mark was small needle hole in place of silver wire, one-tenth inch in diameter, which was driven into head of 5/8 inch copper bolt which was fixed in melted sulphur in granite block. Block was 1 foot square on top, 3 feet long, and placed 5 feet below surface. Copper bolt was covered with glass evaporating dish, cemented onto block, and top of block was marked with letters `U.S.C. & G.S.' Underground mark was surmounted by brick and cement pier, 72 inches square at base and 54 inches square at surface. Space around pier was filled in with coarse sand and charcoal. Surface mark was small needle hole in silver core of 5/8-inch copper bolt which was set in granite block, 26 inches square, flush with surface of ground and built into foundation pier ... In 1890 brick pier, 35 feet high, was built over station. In 1896, this pier was removed and granite monument, 24 inches square at base and sloping to 12 inches at point 2 feet above base, with pyramidal top and small hole at apex of pyramid marking center, was cemented to surface

Click for Complete Article

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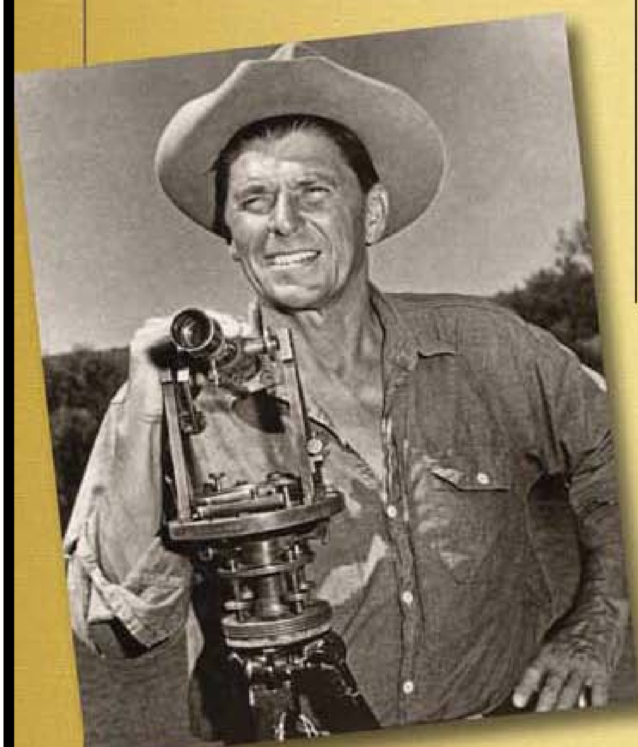
CLSA EDUCATION FOUNDATION

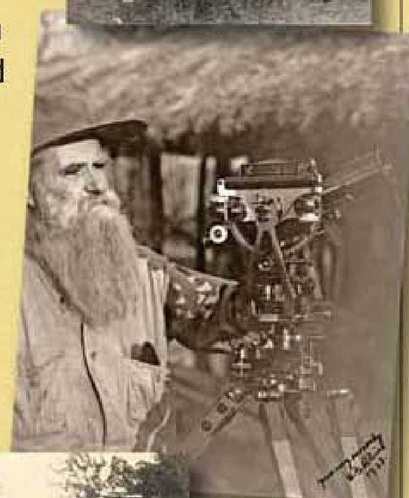
Land Surveying Photo Gallery

Unique Historic Photos Now Available for Purchase! Order Today!

Proceeds from the sale of photos benefit California Land Surveyors Association Education Foundation (CLSA EF) and will be used to fund scholarships for land surveying students.

CLSA would like to thank Bryant Sturgess for generously donating his collection of historic images.





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It's In There

Board Rules

California Code of Regulations
Title 16, Division 5

§415. Practice Within Area of Competence

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

Nothing in this regulation shall be construed: (1) to prohibit a professional engineer from signing plans which include engineering work in areas other than that in which he/she is fully competent and proficient, if such work was performed by other engineers who were fully competent and proficient in such work; (2) to prohibit a professional engineer from performing engineering work or a land surveyor from performing land surveying work in areas which involve the application of new principles, techniques, ideas or technology; (3) to prohibit a professional engineer from supervising other engineers or a land surveyor from supervising other land surveyors who may respectively be performing engineering work or land surveying work in areas other than those in which the supervising professional engineer or supervising land surveyor is fully competent and proficient; and (4) to prohibit a professional engineer from signing plans which include engineering work, portions of which were designed or required by any governmental agency.

If there is a section in the Professional Land Surveyors Act or Subdivision Map Act that you would like to have discussed or you have a comment on, please send your request to:

editor@californiacentralvalleysurveyors.org

A New Brand of Expert..., *cont. from* ***page 3***

advancements in optics, metallurgy, and manufacturing. But even new technologies like EDM, total stations, or GNSS haven't altered the fact that surveyors still collect most of their data as discrete points.

The Transition

The first big jump from point data to mass data came with the advent of photogrammetry. By the end of World War II, aerial photography had proven its capability to cover large areas quickly and accurately. Government and commercial organizations began to use photogrammetry for ever-widening scopes of work in surveying, engineering, and mapping. Still, the early techniques often used photo data simply to produce individual points.

Mass data began to emerge from analog plotters, complex machines that could trace and digitize contours directly from stereo pairs. The analog processes evolved into softcopy photogrammetry, which brought mass data collection to a wider group of practitioners and consumers. Increasing numbers of people saw the value of the mass data—and they began to ask for more of it.

With the introduction of terrestrial and airborne lidar at the end of the 20th century, the technical basis for mass data collection expanded quickly. The advance created new challenges for people working in surveying and mapping. Until the advent of lidar, surveyors and mappers needed to manage relatively small numbers of points while providing services to a fairly narrow cross section of users. As mass data collection became more widespread, surveyors and mappers found themselves facing not only rapidly increasing volumes of data. They also found more—often entirely new—customers and applications. The evolution to "geospatial professional" was underway.

Taking to the Skies

The demand for mass data continues to drive new technologies. One of the most important is the use of unmanned aircraft systems (UAS) for aerial surveying and mapping. UAS use small autonomous or remotely controlled aircraft equipped with imaging and positioning sensors to capture aerial images of a project site. In the office, desktop software processes hundreds of images into orthophotos and point clouds and then performs modeling, feature extraction, and other analyses.

UAS technology is quickly gaining a foothold for applications that require fast mobilization and frequent observation of project sites. UAS are already demonstrating their capabilities in mining, landfills, and transportation and construction grading, and a long list of other applications will benefit as well. In a world where "change detection" is one of the new deliverables, UAS will play an increasingly valuable role.

The Future

As always, we are in the midst of change. Most surveyors have continued to focus on developing and delivering datasets made of points and vectors. In contrast, mass data collection typically produces raster datasets. By expanding data collection to include photogrammetry, whether from aerial or terrestrial imagery or lidar, the geospatial professionals can instantly become more flexible and versatile. Technologies for collecting, analyzing, and sharing mass data are becoming more widespread and easier to use. More importantly, tools for mass data are finding their way into existing, point-based workflows and deliverables.

Click for Complete Article

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PUZZLE PAGE

Sudoku:

The objective is to fill a 9×9 grid with digits so that each column, each row, and each of the nine 3×3 sub-grids that compose the grid (also called "boxes", "blocks", "regions", or "sub-squares") contains all of the digits from 1 to 9

		7	6					2
2						6	3	5
1	8				3			
		1	9			8	4	
	2	9			6	3		
			7				1	4
4	1	2						8
7					4	9		

Quote:

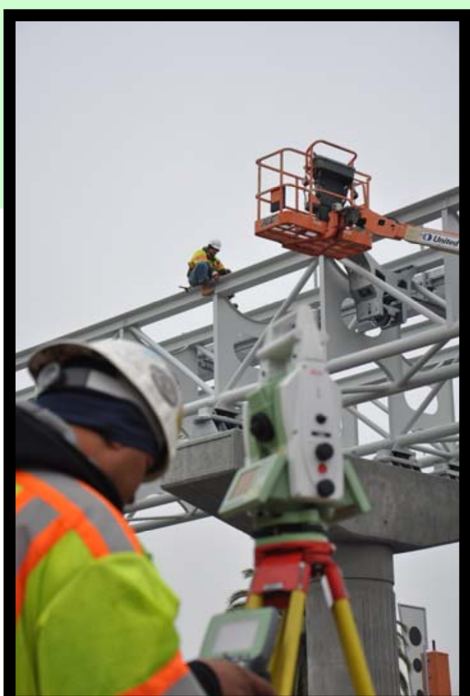
Engineers & Architects design things, Surveyors tell them where to put it!

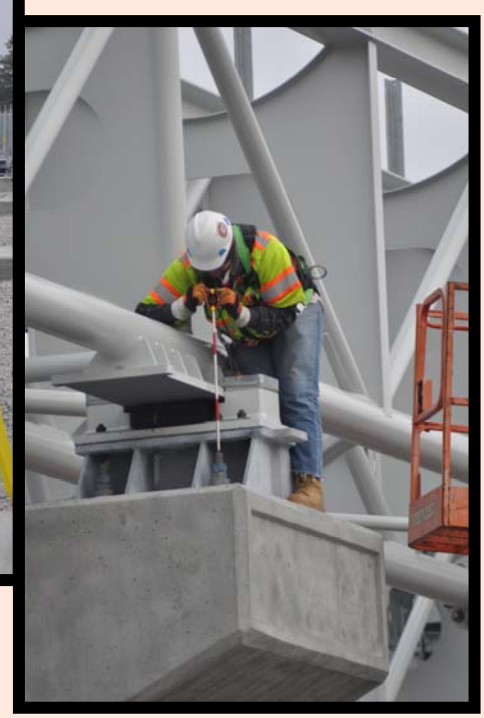
R. Brown

Pictures of the Issue

BART Coliseum to Oakland Airport Connector Survey, Oakland

These photos were taken of the BART Connector Project, connecting Oakland International Airport with O.co Coliseum. The project was completed by Sandis, Sunnyvale Office in January, 2013 by Ken Olcott, President





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Sandis, Sunnyvale, CA, **www.sandis.net**

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

Classifieds

Entry Level & Experienced Survey Technicians needed in Bakersfield

Diversified Project Services International, Inc. (DPSI) is actively seeking full-time Entry Level Survey Technician and an Experienced Survey Technician for their Bakersfield Office This position must possess good communication skills.

Requirements for Entry Level Survey Technician:

- High school diploma or GED equivalent
- Knowledge of Microsoft Office Suite of programs
- Must have 0-2 years experience

Requirements for Experienced Survey Technician:

- Land Survey-in-Training Certification is preferred
- Background in the Oil & Gas Industry
- Competent in Microsoft Office Suite of programs
- Must have 4+ years experience as a Survey Technician

Please email resume to hr@dpsiinc.com

TRANSPORTATION SURVEYOR PARTY CHIEF (CALTRANS)

California State Parks is seeking a Transportation Surveyor

Salary: $6,833.00 - $8,551.00

Apply at: http://jobs.spb.ca.gov/wvpos/more_info.cfm?recno=529082

Have equipment to sell? Looking for a great deal? Check out the CLSA Forums!

CALIFORNIA LAND SURVEYORS ASSOCIATION CENTRAL VALLEY CHAPTER

C/O Hawkins & Associates Engineering, Inc.
436 Mitchell Road
Modesto, CA 95354
Attn: Rich Brown

SUSTAINING MEMBERS

Keith W. Spencer, L.S. 6406, CFedS 1454

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