

Fourth Quarterly Report

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Project Title: California Spatial Reference Center, FY 2007 Height Modernization Program

Period: April-June, 2008

Attn: Gilbert Mitchell (Gilbert.Mitchell@NOAA.gov)

Highlights

- Published and circulated proposal for statewide California Real Time Network (CRTN) - held series of meetings at Scripps with key players (UNAVCO/PBO, Caltrans, JPL) and circulated proposal to California surveying organizations
- Analyzed GPS data from the North San Joaquin Valley 2006 and Central Coast Height Modernization 2007 projects – created first version of bluebook files (B-file, G-file, SERFIL) from CSRC database
- Performed orthometric adjustment for the Central Coast Height Modernization 2007 project and prepared final report to be submitted to NGS
- Began process to contract orthometric adjustment for North San Joaquin Valley 2006 project to Penfield and Smith, with kickoff meeting scheduled in August
- Continued to enhanced PGM software (server and client side) for height modernization and geodetic control projects
- Held two successful “sold-out” RTN workshops with CLSA in May (South Region: Ontario, North Region: San Jose)
- Engaged in extensive outreach efforts and participated in National Height Modernization activities
- Submitted list of proposed “California CORS” to NGS, to be used in their OPUS solutions and other applications
- Working with NGS on NSRS readjustment to correct errors found in last year's readjustment

Statewide Expansion of California Real Time Network (CRTN)

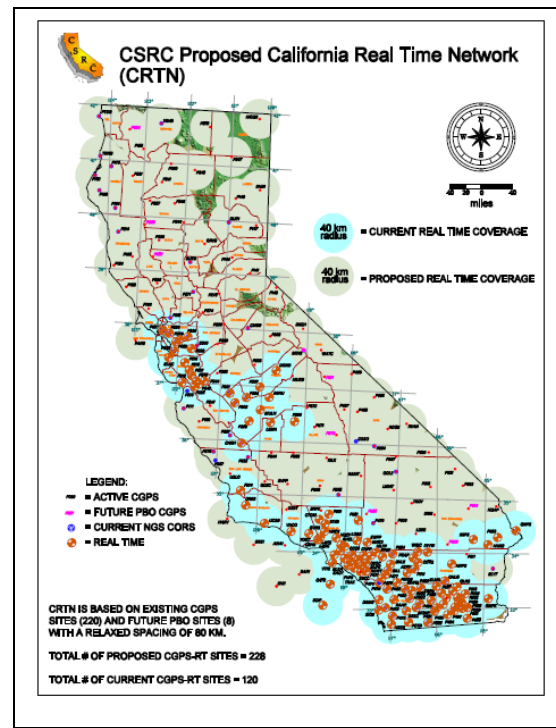
CSRC has prepared a proposal to expand a slightly modified version of the existing California Real Time Network (CRTN) throughout California. We feel that a statewide RTN will provide a needed public utility, realign CSRC priorities, enlarge our constituency, and enhance funding opportunities for the CSRC. Besides our traditional users, a successful effort could impact such areas as disaster preparedness and relief efforts, flood plain management, water transportation infrastructure, precision agriculture, International and offshore boundary mapping, aircraft landing and safety systems,

intelligent transportation and telematics, fleet management, and coastal and harbor navigation.

The figure to the right shows a statewide network with 80 km spacing, based on existing stations from geophysical networks. Also shown are stations that are already providing real-time data streams.

The proposal addresses two related problems:

- (1) The lack of an open, uniform and seamless statewide real-time network in California. Our State with its size, population, unique spatial referencing environment, and despite the tremendous resources at its disposal is far behind in providing a real-time solution for precise spatial referencing, a requirement for increased economic productivity and innovation in private and public sectors for a growing number of interrelated applications.
- (2) The crisis in Federal funding of the California Spatial Reference Center (CSRC), the absence of State support and funding, and a lack of a clear vision for the future. We are still guided by the CSRC's Master Plan for a Spatial Reference Network in California ("Master Plan") published in 2002, which needs to be updated to account for technological advances, infrastructure enhancements, and societal priorities.



The complete proposal (version 3.3) is provided in *Appendix A*. The proposal after a series of discussions and revisions was adopted by the CSRC Executive Committee. We have distributed the Statewide CRTN proposal as follows:

- Sent to County Engineers Association of California (CEAC) Surveying Policy Committee, consisting of 26 County Surveyors who formulate surveying related information for CEAC (Canas, June 30, 2008)
- Sent to League of California Surveying Organizations (LCSO). This organization is a key reviewer of surveying legislation proposals, standards and guidelines for regional governments. Presented at monthly LCSO meeting for review and comment (Andrew and Canas, City of Long Beach, July 10, 2008).
- Sent to County Surveyors. Mailed to each of the 58 individual County Surveyors in California (July 14, 2008, Canas).
- Presented at CLSA Board of Directors Meeting, Oakland, July 26, 2008 by CSRC liaison Steve Martin.
- Posted on CSRC and SOPAC websites.
- Sent to NGS and UNAVCO.

Height Modernization Projects

Central Coast 2007-2008

We completed field GPS observations at 151 monuments for the Central Coast project during the period 27 November 2007 to 22 January 2008. PGM Client user training was provided to the contractors by CSRC staff in La Jolla on 27 September 2007. Observation schedules, monument locations, field personnel, receiver model numbers, antenna model numbers, and monument images were entered through PGM client (Manager Mode). Session metadata were collected through PGM client (Technician Mode). Raw GPS observation data were uploaded with PGM client, and converted to RINEX format. The RINEX file headers were produced by the SOPAC database, based on the session metadata entered through PGM client. A focused and very successful PGM problem-solving session was conducted by CSRC staff on 7 January 2008 in La Jolla with Pete DeKrom (Towill Field Manager) and Marti Ikehara (CSRC Project Manager).

CSRC analyzed all GPS data for the project using session-mode GPS post-processing with the RTD software. This includes 151 monuments and 49 CGPS stations (PBO and BARD). We used SECTOR-based CGPS coordinates in ITRF2005 at epoch 2008.0. We applied the NOAA Trop model to correct for tropospheric refraction and improve the precision and accuracy of ellipsoidal heights. The output for each session is a SINEX file with full covariance information.

The SINEX files were converted to a G-file by transforming each SINEX file into a non-trivial set of independent baselines. The B-file was created from PGM entry and the CSRC database, as well as the SERFIL. This is the first height modernization project for which CSRC has created bluebook files directly from the CSRC database and PGM entry.

The CSRC contractor (Towill) is evaluating the CSRC GPS analysis, and the CSRC-output B-file, G-file & SERFIL. They are performing the orthometric adjustment and preparing the final report. The Project Manager is working on the D-file. After several delays, the project report is expected to be submitted to CSRC for review by 31 July.

The status of this project can be viewed at <http://csrc.ucsd.edu/projects/pgm/cenchr2007.html>.

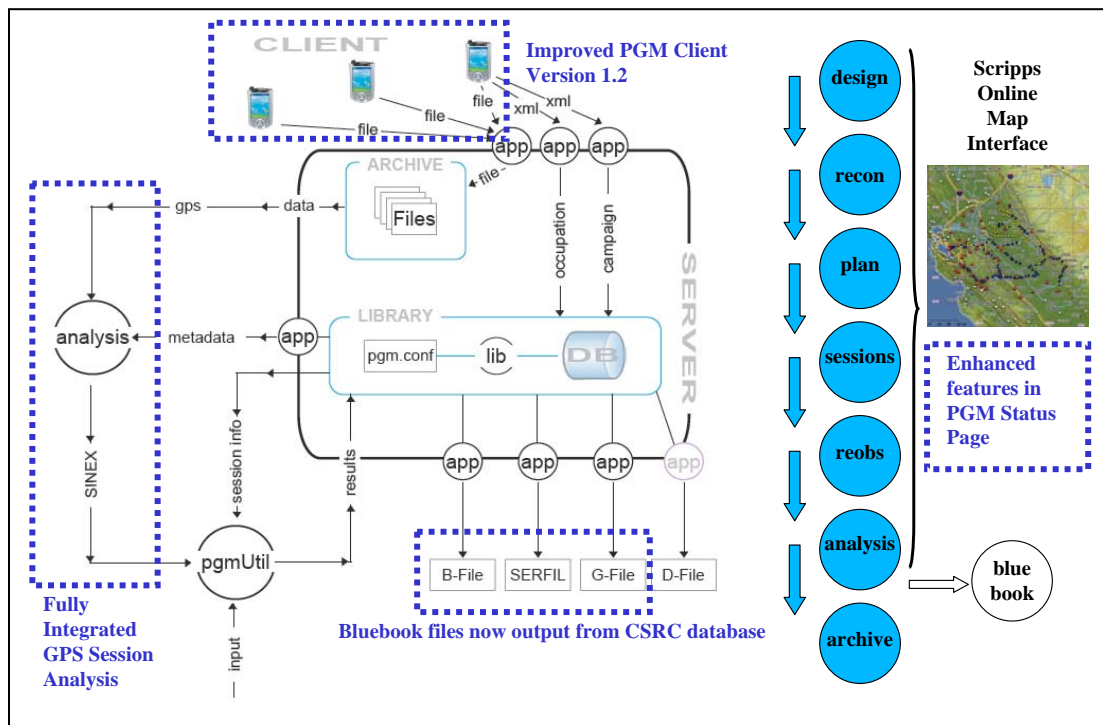
Northern San Joaquin Valley 2006

This project was conducted between 24 July and 29 September 2006 by Johnson Frank Associates. In parallel, Caltrans District 10 conducted GPS observations at a set of additional and overlapping monuments. There was a considerable delay in uploading the complete set of Caltrans data and metadata to the CSRC archive. We have completed the GPS analysis for the Caltrans data and performing the network adjustment for the entire data set, consisting of 152 monuments observed by 26 surveyors and 31 CGPS stations (PBO and BARD). The status of the project can be viewed at <http://csrc.ucsd.edu/projects/pgm/nsjv2006-map.html>.

As described for the CENCHM2007 project, we have created SINEX files, B-file, G-file and SERFIL for this project. These will be the basis for the orthometric adjustment, which will be performed by one of our on-call contractors (Penfield and Smith). We expect to have the contract in place by August.

IT for Height Modernization: PGM Software Enhancements

As shown in the figure below, we made enhancements to PGM in 3 main areas: improved PGM client (version 1.2), enhanced features in PGM status page, added output of NGS bluebook files, and fully-integrated session-mode GPS analysis. The entire process (except for D-file creation has been fully integrated into the CSRC web environment and SOPAC database.



Improvements to PGM client (version 1.2) are outlined at:

http://troj.ucsd.edu/ubbcgi/ultimatebb.cgi?ubb=get_topic;f=35;t=000005

The software can be downloaded from:

<ftp://geopub.ucsd.edu/pub/public/PGM/2008/>

There are 4 versions:

[PGMClient-MM-20080428-Installer.exe](#) - manager version for desktop/laptop

[PGMClient-TM-20080428-Installer.exe](#) - technician version for desktop/laptop

[PGMClient-PDA-MM-20080428.CAB](#) - manager version for PDA

[PGMClient-PDA-TM-20080428.CAB](#) - technician version for PDA

Outreach Efforts

- 3 April 2008: League of California Surveying Organization (LCSO) Meeting, State of the NGS, Riverside (Davis, Canas)
- 9 April 2008: SOPAC/CSRC /PBO Meeting, Scripps, La Jolla (Bock, Canas, Andrew, Helmer, Whitaker, Connors)
- 23-25 April, Exhibited at CalGIS Conference, Modesto (Ikehara, Kelly)
- 23 April 2008: CSRC Executive Committee Teleconference
- 1 May 2008: LCSO Meeting Orange County (Canas)
- 2 May 2008: CLSA/CSRC RTN Workshop, Ontario (Bock, Helmer, Whitaker, Martin)
- 7 May 2008: CSRC Executive Committee Meeting, San Jose
- 8 May 2008: CSRC Coordinating Council Meeting, San Jose
- 9 May 2008: CLSA/CSRC RTN Workshop, San Jose (Helmer, Martin, Canas)
- 12-15 May 2008: Attended 13th FIG International Symposium on Deformation Measurements and Analysis, Lisbon, presented paper “NAVD88 Orthometric Height Determination Utilizing the California Real Time GPS Network and varied Occupation Time Intervals” (Whitaker)
- 16 May 2008: Attended NGS RTN Operators Meeting, Sacramento (Helmer)
- 4 June 2008: CSRC Executive Committee Teleconference
- 5 June 2008: LCSO Meeting, San Bernardino (Canas)
- 13 June 2008: Meeting with Luke Nachbar, NOAA Legislative Affairs (Bock, Turingan)
- 16 June 2008: CSRC Executive Committee Teleconference
- 25 June 2008: CSRC Executive Committee Teleconference
- 20 June 2008: CALTRANS/CSRC RTN meeting, Scripps, La Jolla (Bock, Canas, Andrew, Helmer, Whitaker, Connors, Davis, Turner, Turingan)
- 10 July 2008: Presented the CRTN Statewide Proposal at the monthly LCSO meeting for review and comment, City of Long Beach (Andrew, Canas)
- 18 July 2008: UNAVCO/PBO/JPL/SIO meeting, Scripps, La Jolla (Bock, Webb, Turingan)
- 23 July 2008: CSRC Executive Committee Teleconference

National Height Modernization

- Participated in monthly conference calls (Canas, Turingan, Bock)

Governance

CSRC is governed by an Executive Committee, which holds monthly conference calls and occasional face-to-face meetings. Minutes of these minutes can be found at <http://csrc.ucsd.edu/general/reports.html>.

The EC main accomplishments include:

- Prepared CSRC Work Plan for FY 08/09
- Contributed to, reviewed and approved Statewide CRTN Proposal
- Submitted list of proposed “California CORS” to NGS
- Oversaw RTN workshops in collaboration with CLSA

Real Time Network Seminars and Report to CLSA

The following was submitted to CLSA by Steve Martin, EC Member and CSRC Liaison to the CLSA Board of Directors.

The activities of the California Spatial Reference Center this past quarter include:

- CSRC and CLSA sponsored a Real Time Networks seminar May 2nd in Ontario and May 9th in Santa Clara. Attendance was great, 104 in Ontario and 84 in Santa Clara, essentially sold out in both locations. The speakers included: Bill Henning, Dr. Charlie Schwarz and Marti Ikehara of NGS; Dr. Yehuda Bock and Greg Helmer of CSRC; Bryan Banister of CALTRANS and Gavin Schrock of the Washington Spatial Reference Network. Feedback indicates that it was a very timely, informative topic that has created lots of discussion. To view Powerpoint presentations from the seminar goto: <ftp://californiasurveyors.org/>; login: chapter@californiasurveyors.org, password: clsa or there is a link to the site at <http://csrc.ucsd.edu/>
- Funding for future projects and continued operation continues to be a critical issue and CSRC is pursuing several avenues. Kathleen Ritzman of the Scripps Institution of Oceanography, government relations office reports that 8 million for “Geospatial modeling grants” has been added to the FY09 Senate budget bill which potentially gives CSRC another source of funds to compete for.
- Dr. Bock has presented a white paper on a Proposal for a Statewide California Real Time Network. Version 3.3 of this work in progress is attached. The proposal is to open up access to CRTN and create partnerships to support a Statewide Real Time Network. Dr. Bock, Greg Helmer and Cecilia Whitaker met with representatives of CALTRANS June 20th to discuss the proposal. Dr. Bock has had some discussions with PBO on the proposal and CSRC is seeking to meet with other potential partners in this Statewide CRTN. CSRC requests your input on the White Paper by July 31st.

Financial Report

The last CSRC monthly financial report for this quarter and this award period is given in *Appendix B*.

Appendix A

Living Document



Proposal for a Statewide California Real Time Network Version 3.3

California Spatial Reference Center
Scripps Institution of Oceanography, La Jolla, CA

June 27, 2008

Please send comments to ybock@ucsd.edu

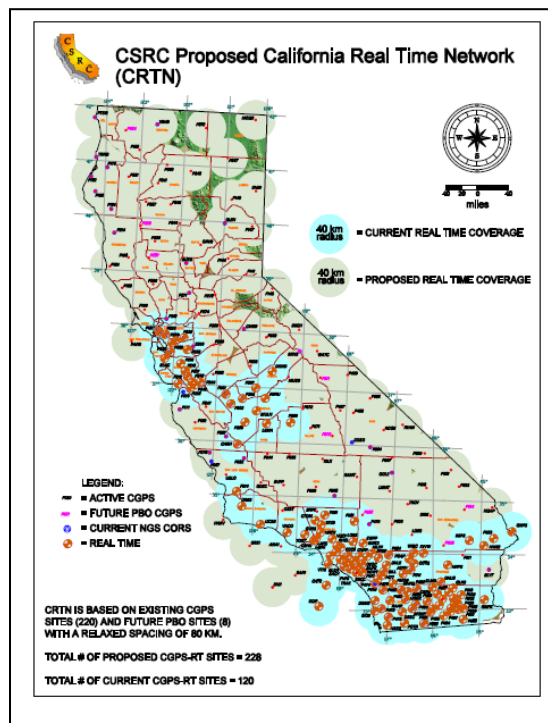
Statement of the Problem

This proposal addresses two related problems:

- (1) The lack of an open, uniform and seamless statewide real-time network in California. Our State with its size, population, unique spatial referencing environment, and despite the tremendous resources at its disposal is far behind in providing a real-time solution for precise spatial referencing, a requirement for increased economic productivity and innovation in private and public sectors for a growing number of interrelated applications.
- (2) The crisis in Federal funding of the California Spatial Reference Center (CSRC), the absence of State support and funding, and a lack of a clear vision for the future. We are still guided by the CSRC's Master Plan for a Spatial Reference Network in California ("Master Plan") published in 2002, which needs to be updated to account for technological advances, infrastructure enhancements, and societal priorities.

The premise of this proposal is that a slightly modified version of the existing California Real Time Network (CRTN) and its expansion throughout the State will provide a needed public utility, realign CSRC priorities, enlarge our constituency, and enhance funding opportunities for the CSRC. Besides our traditional users, a successful effort could impact such areas as disaster preparedness and relief efforts, flood plain management, water transportation infrastructure, precision agriculture, International and offshore boundary mapping, aircraft landing and safety systems, intelligent transportation and telematics, fleet management, and coastal and harbor navigation.

The figure on the right (prepared by Art Andrew) shows a statewide network with 80 km spacing, based on existing stations from geophysical networks. Also shown are stations that are already providing real-time data streams.



Elements of a Proposed Statewide CRTN

There are distinct advantages to adopting a slightly revised CRTN model for a statewide system:

- Builds upon existing (~80) CRTN stations in southern California, operated since 2003 by SOPAC, USGS, PBO, Orange County, San Diego County, and MWD, and the CVSRN operated in the Central Valley by Caltrans (see figure)
- Requires a partnership with existing geophysical networks (SCIGN, PBO) to expand the network throughout the State - discussions initiated with UNAVCO management
- Uses only CGPS stations that are part of the California Spatial Reference Network (CSRN), and built for high-accuracy, longevity, and geophysical stability
- Leverages existing metadata/archive infrastructure at SOPAC/CSRC
- Is directly tied to the California Spatial Reference System (CSRS) and National Spatial Reference System (NSRS) through SECTOR velocity model and HTDP crustal motion model, providing seamless epoch-date conversions
- Fulfills the requirements of the California public resource code for GPS-derived coordinates and orthometric heights, as provided by statutes that became effective on January 1, 2007
- Is able to recover from large seismic events by instantaneous monitoring of changing site positions, followed by rapid geophysical modeling and updates to SECTOR and HTDP models
- Contributes to and uses national real-time atmospheric propagation models (troposphere and ionosphere)
- Has a 20-80 km spacing, with 24/7 coverage and latency of 1 second
- Supports both kinematic and dynamic applications using server-side network positioning, rather than a rover-intensive approach
- Provides on-the-fly geodetic coordinates, and orthometric heights through national geoid models supplemented with local corrections
- Requires no user fees but is subsidized by CRTN partners
- Provides open access to CRTN network solution through public protocol using standard GNSS formats (RTCM, NMEA)
- Provides access to raw data streams in receiver-native format to CRTN partners
- Is managed by a consortium, which may be under the CSRC Executive Committee through the UCSD Support Group
- Is operated by the CSRC facility at SOPAC under contracts with partners

Current Situation

CRTN is operational (~80 stations) and provides complete RT coverage with a latency of less than 1 second for the five southernmost California counties (Imperial, Los Angeles, Orange, Riverside and San Diego) (<http://sopac.ucsd.edu/projects/realtime/>). Single-base RTK is fully supported through a variety of open protocols (RTCM, NTRIP). CRTN also

provides two types of network solutions (client-side and server-side). Currently, access to the network solutions requires PDA-based commercial software, available from a single vendor. PBO has also started to provide real-time data streams in RTCM and BINEX formats. The Figure shows the current availability of real-time data streams.

Some development is still required at SOPAC to complete on-the-fly epoch-date conversions and to stream orthometric heights.

Additional Information: Powerpoint presentation by Y. Bock for 2008 CLSA/CSRC RTN seminars (“California Real Time Network: Rationale, Results and Future Plans” – accessible at anonymous ftp://dozer.ucsd.edu/pub/public/CRTN_WhitePaper).

The Request for Information (RFI) for Real Time GPS/GNSS Data Sharing for the State of California, California Dept. of Transportation (Caltrans) dated June 2008 is complementary to this proposal. Information submitted in response to the Caltrans RFI will be shared with the CSRC in order to improve this proposal.

Management and Governance

The governance of CRTN would be provided through the CSRC Support Group at UCSD. The Support Group currently includes CSRC Bylaws, the CSRC Coordinating Council (CC), and the CSRC Executive Committee (EC). The Support Group could decide to form additional entities such as a CRTN Consortium with its own set of bylaws but accountable to the CSRC EC. The CRTN Consortium would include the CRTN Partners. Each consortium member (CRTN partner) would sign a contract with the University to agree to pay a pre-established rate for CRTN services. Unlike the grant process in which the CSRC PI/Director has ultimate responsibility for the grant, CRTN would be run through service contracts to the SOPAC recharge facility. In addition to serving as a Center at SIO, SOPAC serves as a mechanism for service contracts to be entered into by the University. This mechanism is advantageous since it requires a lower university overhead rate (45% instead of 54.5%). In addition, a portion of the overhead is returned to SOPAC. Members would provide governance and oversight of CRTN through these contracts and may withhold payment if services are not rendered and completed to their satisfaction.

Cost Recovery

The revenue for CRTN would come from SOPAC contracts with CRTN partners similar to the ones with the Riverside County Flood Control and Water Conservation District and the Riverside County Department of Transportation who have contracted with SOPAC for services (last one was in 2003).

CSRC/SOPAC would develop an annual budget for CRTN, including an approved rate sheet and justification of costs. There may be various ways to determine the cost per consortium member/partner. One possible cost basis (favored by Scripps) could be a

daily rate based on the annual budget (in this case partners would need to contribute enough funds to cover a total of 365 days of operation); another would be the number of ports (stations) a partner accesses. If the yearly budget increases or decreases, future consortium membership rates could be adjusted. A deficit or surplus from the previous year could also be incorporated into the consortium membership rates and would be readjusted from year to year. The budget and rates would be decided upon by the Consortium.

Each contract must conform to University requirements. To provide flexibility, it is recognized that contracts would vary according to the requirements of the contracting agency. It should be noted that warranties cannot be stipulated in University contracts.

Consortium funds administered through SOPAC could be used to subcontract services to others, such as UNAVCO, especially since many real-time sites are operated by them.

CSRC-Executive Committee**Meeting Date:** 05-07-2008**Subject:** White Paper: (Draft) Proposal for a Statewide California Real Time Network, dated May 5, 2008, submitted by Yehuda Bock, Director CSRC/SIO.

Executive Council discussion recognized that the draft proposal outlined an idea for transitioning CRTN to a statewide multi-user system, and that many of the details would necessarily be developed over time. To facilitate continued discussion, the following questions are presented for clarification.

Responses provided by Yehuda Bock on June 6, 2008.

1. What does “open” mean, please clarify the extent of what “open” is indicating?

Open means that CRTN will provide the protocol for anyone to freely use the server-generated network-solution through a single IP port. This will require fairly minor modifications to controller software provided by GPS vendors. I’ve already outlined the benefits of using the server-based RTK approach in that we will be able to provide instantaneous real-time access to epoch-date, geodetic coordinates and orthometric heights directly tied to the CSRS and NSRS, based on state-of-the-art reference stations built to survive earthquakes.

2. Will the *raw receiver data* from all stations be made available (continuously and simultaneously)?

Yes for partners. This capability provides a serious load on the system if it is used extensively. If various vendors or other groups would like this kind of access they should become partners by contributing funds to maintain CRTN. The benefit to the vendors is that they will not have to construct and build their own infrastructure, or that they can use CRTN to backup, densify, and/or extend their existing infrastructure.

3. Will all private agencies have 24/7 accesses and is it intended to be freely available to vendors to resell?

See answer above. They are free to resell if they are partners.

4. How is “Independent governance” to be defined?

This term is not used in my proposal, but see the section on “Management and Governance.”

5. Managed and operated by CSRC?

Yes, or by SOPAC if CSRC does not want to take on this responsibility. See the section on “Management and Governance.”

6. Who would own CRTN?

It will be operated by SOPAC/CSRC. See the section on “Management and Governance.” It wouldn’t be owned by one single group since no one group controls all the assets. It will require cooperation with several groups (UNAVCO/PBO and partners such as Caltrans, MWD, Counties) and understandings among them.

7. Are we open to all vendors s/w and capable of a fair competitive process in making this selection?

Y, Bock’s presentation at the CLSA/CSRC RTN seminars (see above ftp link to document) assumes that CRTN would continue to use the Geodetics RTD Pro software to gather and disseminate data and network solutions. This software is integral to research being performed at SOPAC into the development of earthquake early warning systems, but is also able to support field surveying in the most general sense using the server-side network RTK approach. The latter has been demonstrated successfully as part of the 2006 Southern California Height Modernization project using legacy Trimble GPS receivers with respect to CRTN. The RTD software has also been used in post-processing for the 2006 North San Joaquin Valley and the 2007 Central Coast projects. There is also some R&D required at SOPAC to provide the complete suite of models as part of the centralized server-based approach so there will need to be close cooperation between s/w vendor and CRTN. Some of this R&D is ongoing.

8. Who would own the software?

The software will be licensed by USCD/SIO as it is now.

9. Who owns the hardware that is/will be used by CRTN?

Hardware includes computer workstations and peripherals, radio communications equipment, GPS equipment and peripherals, GPS monuments, etc. Ownership will be mixed because CRTN is a cooperative project. Hardware at the central facility at SIO (workstations) will be owned by UCSD.

10. What arrangement does CSRC have with Scripps on the use of hardware?

No arrangement is required since CSRC is a Scripps project. See the section on “Management and Governance.” Of course, long-term commitment is based on adequate funding.

11. With funding issues being what they are (scarce) long-term reliability is an essential quality toward partnering. This begs the question, what is the foreseeable life-span of CRTN?

The primary intention of the proposal is to put CSRC and its projects (including CRTN) onto a more favorable funding environment that relies less on Federal funding and more

on local and State funding. The intention is also to keep CSRC focused on staying at the cutting edge and being responsive to the needs of its constituency, which we hope to grow to include non-traditional users. So the foreseeable life-span of CRTN depends on whether we can implement and sustain this vision.

12. How would decisions be made with respect to the managing of the network?

Through the CSRC EC, or other group. See the section on “Management and Governance.”

13. Who would provide server software updates?

Since all network computations will be done at the CRTN server, updates will be seamless to the user and will not require modifications to field controller software.

14. CSRC's responsibility?

To run and manage the network and provide user support, and to provide oversight. The CRTN budget will have adequate funding to support these functions.

15. Who are the potential partners?

Some mentioned above: UNAVCO/PBO, Caltrans, MWD, Water Districts, Counties, Private Sector Survey Companies, GPS Vendors

16. We need a workable plan that includes identifying specifics on what partners might want. (A more detailed proposal is needed to approach partners.)

The CSRC needs to take the lead on this and solicit comments from the surveying community and professional organizations. The future users and partners need to provide insight and feedback on what they expect/need from a statewide network.

Additional questions by Mark Turner (Caltrans) and responses by Yehuda Bock

Why have so many surveyors and engineers, including potential users in Caltrans, as well as the surveying service provider companies (Servco, CSDS, Haselbach, etc): 1) Not accepted the current CRTN model or fully utilize the existing CRTN subnetworks?, and 2) Compelled to actively build their own RTN infrastructure and provide/subscribe RTN network solutions for their users?

Currently CRTN has several limitations. First of all, it is limited to southern California (Imperial, Orange, Los Angeles, Riverside, and San Diego Counties). Most (if not all) of the service providers are outside of this region. Secondly, it is not an open system with respect to providing a network RTK solution or access to raw GPS data streams. Thirdly, it has had some technical problems in serving RTCM data to Trimble users. The first two

limitations are addressed by this proposal; the third limitation appears to have been resolved.

Obviously, there is a profit motive driving the GPS vendors and service providers and they may continue with their efforts regardless of how CRTN develops. On the other hand, the benefit to the vendors is that they will not have to construct and build their own infrastructure, or that they can use CRTN to backup, densify, and/or extend their existing infrastructure. It is in CRTN's interest to have vendors become CRTN partners. Although they are interested in promoting their individual network RTK solutions, they may decide that it is more economical to make use of the CRTN infrastructure and data products.

Will a new "open" CRTN model (and/or coupled with NGS/CSRC guidance) address the needs of this community and enable them to integrate, or disband any portion of, their efforts by leveraging the CRTN infrastructure and data? How?

Yes, I believe that this is adequately discussed in the present version (3) of the proposal.

Appendix B

CALIFORNIA SPATIAL REFERENCE CENTER FY2007-2008 NOAA/NGS Grant Budget by Task (FY07 Funding) Revenue and Expenses from October 1, 2007 to June 30, 2008

<i>TASK</i>	<i>Task 1 Educ & Outreach</i>	<i>Task 2 SW Zone</i>	<i>Task 3 Info Tech/ Data Portal</i>	<i>Task 4 CGPS Op&Mnt</i>	<i>Task 5a HM Task Adj N San Joaquin</i>	<i>Task 5b HM Task Intrgrt Data Data Portal</i>	<i>Task 5c HM Task Ctrl Coast Ht Mod</i>	<i>Task 6a Mgmt & Admin</i>	<i>Task 6b Exec Mgr/ Financial Advisor</i>	<i>FY0607 Improve Geoid Model</i>	<i>Reserve Funds*</i>	<i>TOTAL</i>
REVENUE												
FY0607 Carry Forward	(15,054)		(26,513)	(41,263)			164,765	(21,210)	(33,416)	100,313	61,887	189,509
Transfer September 2007*							102,217			(71,313)	(30,904)	0
FY0708 Award	40,000	25,000	50,000	245,000	112,000	88,000	225,000	125,000	50,000	0	0	960,000
Transfer June 2008*	30,353	(25,000)	36,743	139,816	(140,879)	(18,056)	3,284	7,219	17,013	(19,510)	(30,983)	0
FY0708 Budget	55,299	0	60,230	343,553	(28,879)	69,944	495,266	111,009	33,597	9,490	0	1,149,509
EXPENSES												
Salaries	16,106	0	37,377	198,013	5,791	43,954	15,964	64,760	0	0	0	381,965
Consultants	11,182	0	0	0	650	0	0	3,978	29,323	7,250	0	52,383
Subcontractors	0	0	0	357	0	0	339,691	0	0	(850)	0	339,198
Supplies	10,255	0	1,684	33,205	31	1,317	1,211	6,906	0	1,780	0	56,389
Equipment	0	0	0	0	0	0	0	0	0	0	0	0
Travel	2,403	0	0	3,395	0	0	323	320	0	0	0	6,441
Total Direct Costs (DC)	39,946	0	39,061	234,970	6,472	45,271	357,189	75,964	29,323	8,180	0	836,376
Indirect Costs (IDC)	15,353	0	21,169	108,583	3,277	24,673	157,212	35,045	4,274	1,310	0	370,896
EXPENSES THROUGH JUNE 30, 08	55,299	0	60,230	343,553	9,749	69,944	514,401	111,009	33,597	9,490	0	1,207,272
BALANCE	0	0	0	0	(38,628)	0	(19,135)	0	0	0	0	(57,763)

***NOTES:**

1. Current FY0708 NOAA/NGS award start and end dates are July 1, 2007 and June 30, 2008.
2. Reserve Funds Column: For tasks completed in FY0607, \$45,281 in surplus funds (PBO Coordination and Real Time Networks) and \$100,200 in reserve funds were used to cover a deficit of \$83,594 (NAVD88, San Joaquin Valley Ht Mod, and North San Joaquin Valley Ht Mod Projects); thus, the reserve funds were reduced to \$61,887. For past reports, Canas asked that all negative carry forward balances be zeroed out; however, for this report in FY0607, Farquharson (IGPP Business Office) requested that only completed tasks be zeroed out. For FY0708 tasks, the remaining reserve funds were used to zero out negative balances.
3. Transfer September 2007 Line (Revenue Section): As discussed at EC teleconferences, \$102,217 was added to the Central Coast Ht Mod task to cover the Towill PO; thus, \$71,313 in surplus funds (FY0607 Improve Geoid Model subcontract was cut from the work plan) and \$30,904 in reserve funds were transferred to cover this deficit.
4. Transfer June 2008 Line (Revenue Section): As requested by Dr. Bock, surpluses and deficits were transferred to zero out the balances in FY0708.