



PARALLAX

Newsletter of the Central Coast Chapter of the California Land Surveyors Association

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April 2000

The California Spatial Reference System

By Gregory A. Helmer, PLS

California presents a unique challenge to the successful implementation and maintenance of a high-precision geodetic reference network. Crustal motion in the form of tectonics, local and regional seismic activity, volcanic expansion, and land subsidence makes any geodetic control campaign temporal at best. Difficult terrain in the form of vast deserts, remote mountains and offshore areas introduce questions as to the reliability of the geoid model, and compound the difficulty of water vapor modeling in the troposphere. These unique challenges are issues within the most populous state in the nation -- a region that on its own is the seventh largest economy in the world. Decreasing federal programs frustrate the problem and place increasing responsibility for solutions at the local level. The California Spatial Reference Center has been formed as a partnership with federal, state and local agencies, business and educational institutions, to provide for a state-of-the-art spatial reference framework for the state of California. The Center is based at the University of California San Diego's Scripps Institution of Oceanography. At the heart of the mission for the Center is establishing a state-of-the-art geodetic reference system to support modern spatial referencing needs in a dynamic environment. Building upon the infrastructure of Continuous Operating Reference Stations (CORS), data processing and data management at the Scripps Institute for Geophysics and Planetary Physics, the Center is dedicated to providing the necessary geodetic services to ensure accurate and consistent spatial referencing of information throughout California. The California Spatial Reference System (CSRS) provides one accurate, consistent spatial reference network that will fulfill the many diverse spatial referencing needs of California's users.

This paper discusses the different components of the CSRS including current coordinates and elevations, data processing and distribution infrastructure, geodetic and geophysical models, and professional education programs directed at successful implementation of the system. Modern technology has made it feasible to distribute via the Internet near-real-time coordinates. While this type of data is invaluable to geophysical science, it presents a dilemma for surveying and mapping. Crustal motion models, such as the Horizontal Time-Dependent Positioning Model (HTDP) from NGS, and the Southern California Velocity Field Model from the Southern California Earthquake Center, provide the ability to integrate published positions and GPS observations, from various epoch dates, to a common epoch. Proper application of these modeling methods is a new subject for most GPS survey professionals. Advancing education in this area is a high priority for the California Spatial Reference Center (CSRC).

Up to date information on activities at the CSRC, and an interface to the geodetic data and management structure can be found at the organizations web site at <http://csrc.ucds.edu>
(Read more about our guest speaker on Page 4)

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APRIL MEETING NOTICE

Date: Thursday, April 13, 2000 Location: F. McClintocks
 Time: 6:30pm.....no-host cocktails Shell Beach
 7:00pm.....business meeting 750 Mattie Road
 7:15pm.....dinner Dinner: Beef/ Chicken / Seafood
 8:00pm.....speaker Cost : \$21.30 includes tax &

tip

Program: Mr. Gregory A. Helmer, PLS will be discussing The California Spatial Reference System. See article above.

RSVP ASAP with choice of meal to:

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CLSA Central Coast Chapter

March 2000 Meeting Minutes

CLSA Minutes for the March 09, 2000 meeting held at McIntock's in Paso Robles

- 1) Call to Order by Bob Fredricks @ 7:18 PM
- 2) Introductions
- 3) Approval of Minutes
 - a) No modifications to the minutes. Motion to approve minutes by Robert Reese. Seconded by John Sanders. Minutes approved.
- 4) Officer's Reports
 - a) Presidents Report (Bob Fredricks) - No Report
 - b) Vice Presidents Report (Mark Lewis) - Letter off to CLSA news Quarterly Report
 - c) Secretary/Treasurers Report (Rochelle Vierra)
 - i) General Fund Balance: \$6640.32 AG Edwards Account \$2419.82 Checking Account
 - ii) Balances of separate funds (money kept in the AG Edwards and/or Checking Account)

_____ Education Fund	\$44.00 Legal Fund	\$0.00 Historical Fund
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- 5) Committee Reports
 - a) Standing Committees
 - i) Education Committee (Tom Mastin) - No Report
 - ii) Membership Committee (Rochelle Vierra)

We have received 60 responses so far. 4 Affiliate, 4 Associate, 33 Corporate, 4 life, 6 none and 7 unknown. Linda Richardson, Joann Benner-Head and Bob Fredricks volunteered to help make phone calls to members who haven't yet set in their membership.
 - iii) Professional Practices Committee (Bob Fredricks)
 - (1) Mike Baumberger, Tom Vaughan, Joe Morris, Linda Richardson, Dan Manion and Leonard Langer
No Report
 - b) Special Committees
 - i) Publications Committee (Bryce Dilger) - No Report
 - ii) Trig Star Committee (Randy Woodjack)
 - (1) Keith Crowe, John Sanders, Skip Touchon, JoAnn Benner-Head, Alan Volbrecht, Mark Lewis, Randy Ellison, Tom Mastin, George Marchenko, Geoff Villegas, Dave Carey, Burke Blake, Leonard Lenger.
Nothing new. Test is Monday, April 4, 2000 at five high schools. No new schools have been recruited.
 - iii) Workshops/Seminar Committee (Randy Ellison) - No Report.

Bob Fredricks will call Randy Ellison to find out information on the Subdivision Map Act seminar.
 - iv) Bar-b-que Committee (Mark Lewis) - All set for July 8 at Cuesta Park.
 - v) Nominating Committee (Bob Fredricks) - On hold.
 - vi) Christmas Committee (Linda Richardson) - On hold.
 - c) Ad Hoc Committees
 - i) Scholarship Committee - (Bob Fredricks) - No Report
 - ii) GIS Development Committee (Victor Rasjo) - No Report
 - iii) Historical Records Committee (Randy Ellison) No Report
 - iv) County Liaison Committee (Mike Stanton) - No Report
 - v) Legislative Liaison - (Robert Reese)

Association has someone to carry bills to the senate: Changes test requirements to: 8 year's for the LS and 4 years for the LSIT.
There are also several items in the works with regards to Record of Survey requirements.
- 6) State Board Report (Robert Reese, Randy Ellison, Randy Woodjack)

Next meeting is May 13, 2000.
- 7) Old Business - None
- 8) New Business

SLO high is having a career fair on May 9, 2000. They would like us to participate again this year. Linda Richardson suggested that it be set up w/enough volunteers for people to rotate through. We should have some handouts (hats, pencils t-shirts, etc.) to give to the students. Could we allocate money from the education fund for this? Motion to allocate \$300 out of the general fund by Robert Reese. Seconded by John Sanders. Motion was modified to read out of "education fund" instead of the "general fund" second concurs. Discussion. Motion passes. Linda Richardson will check into what is available.
- 9) Announcements - None
- 10) Program

The speaker tonight is Dave Exline, a contractor who builds straw bale houses. Works with rice, wheat and barley straw bales for construction, fast growing industry, sustainable resource, emulates approx. R56 insulation, no termites, sound bounces off, ecologically sound house. Has built some in the area. Costs vary: built by owner approx. \$15 to \$20 per square foot; built by contractor approx. \$80 to \$90 square foot. 2 basic types Nebraska style or post and beam stacked like bricks in between the post and beam. Mostly post beam in CA for seismic. Takes approx. 300 to 400 bales for 2000 sq. ft house. Approximately 7 bales tall, which yields about 10 foot high ceilings. Walls are approx. 30" wide 6" of plaster 3" on each side.
- 11) Adjournment Dinner was ordered off the menu. There were 13 people in attendance.

Biographical Sketch for April Guest Speaker Gregory A. Helmer, PLS

Mr. Helmer is a Professional Land Surveyor in California, Colorado, Nevada and Arizona with over twenty years of experience in geodetic surveying and mapping. As a partner with the firm of Robert Bein, William Frost & Associates, he has been involved exclusively with GPS for the past fifteen years and is nationally recognized for his expertise in this field.

In addition to projects, Mr. Helmer's experience includes GPS training for public and private organizations, and GPS-related programs and seminars for local and national professional organizations. He is the author of several articles and professional papers on geodetic surveying, and is the Vice Chairperson of the California Spatial Reference Center.

Save a Tree !!! Get with the program !

To save costs on printing and postage, not to mention trees, beginning next month, Parallax will be published digitally and available by email. Each month's issue will be emailed directly to you in a HTML format (approx 200kb) that may be viewed with any Internet web browser and then you can just print what you need. Please help save resources. If you can change over to email, please send your email address to : vaughan@tcsn.net with a message **Re: Parallax email list**. Thanks, Ed.

Coming Next Month History of the U.S. Part IV along with some maps provided by Joe Carey,

So, you think a gallon of gasoline is expensive, huh?? Try this out for comparison....

Diet Snapple 16oz for \$1.29 = \$10.32 per gallon, Gatorade 20oz for \$1.59 = \$ 10.17 per gallon
 Ocean Spray 16oz for \$1.25 = \$ 10.00 per gallon, Pint of milk 16oz for \$1.59 = \$12.72 per gallon
 STP Brake Fluid 12oz for \$3.15 = \$ 33.60 per gallon, Vick's Nyquil 6oz for \$8.35 = \$ 178.13 per gallon
 Pepto Bismol 4oz for \$3.85 = \$123.20 per gallon, Whiteout 7oz for \$1.39 = \$25.42 per gallon
 Scope 1.5oz for \$0.99 = \$ 84.48 per gallon,

And this is the REAL KICKER.....

Evian water 9oz for \$1.49 = \$ 21.19 per gallon

So next time you're at the pump, be glad your car doesn't run on Nyquil, or Scope, or WATER !!!!



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TIDAL BOUNDARIES

By Randy Ellison, LS7065

Most of us know that the boundary of the uplands along the Pacific Coast of California is the Ordinary High Water Mark (OHWM). OHWM is a legal term and sometimes hard to determine. Mean High Tide (MHT) is scientifically derived and is relatively easy to obtain. Most of the time, OHWM and MHT are the same. However, be very careful, you can not use MHT if the shoreline is not in its natural state or a court of law has determined a different boundary.

The National Oceanic and Atmospheric Administration (NOAA) maintains tide stations along the coastline to determine high and low tides. NOAA averages the high and low tides over 19 year periods, called epochs, and determines (among other things) the Mean High Tide. It is a simple matter to call NOAA and get the MHT value for an area on the central coast.

The problem is that surveyors work on the National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988 while NOAA works on Mean Lower Low Water (MLLW). MLLW is what a tide station "zeroes" on. Nautical charts and tide tables (like the ones from local surf shops or data published in the newspaper) base their numbers on a zero of MLLW. The "zero" for NGVD29, however, is "mean sea level". Mean sea level is somewhere between MLLW and MHT.

So! Not only do we need to obtain the elevation of Mean High Tide, we also have to get the elevation difference between Mean Lower Low Water and whatever datum our benchmark is on. For instance, if Mean High Tide at our site is given as 4.61 feet above Mean Lower Low water; and the equation between Mean Lower Low water and NGVD29 at the site is 2.66 feet; then, the elevation of Mean High Tide is 4.61-2.66 or 1.95 feet NGVD29. Now the 1.95 foot contour can be run on the ground.

A good idea is to draw a vertical sketch showing the relationship of the datums. It is also a good idea to plan your survey at a time of low tide so as not to lose a rod and glass (but that's another story.)

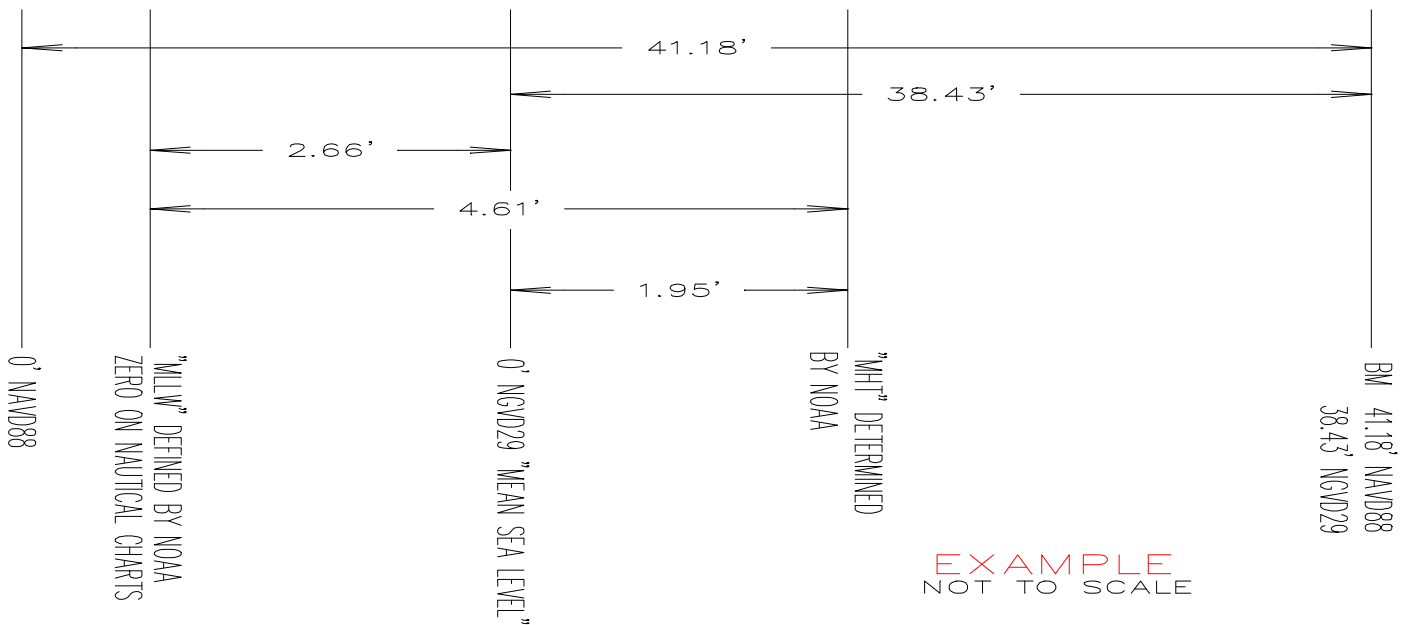
Tide data information can be obtained from:

Briah Connor • Chief of User Services Div, NGS
 (301) 713-4436 FAX • (301) 713-2877 VOICE

Give him the Latitude/Longitude and datum needed for the site you are working on. If there is no station nearby, you will need to get the two closest stations bracketing your site in order to interpolate.

Update: The above was written in March of 1995. Tidal information is now available on the Internet at:

<http://www.co-ops.nos.noaa.gov/bench.html>



EXAMPLE
 NOT TO SCALE

U.S. Land History, Part III

Translated from Spanish by Luis G. Zorilla, Archivist. Provided by Joe Carey, LS, PE, Ret.

Spain renounced its claim to any lands North of the 42nd parallel, in spite of having explored the Pacific all the way to Alaska (Valdez) and established forts in the Nootka and Zevallos Straits, thus the U.S. appeared on the Pacific Coast with a firm claim. Also, in 1819, the U.S. Army invaded and occupied all of Florida originally Spanish.

The treaty was immediately ratified by the U.S. and a little later by Spain on Feb 29th, 1821 (*I checked it 3 times : Sr. Zorilla must have been tired after his research, that he called 1821 a leap year. Our Gregorian calendar predates him; 1820 was a leap year. So which is it? I.e. this is the near the eve of Mexican Independence.*) The treaty sanctioned the loss of both Floridas, with all the dangerous implications for a new nation that was a neighbor of another nation in the way of further expansion. The young nation's expansion was crowned with success in spite of the fact that Spain still considered one of the greatest powers of that era, so it is logical to suppose that the American expansionist cause would now continue, affecting independent Mexico, a country which was undoubtedly far weaker, finding itself alone without allies, without a navy or merchant marine, without experience in government, all of which it had as part of the Spanish Empire. That heritage would be manifested very soon.

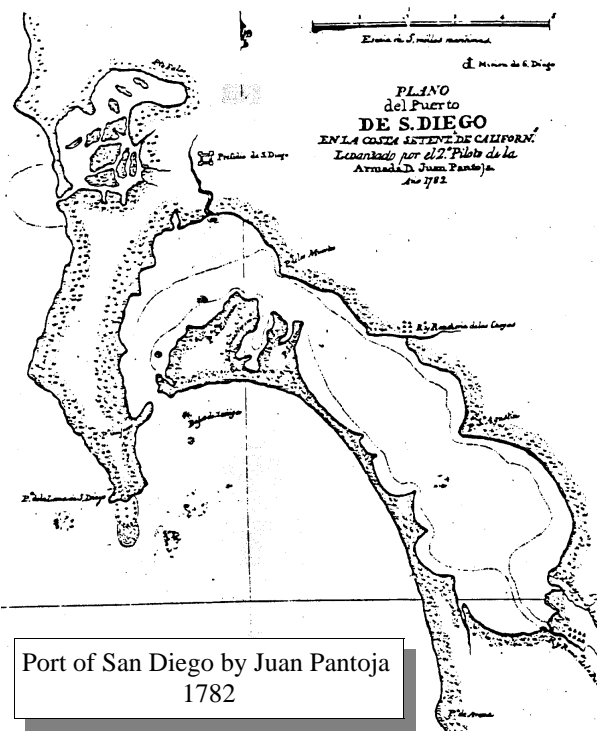
Independent Mexico accepted the border as defined by Adams-Onis and made efforts from the very start to see that the U.S. would recognize it, seeing that the U.S. had ratified the treaty on two different occasions: before and after Spanish ratification. Nevertheless, the U.S. government, under the direction of southern states administration, almost uninterrupted since the turn of the century, demonstrated reluctance in accepting it, expressing from the very first its intentions to sign the new boundary agreement with Mexico.

However, the government of Guadalupe Victoria showed itself determined to keep the Adams-Onis border intact and refused to sign a treaty of "friendship, commerce, and navigation with its neighbor to the north unless the U.S. would talk about boundaries at the same time, this, in spite of their desperate need to find a market for their Mexican products and to supply themselves with what they needed' when, with one bold stroke they had already closed forever the only market Mexico had known for three centuries-Spain. Thus it was that the Adams-Onis border did indeed remain intact with U.S. acceptance through a new treaty signed Jan 28, 1828, and ratified by both nations April 5, 1832.

That meeting of minds stipulated that a bi-lateral commission should carry out the surveying and mapping of the border, but the commission did not meet within the stipulated one year from the date of ratification. In part because some Americans wanted to go farther South, moreover, Mexico had made huge land grants in Texas for the benefit of entrepreneurs and colonists from the southern states of the U.S. Also, there was a constant agitation and turnover of authority in Mexico- a situation that irritated the government in Washington. What would be the purpose of fixing a border if almost immediately the American colonists, in constant contact with their fellow Mexican citizens, would resolve to separate from Mexico and join the U.S.?..Nevertheless, Mexico's persistence accomplished a postponement of one more year by means of a protocol signed April 3, 1835. The postponement would begin on the date of ratification of the new protocol, which took place April 30, 1836.

While these last negotiations were being carried out, the Texas revolt took place. It started as an internal problem, but soon became international. The U.S. incited it and intervened in various ways aiding the rebels, to such an extent that at the end of the crisis the Mexican forces confronted an equal number of volunteers, perhaps even a greater number of U.S. Army soldiers. April 21, 1836, the independence of Texas was established. (At least that part northeast of Coahuila and as far as the Nueces River). The Mexican forces were completely routed and their President made a prisoner. The government in Washington began to make gestures toward the annexation of Texas, but it was blocked by northerners in the U.S. and Mexican protests, until 1845.

More next month ...



Port of San Diego by Juan Pantoja 1782

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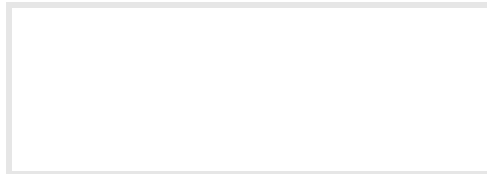
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U.S. Land History, Part III

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