



CLSA

CALIFORNIA LAND SURVEYORS ASSOCIATION



In Conjunction with CSRC

Presents:

Real-Time Networks

Speakers:

Bryan Banister, PLS

Yehuda Bock, Ph.D.

Greg Helmer, PLS

Bill Henning, PLS (May 9th Only)

Marti Ikehara

Charlie Schwarz, Ph.D. (May 2nd Only)

Gavin Schrock, PLS

Two Locations

Friday, May 2, 2008

**Ayres Hotel & Suites
Ontario, CA**

Friday, May 9th

**Biltmore Hotel & Suites
Santa Clara, CA**



HOTELS:

Friday, May 2, 2008
Ayres Hotel & Suites Ontario
1945 East Holt Blvd.
Ontario, CA 91761

Friday, May 9, 2008
Biltmore Hotel & Suites
2151 Laurelwood Road
Santa Clara, CA 95054

SCHEDULE:

8:00 AM - Registration
8:30 AM - Seminar
12:00 PM - Lunch
1:00 PM - Seminar

The seminar will conclude at
5:00 PM

10% DISCOUNT:

A 10% discount to companies or agencies registering 5 or more registrants from the same office. All registration forms and payment must be received at the same time.

CANCELLATION POLICY:

Refunds for cancellation will be made if requested in writing 7 days prior to event and are subject to a \$35 cancellation fee. Substitutions welcome - Contact the CLSA Central Office for more information.

PROFESSIONAL DEVELOPMENT:

A certificate for 7 hours of professional development will be issued to each attendee.

SEMINAR TOPICS

Keynote Address: RTN Innovation, Infrastructure, or Industry Opportunity
Greg Helmer, PLS

The capability of precise positioning within a real-time GNSS network is so powerful that there's no question that the technology will proliferate and replace much current positioning work. Real-time network capability then goes beyond to open technologies such as intelligent highway systems and any number of monitoring and precision navigation applications. RTN is here and it's very early in its adoption. Who will construct and operate these networks? How will they be funded and what formats will they embrace? Of an even grander perspective; what industries and professionals will embrace the value-added applications that await innovators and entrepreneurs?

California Real Time Network: Rationale, Results & Future Plans - Yehuda Bock, Ph.D.

CRTN evolved from a collaboration of the CSRC, the County of Orange, and the SCIGN project to develop the Orange County Real Time Network in 2001. The County was interested in continuous access to high-rate data to support real-time kinematic (RTK) surveys, for economical reasons and in support of photogrammetric and LIDAR airborne surveys. Scientists were interested in the project as a prototype for earthquake early warning systems. Additional stations and sub-networks were added over the next few years thanks to the efforts of SOPAC, USGS, San Diego County and the Metropolitan Water District, often leveraging PBO infrastructure. The CRSC's Southern California 2006 height modernization project was the first to make use of CRTN to explore new ways to conduct height modernization surveys. Rather than conduct synchronized multi-team surveys, in this project we operated single survey teams that positioned monuments in real-time with respect to the GPS infrastructure provided by CRTN. Results will clearly indicate that this real-time approach can be used more effectively and economically for height modernization and geodetic control projects than traditional post-processed approaches with no loss of accuracy and precision. These conclusions will be further demonstrated by describing a recent (February 2008) crustal deformation project conducted across the Imperial Fault by Scripps faculty and students using CRTN infrastructure. The rapid expansion of CGPS sites in California brought about by NSF's Earthscope/PBO project opens up the possibility of expanding real-time capabilities statewide. A grid of CGPS stations (already built) at an 80 km spacing could form the basis for a statewide network. This would guarantee that any user will be within 40 km of a real-time station, which is a reasonable distance for network RTK-type surveys. A vision on how this can be accomplished will be described.

The Evolution of RTN as a Global Utility - Gavin Schrock, PLS

Varied RTN models from around the U.S. and the world will be examined to illustrate the evolution in the implementation of RTN technology to serve as a reliable positioning utility and as the "active control" segment for modernized geodetic reference frameworks.

NGS Support for Real Time Positioning in the USA

Bill Henning, PLS and Charlie Schwarz, Ph.D.

As the caretaker of the National Spatial Reference System, NOAA's National Geodetic Survey (NGS) is developing guidelines for new applications of positioning using real time techniques. The goal is to link the burgeoning number of real-time networks (RTN) at a specific level of accuracy aligned to the NSRS. The guidelines may encompass the design, construction, administration and use of these RTN to insure their integrity and to provide users with the best methods of positioning with real time techniques. Additionally, the NGS is planning to implement the streaming of real time data in industry standard Radio Technical Commission for Maritime Service (RTCM) format from selected federally owned or operated Continuously Operating Reference Stations (CORS), so that RTN administrators may use the data as a fiducial value adjusted into their networks. This presentation will describe current NGS efforts in these areas.

Prevarications, Precisions, & Procedures: Lessons Learned by a New RTN Administrator
Bryan Banister, PLS

Lessons learned and initial results of the Central Valley Spatial Reference Network (CVSRN) will be presented.

Coordinates, Epochs, Correctors for RT Applications - Marti Ikehara

What coordinates of which epoch are associated with the stations of a Real-Time Network? Does it matter? Does it matter if you are using a network solution vs. a single-base solution? Does the operator provide only correctors and expect you to include known control in your survey to get constraints? Will you be informed if the coordinates are changed? Do you have to provide the names and coordinates of all network stations on a recorded document? Was the network tied to any NSRS stations and if so, how and when? Do you need to use a velocity model as part of the process?

GENERAL INFORMATION

Registration Fees (each seminar):

CLSA State Association Member	\$135.00
Non-Member	\$235.00

These fees include lunch, seminar handouts, certificate of completion and refreshment breaks. For non-CLSA State Association members, the difference between member and non-member registration fees may be applied toward membership.

THE INSTRUCTORS

Bryan Banister, PLS has worked in the Surveying profession for the last 15 years. He attended California State University at Fresno and is a Professional Land Surveyor. He is currently employed at Caltrans in District 6, where he works both as a head of the Control processing unit and as an administrator of the Central Valley Spatial Reference Network.

Yehuda Bock, Ph.D., is a research geodesist and senior lecturer at UCSD's Scripps Institution of Oceanography, and is Director of the California Spatial Reference Center (<http://csrc.ucsd.edu>) and the Scripps Orbit and Permanent Array Center (<http://sopac.ucsd.edu>). He is a founder of Geodetics, Inc., a developer of precision real-time GNSS software and hardware for civilian and military applications. With a BSc (1977) in Geodetic Engineering from the Technion, Israel Institute of Technology, and a PhD (1982) in Geodetic Science from The Ohio State University, Dr. Bock has held academic appointments at MIT and at Scripps (since 1989) and has published over 95 peer-reviewed journal articles on the application of GPS technology to a variety of geophysical and civil applications. Dr. Bock pioneered the development of regional and global continuous GPS networks for crustal deformation research and was a founding member of the IGS and SCIGN. He developed the first continuous GPS data archive and database (SOPAC) and designed GNSS data and analysis methods including GAMIT, RTD, and PGM softwares. Dr. Bock's research has contributed to understanding crustal deformation and present-day tectonics of California, Indonesia, Japan, and the Middle East. He has contributed to an operational NOAA system for near-real-time GPS meteorology in support of short-term weather forecasting. Over the last decade he has been researching early warning systems for natural hazards mitigation (earthquake, volcano, tsunami) and structural engineering using modern IT methods and real-time GNSS technology. As part of this research and in partnership with several organizations he founded and operates the California Real Time Network (<http://sopac.ucsd.edu/projects/realtime/>).

Greg Helmer, PLS is a Professional Land Surveyor in California, Colorado, Nevada and Arizona with over twenty-five years of experience in geodetic control, boundary surveying and mapping. As a Senior Vice President with the firm of RBF Consulting, he has been an innovator for advanced technologies. He is nationally recognized for his contributions to GPS surveying and high-precision geodesy. In addition to numerous high-profile projects, Mr. Helmer's experience includes GPS training for public and private organizations, and GPS-related publications and seminars for local and national professional organizations. For the last decade he has been one of the most vocal proponents of a statewide geodetic reference system including leadership positions with the California Geodetic Control Committee, the Coalition for the Implementation of NAVD88. Mr. Helmer is a contributing author to the National Height Modernization Program at NOAA, and is the immediate past Chairperson of the California Spatial Reference Center at Scripps Institution of Oceanography.

Bill Henning, PLS is employed by the National Geodetic Survey (NGS) as a real-time specialist, helping to develop NGS guidelines and policy related to real-time positioning. He is a registered professional land surveyor in Maryland with over 40 years of active experience in all phases of surveying technology. He has helped plan, implement and manage height modernization geodetic networks for county-wide projects in Maryland and Virginia. Mr. Henning is a Past President of the American Association for Geodetic Surveying (AAGS) and is the NGS representative to the RTCM special committee involved with differential positioning (SC-104). He has presented numerous talks at local, regional and national venues for over 12 years.

Marti Ikehara is the State Geodetic Advisor with National Geodetic Survey, which is an agency within NOAA. She has been in this position in California for 8+ years; prior to that, she was a ground-water hydrologist with the US Geological Survey for nearly 20 years, first in Honolulu (5 yrs) and then in Sacramento, investigating land subsidence while in California. One of her main duties is to help the public utilize accurate horizontal and vertical control in their surveying, engineering, and mapping projects. As California shifts to a spatial reference system—relying more on permanent GPS reference stations and GPS for both horizontal and vertical geodetic control surveys, a key role for the Advisor is to provide assistance in expanding, accessing, and utilizing the NSRS.

Charlie Schwarz, Ph.D recently retired from the position of Chief of the Systems Development Division of the National Geodetic Survey (NGS). In that position he was responsible for the NGS web site, the NGS Data Base, and the IT Infrastructure used by NGS. He created the NGS Geodetic Tool Kit and wrote much of the code in the popular OPUS utility. He now works part time for NGS as a consultant, where his main duties have been to create the rapid static version of OPUS (OPUS-RS) and to assist with the development of NGS's role in RTN. He holds a Ph.D. in Geodesy from The Ohio State University.

Gavin Schrock, PLS is a surveyor and GIS analyst for Seattle Public Utilities, where his strategic initiatives group focuses on improving soft-hard cost ratios for public works. He is also the administrator of the Washington State Reference Network (www.wsrn.org) a regional real-time GNSS network cooperative in the Pacific Northwest. He has worked in surveying, mapping, data management, and GIS for over two decades in public works, commercial development, defense, and utilities. He has published in these fields and has taught these subjects at local, state, national, and international conferences.

Space is Limited

Register Today!

Mail to:

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CLSA-CSRC Real-Time Network Workshop

Friday, May 2nd - Ontario & Friday, May 9th - Santa Clara

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