

Appendix A



AGENDA

COORDINATING COUNCIL FALL MEETING

California Spatial Reference Center
Martin Johnson House, Building T29
Scripps Institution of Oceanography, UCSD, La Jolla
Thursday, October 15, 2009 - 9:30 a.m. to 3:15 p.m.

Time	Topic	Primary Lead
9:30	Greetings and Orientation	
10:00	Opening <ul style="list-style-type: none">Welcome and Introductions	Art Andrew
10:15	Director's Report <ul style="list-style-type: none">CSRC OverviewCRTN	Dr. Yehuda Bock
11:30	CSRC Funding <ul style="list-style-type: none">Financial ReportCRTN Business ModelConsortium Meeting Summary	Maria Turingan/Art Andrew
12:00	Lunch Break	
1:00	Executive Manager's Report <ul style="list-style-type: none">CRTN Outreach Efforts	John Canas
1:15	Caltrans Report <ul style="list-style-type: none">Update	Mark Turner
1:30	PBO/UNAVCO <ul style="list-style-type: none">Partnership	Adrian Borsa
2:00	NGS Report <ul style="list-style-type: none">Update	Renee Shields
2:15	Bylaw Changes <ul style="list-style-type: none">NGS Representatives - Non-Voting Status	John Canas
2:30	Discussion	All
3:00	Closing <ul style="list-style-type: none">Comments	Art Andrew
3:15	Adjourn	



Contacts: Art Andrew, Chairman
Phone 714-834-3804, Email art.andrew@ocpw.ocgov.com

Maria Turingan, Administrator
Phone 858-822-2156, Email mariaturingan@ucsd.edu





Appendix B

CSRC Coordinating Council Fall Meeting October 2009, Attendees List

Name	Email	Organization
1 Adrian "Dick" Davis*	Adrian_Davis@dot.ca.gov	Caltrans, CSRC EC
2 Adrian Borsa	borsa@unavco.org	UNAVCO
3 Agnew Duncan*	dagnew@ucsd.edu	IGPP
4 Andrea Gordon	ajgordon@ucsd.edu	Scripps Institution of Oceanography
5 Art Andrew*	Art.Andrew@ocpw.ocgov.com	Orange County Public Works, CSRC EC
6 Bill Hofferber*	BHOFFERB@rcflood.org	Riverside County Flood Control
7 Bob Packard*	pbo3417@verizon.net	CSRC
8 Brian Wiseman*	bwiseman@mwdh2o.com	MWD
9 Bruce Hunsaker	bruce.hunsaker@towill.com	Towill, Inc
10 Bruce Urquhart	bruce_urquhart@dot.ca.gov	Caltrans
11 Chance Bainum	CBainum@mwdh2o.com	MWD
12 Dan Gilleland*	DGilleland@valleywater.org	Santa Clara Valley Water District, CSRC EC
13 Guy Masters*	gmasters@ucsd.edu	IGPP, CSRC EC
14 Jeff Little*	JDL7@PGE.COM	PG&E
15 Jim Morrell	JMORRELL@rcflood.org	Riverside County Flood Control
16 John Canas*	jcanas@socal.rr.com	CSRC
17 Kevin Kelly*	kevin_kelly@esri.com	ESRI, CSRC EC
18 Maria Turingan	mariaturingan@ucsd.edu	CSRC, IGPP
19 Mark Turner*	mark_turner@dot.ca.gov	Caltrans
20 Marti Ikehara*	Marti.Ikehara@noaa.gov	NGS, Caltrans, CSRC EC
21 Mike Duffy*	mduffy@mwdh2o.com	MWD
22 Ned Salman	ned_salman@dot.ca.gov	Caltrans
23 Renee Shields	Renee.Shields@noaa.gov	NGS
24 Steve Martin*	sjmartin@ebmud.com	EBMUD, CSRC EC
25 Yehuda Bock*	ybock@ucsd.edu	CSRC, IGPP, CSRC EC



*CSRC CC Members

All CSRC CC Members present at the time of the Bylaws vote approved to accept the revisions (highlighted).



CSRC Director's Report

Yehuda Bock
Scripps Orbit and Permanent Array Center (SOPAC)
California Spatial Reference Center (CSRC)
Scripps Institution of Oceanography
La Jolla



CSRC Coordinating Council Fall Meeting
La Jolla
October 15, 2009

ShakeOut Today at 10:15 AM: <http://www.dropcoverholdon.org/>

Summary

- CSRC funding has been reduced this year to \$100k from NGS height modernization program – has resulted in staff layoffs
- SOPAC funding for real-time GPS research and other related projects is good and we have several proposals in review
- We are pursuing a new business model for CSRC that focuses on expansion of CRTN through In-State funding sources with partnership with PBO and other data providers
- Successful inaugural CRTN Consortium Meeting held on October 2
- Future of CSRC (beyond this year) depends on our ability to raise funds through the CRTN Consortium

SOPAC/CSRC Staff

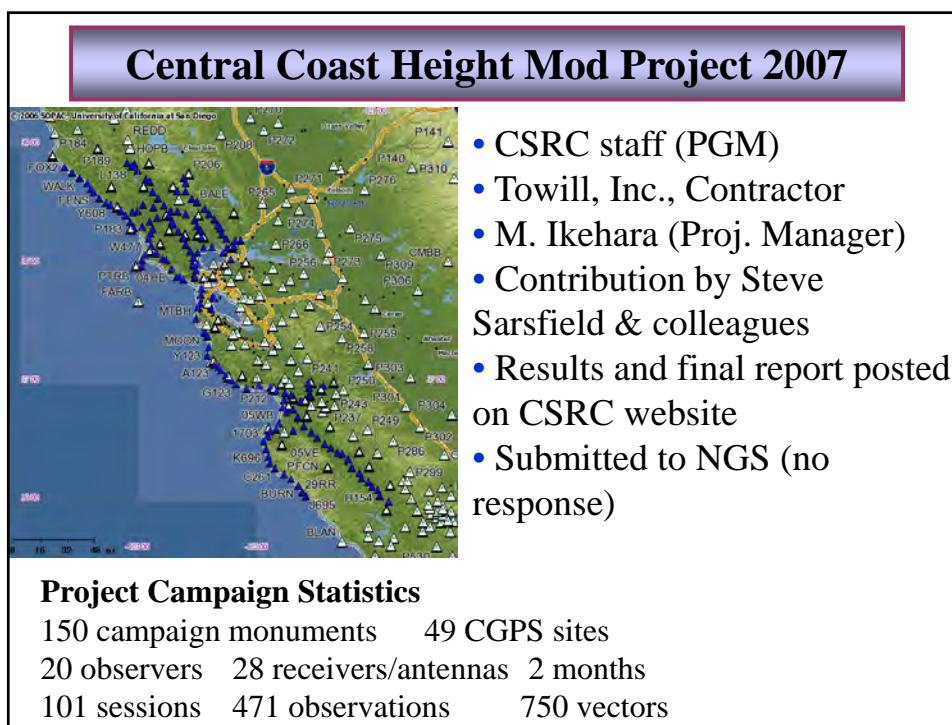
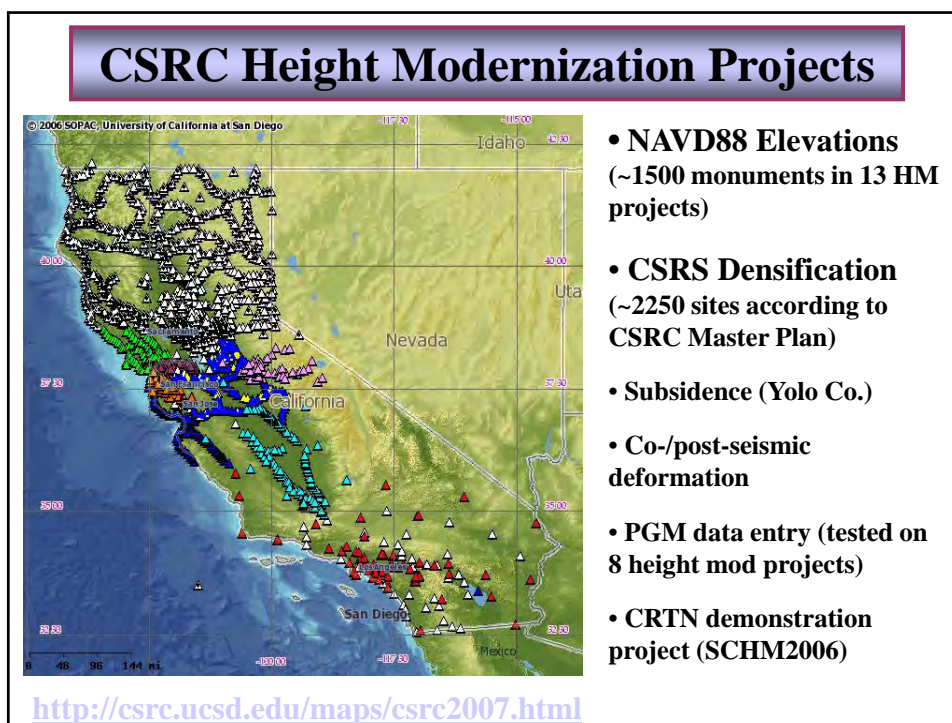


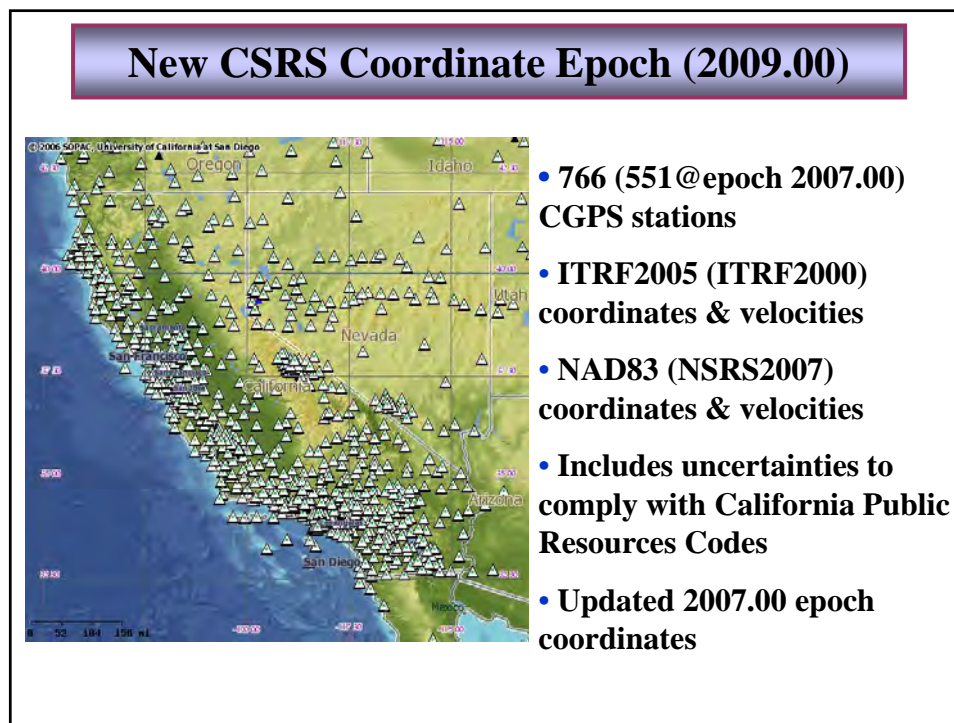
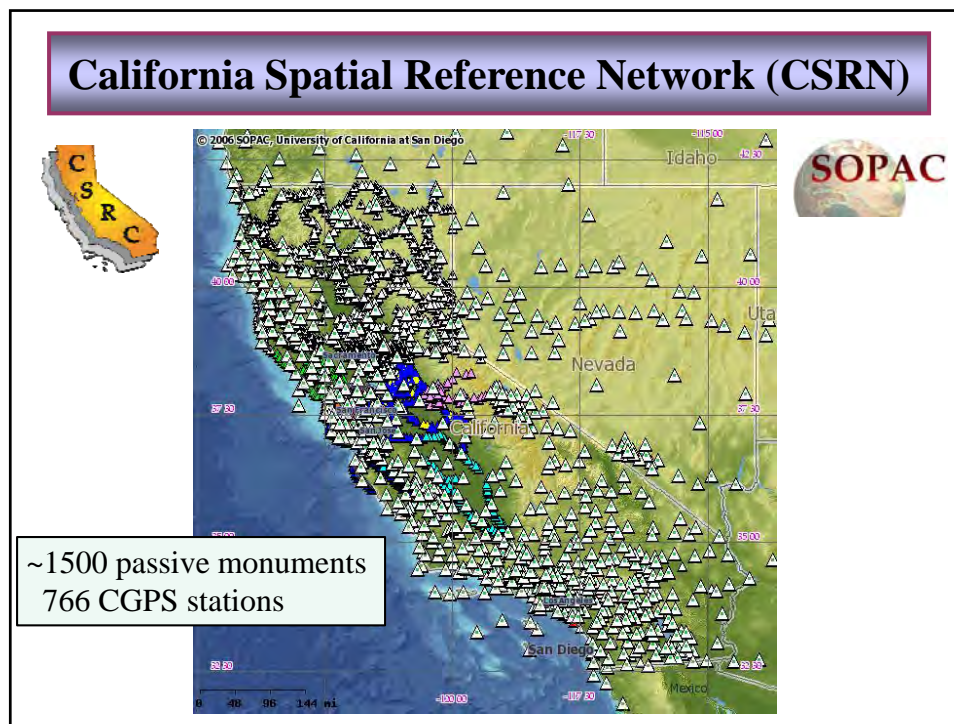
- Director: Yehuda Bock
- Coordinator: Maria Turingan
- Analysis: Peng Fang
- Web Administrator and Programmer: Paul Jamason
- System Administrator: ~~George Wadsworth~~, Brent Gilmore (1 day a week)
- Programmer Analyst: Mindy Squibb
- GIS Programmer: ~~Ian MacLeod~~
- SCIGN and CRTN Field Support Staff: Glen Offield
- PGM Technician: ~~Ryan Sapinosa~~

CSRC Consultants



- CSRC Executive Manager: John Canas, PLS
- Geodetic Consultant: Cecilia Whitaker, PLS

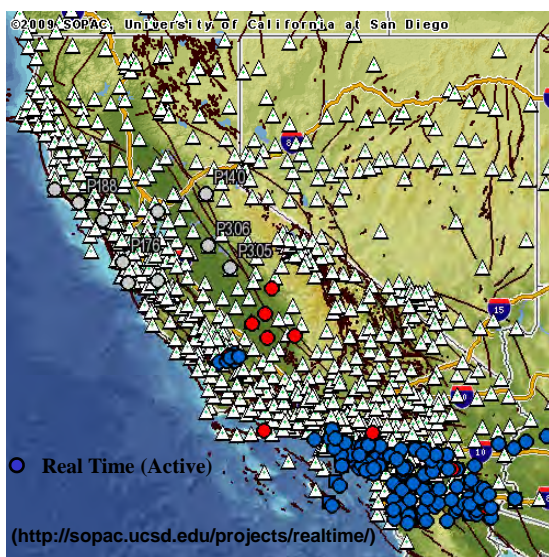




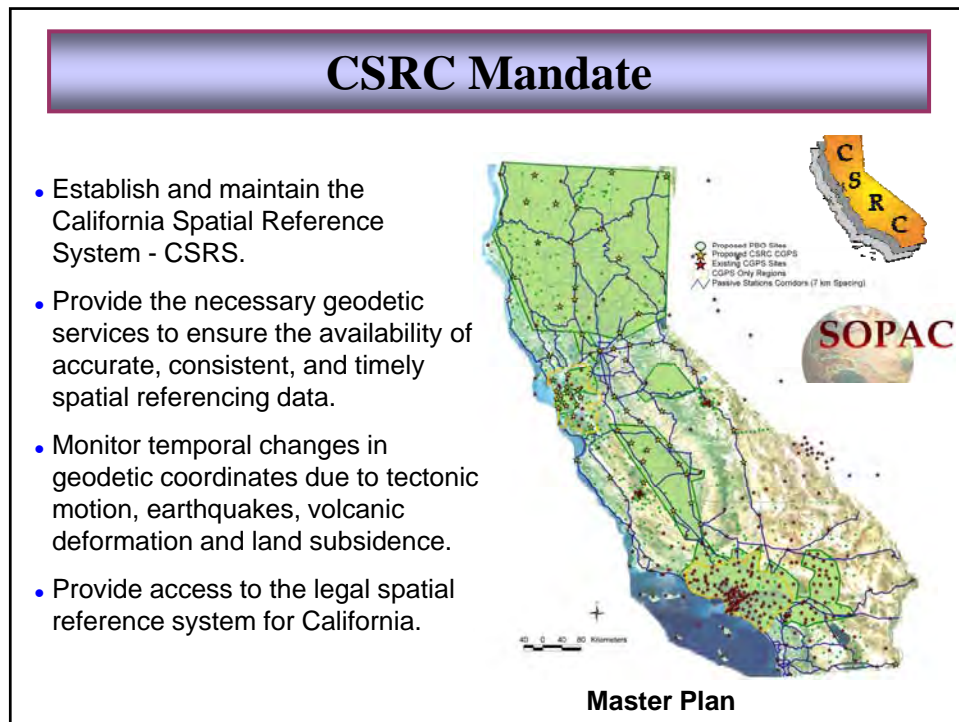
Further Height Mod Work

- Complete North San Joaquin Valley project (CSRC, Dick Davis, Marti Ikehara) and submit to NGS
- Update all height mod projects in CSRC database and portal to be consistent with latest PGM procedures
- Re-adjustment of all CSRS monuments
- Incorporation of newer geoid models (Geoid09)
- Re-survey of selected monuments

California Real Time Network (CRTN)



- First stations in 2002, currently ~130 stations operated by SOPAC, USGS, PBO, Orange County, San Diego County, and MWD
- 1 Hz Raw GPS data streamed over dedicated radio links with a latency of a fraction of a second
- Stations have been built to high standards for geophysical monitoring



CRTN & California Public Resources Codes

CALIFORNIA CODES PUBLIC RESOURCES CODE, SECTION 8856-8858	
<p>8856. The geodetic control stations within the State of California having horizontal positions conforming to all of the following requirements shall be part of the CSRN. The horizontal positions shall: (a) Be referenced to NAD83. (b) Have been determined by GPS survey methods. (c) Be published by NGS or CSRC. (d) Have a NGS or CSRC published network accuracy of two centimeters or better as defined by FGDC or a NGS or CSRC published accuracy of first order or better as defined by FGCS. (e) Have a NGS or CSRC published horizontal velocity or a horizontal velocity that can be determined using procedures and values published by NGS or CSRC.</p> <p>8857. The geodetic control stations within the State of California having ellipsoid heights conforming to all of the following requirements shall be part of the CSRN. The ellipsoid heights shall: (a) Be referenced to NAD83. (b) Have been determined by GPS survey methods. (c) Be published by NGS or CSRC. (d) Have a NGS or CSRC published network accuracy of five centimeters or better as defined by FGDC or a NGS or CSRC published accuracy of fourth order, class II, or better as defined by FGCS.</p> <p>8858. The geodetic control stations within the State of California having orthometric heights determined by GPS survey methods and conforming to all of the following requirements shall be part of the CSRN. The orthometric heights shall: (a) Be based on NAD83 and referenced to NAVD88. (b) Be published by NGS or CSRC. (c) Have a NGS or CSRC published network accuracy of five centimeters or better as defined by FGDC.</p>	<ul style="list-style-type: none">• CRTN is directly tied to the California Spatial Reference System (CSRS) and National Spatial Reference System (NSRS), which fulfills the requirements of the California Public Resources Codes 8856(c)(e), 8857(c), and 8858(b) for GPS-derived geodetic coordinates and orthometric heights

Appendix C: CSRC Director's Report

CRTN Proposal, 10/16/08

Living Document



Proposal for a Statewide California Real Time Network
Version 6.0

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

October 16, 2008

Prepared by

Yehuda Bock, CSRC Director
Mario Iuringen, CSRC Coordinator
CRTN Review Committee:
Art Andrew (Chair)
Gigi Cardoza
Ross Carlson
Chris Walls
Cecilia Whitaker

Please send comments to
ybock@ucsd.edu & Art.Andrew@rdmd.ocgov.com

CRTN Business Model, 7/15/09

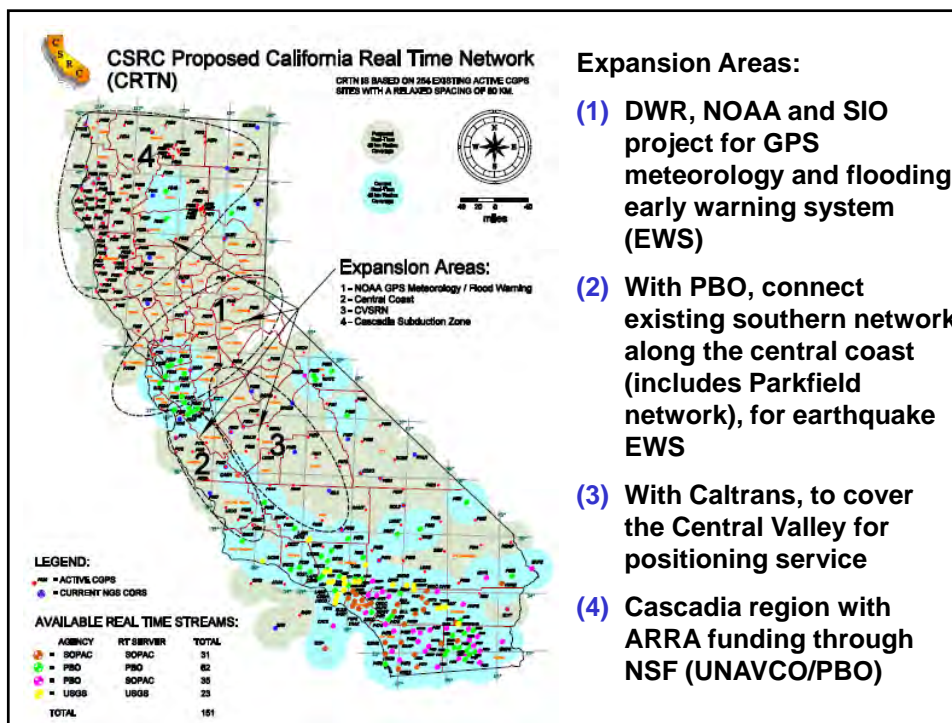
Living Document



Business Model for the Statewide California Real Time Network
California Spatial Reference Center
July 15, 2009



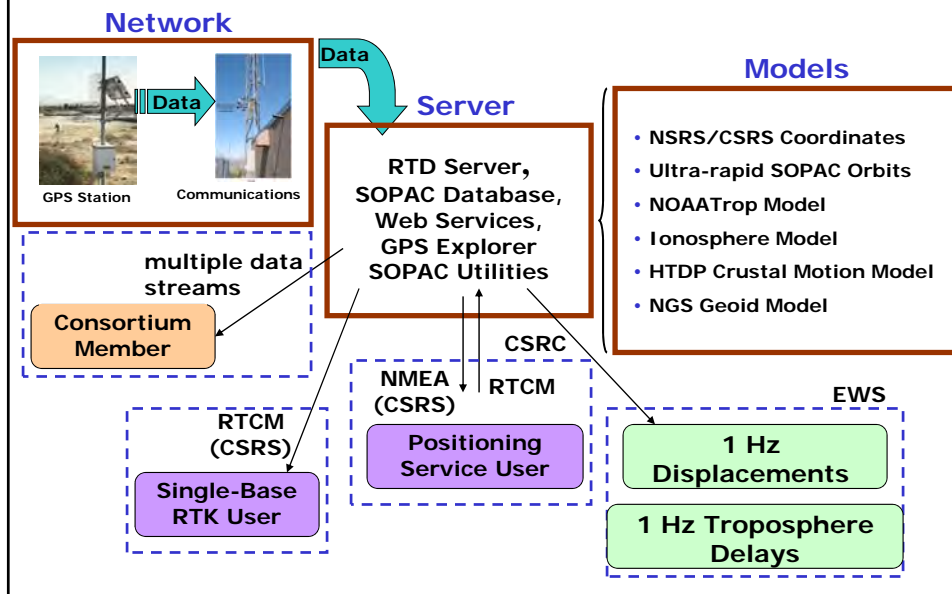
Typical CRTN station (RAAP - Ramona Airport, San Diego County)

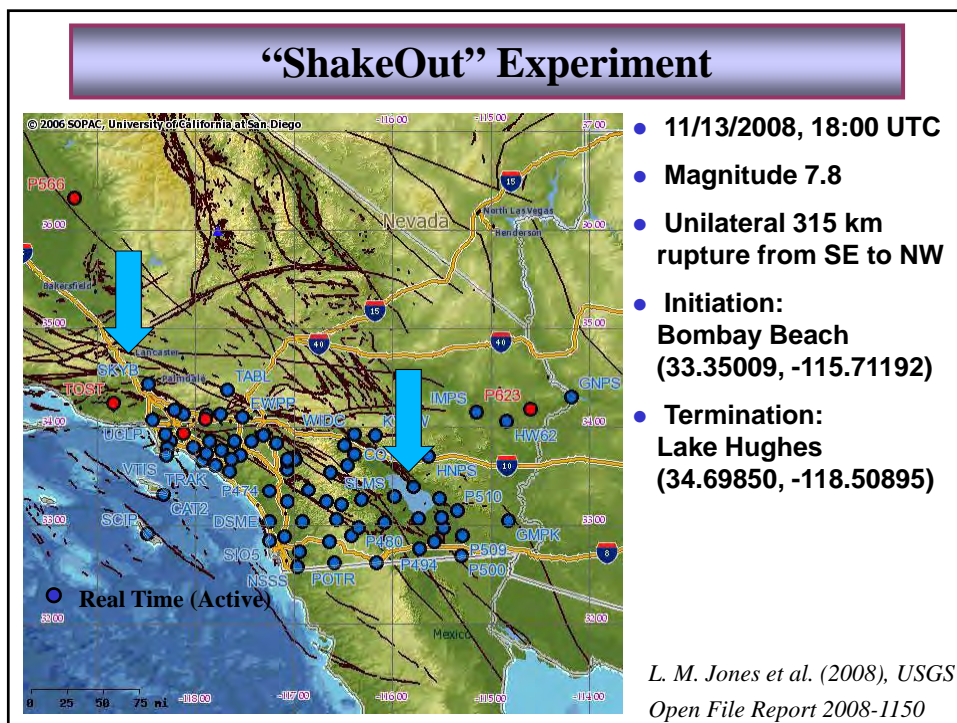
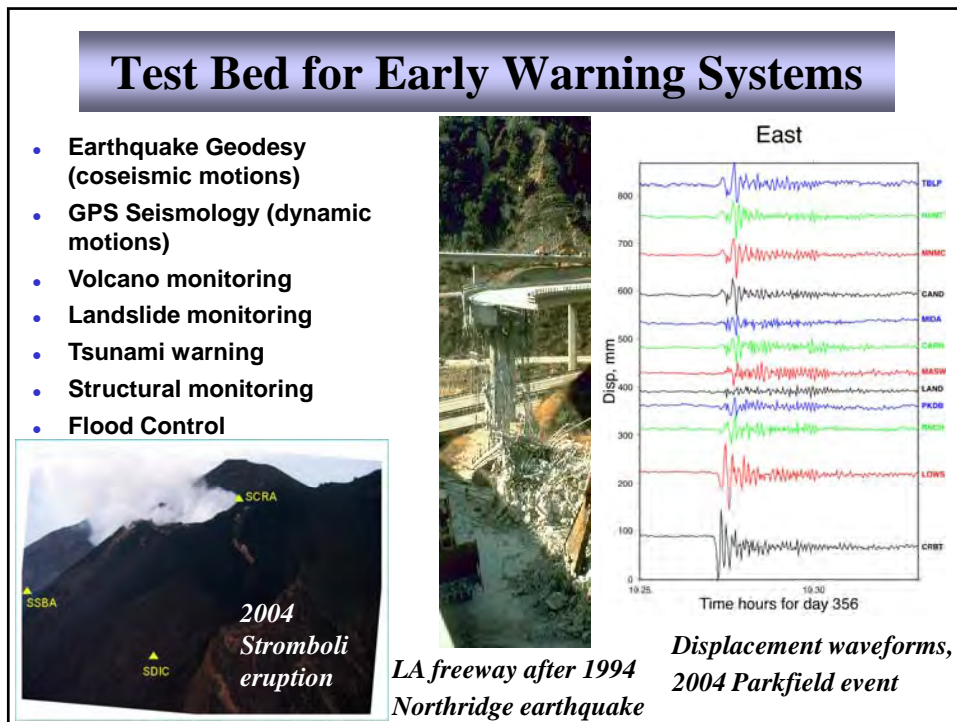


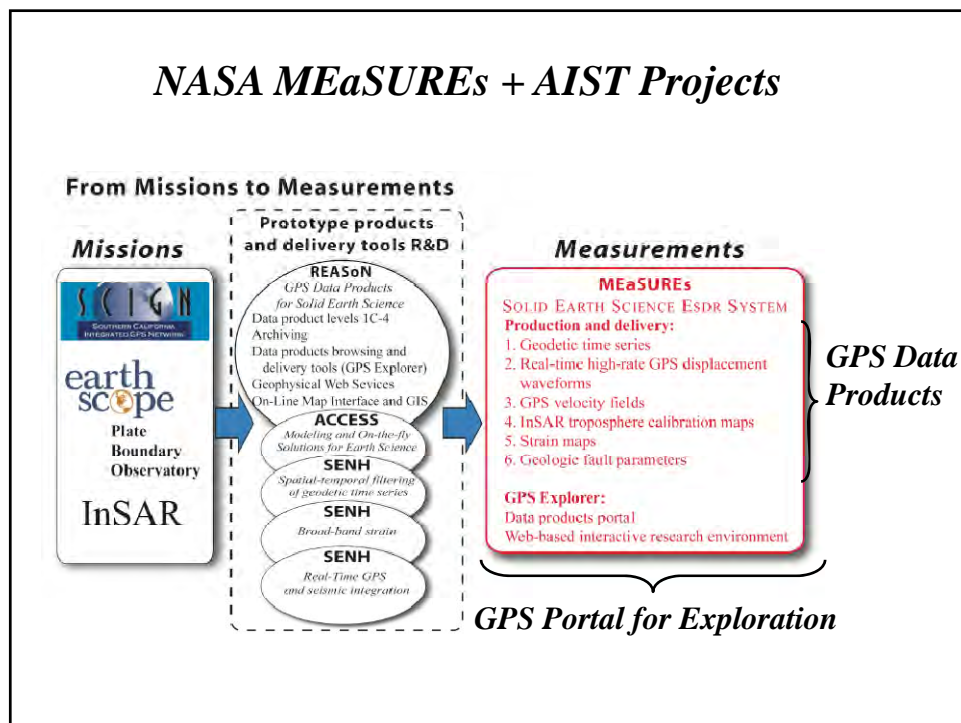
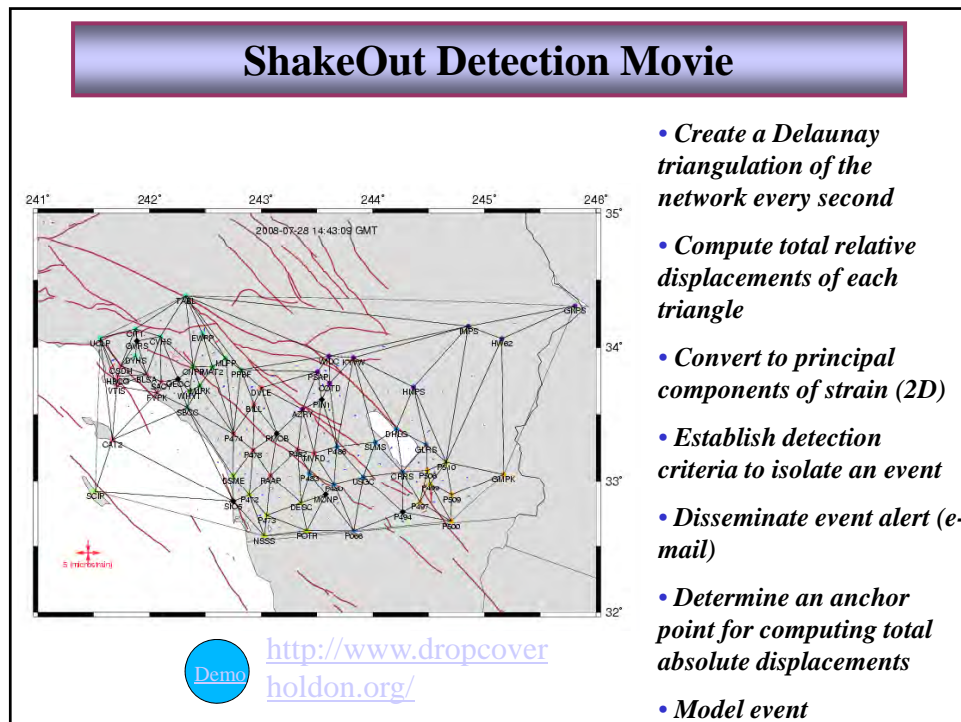
NSF/UNAVCO/PBO Perspective

- 150-250 stations will be upgraded to real time on a cost recovery basis, using at least 3G cell modems to meet latency requirements
- UCSD/UNAVCO will enter into an agreement for cost recovery and station upgrades using service agreement funds from Consortium members
- CRTN will benefit from PBO upgrades in the Cascadia region, including northern California
- Although PBO data are freely available and accessible to anybody, CRTN will assist PBO in fielding users' inquiries and providing user support and a united voice for our user community
- Nothing in the Business Plan, CRTN agreements, or any legal document may imply NSF or government endorsement, promise, commitment, or level of service above the existing operational PBO standards

CRTN Components



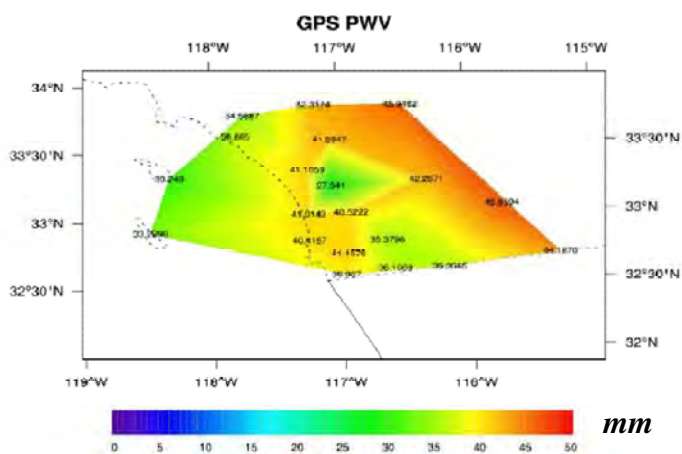




Hourly GPS PW Plots

- Real-time GPS delays are available from the California Real-time Network (CRTN)
- Delays are averaged over the preceding hour
- Hourly analyses are available from the 13-km Rapid Update Cycle (RUC) numerical weather prediction model
- RUC analyses give T and P at GPS sites, so PW is calculated every hour
- Plots are constructed and uploaded to a public website
- This method has the potential to improve weather forecasting ability by filling a crucial gap in forecaster knowledge: the present state of atmospheric water vapor

2pm PDT Saturday July 25

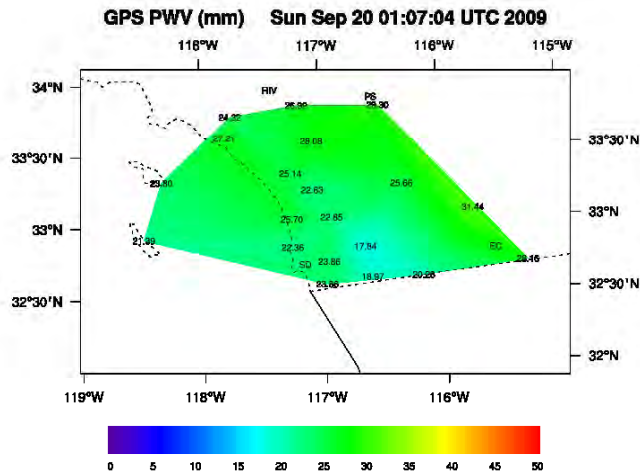


**You can see
the high values
off to the east
due to the
monsoon and
low elevations
and the lower
values over the
mountains**

Prepared by Jim Means

Appendix C: CSRC Director's Report

Hourly PW Image



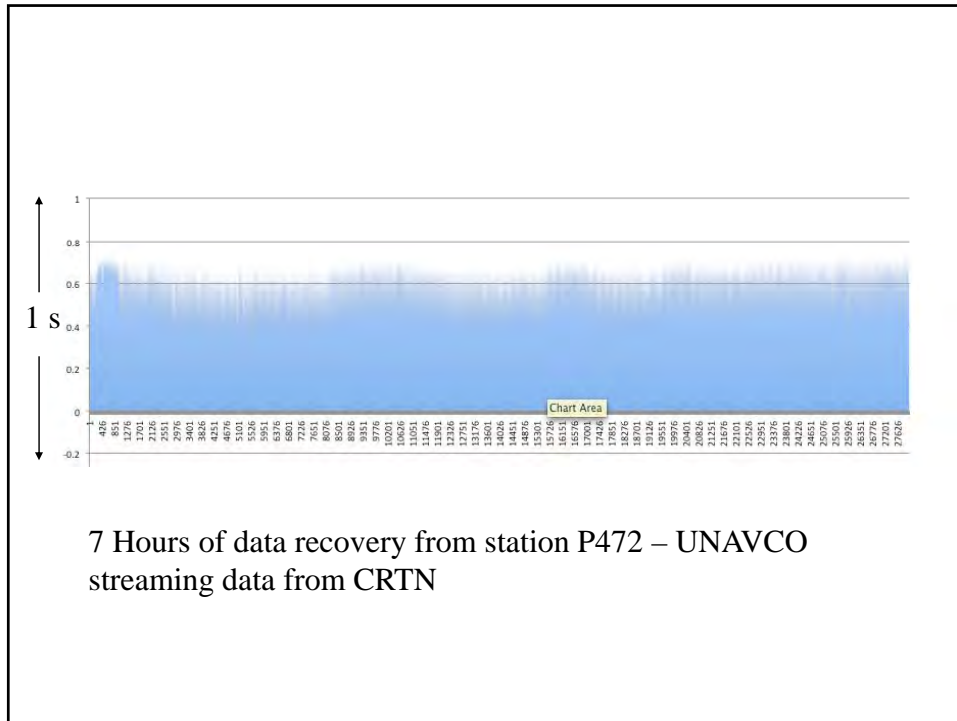
<http://tenaya.ucsd.edu/~jmeans/realtime-pw.html>

Prepared by Jim Means

Latency Tests – CRTN/SDCRTN

site	median (s)	iqr (s)	95% (s)	receiver	sub-net	% data	run length	start date
desc	0.73	0.80	1.19	lei	sdcrtn	100.000	23:49:17	24-Sep
dsme	0.67	0.17	0.25	lei	sdcrtn	99.744	21:30:35	30-Sep
monp	0.37	0.07	0.10	ash	sdcrtn	100	21:33:54	30-Sep
mvfd	0.42	7.84	11.61	ash	sdcrtn	100	21:33:51	30-Sep
nsss	0.49	0.07	0.11	ash	sdcrtn	100.000	22:52:11	25-Sep
p066	0.34	0.10	0.14	tr	sdcrtn	99.996	22:52:08	25-Sep
p472	0.29	0.06	0.09	tr	sdcrtn	99.988	23:49:07	24-Sep
p480	0.27	0.06	0.09	tr	sdcrtn	99.996	21:33:50	30-Sep
p483	0.36	0.07	0.10	tr	sdcrtn	99.991	23:49:09	24-Sep
pmob	0.35	0.06	0.09	ash	sdcrtn	100.000	22:59:52	27-Sep
potr	0.14	0.03	0.04	lei	sdcrtn	100.000	23:49:17	24-Sep
raap	0.58	0.17	0.25	lei	sdcrtn	100.000	24:08:13	26-Sep

Appendix C: CSRC Director's Report



Latency Tests – CRTN/HPWREN

site	median (s)	iqr (s)	95% (s)	receiver	sub-net	% data	run length	start date
azry	0.45	0.08	0.12	ash	crtn	100.000	24:08:13	26-Sep
cotd	0.47	3.93	5.82	ash	crtn	100.000	22:59:55	27-Sep
crrs	0.30	0.07	0.10	tr	crtn	99.993	24:08:07	26-Sep
dhlq	0.41	0.07	0.10	ash	crtn	99.999	24:08:12	26-Sep
glrs	0.30	0.07	0.11	tr	crtn	99.993	24:08:07	26-Sep
kyvw	0.47	0.15	0.22	ash	crtn	100.000	22:59:53	27-Sep
p494	0.31	0.08	0.12	tr	crtn	99.999	22:52:10	25-Sep
p499	0.35	0.10	0.15	tr	crtn	99.939	22:51:22	25-Sep
pin1	0.43	0.08	0.11	ash	crtn	100	21:33:53	30-Sep
pin2	0.46	0.14	0.20	ash	crtn	100	21:33:34	30-Sep
psap	0.45	0.09	0.13	ash	crtn	100.000	22:59:54	27-Sep
scip	0.40	0.07	0.11	ash	crtn	100.000	22:52:12	25-Sep
sio5	0.38	0.07	0.10	ash	crtn	100.000	24:08:13	26-Sep
slms	0.29	0.06	0.09	tr	crtn	99.988	22:59:42	27-Sep
widc	0.39	0.08	0.12	ash	crtn	100.000	22:59:54	27-Sep

Latency Tests – CRTN/OCRTN

site	median (s)	iqr (s)	95% (s)	receiver	sub-net	% data	run length	start date
cat2	0.85	0.57	0.85	tr	ocrtn	99.987	22:50:12	28-Sep
cccs	1.47	0.60	0.89	ash	ocrtn	99.774	22:47:20	28-Sep
fvpk	0.66	0.13	0.19	ash	ocrtn	99.999	22:50:27	28-Sep
mjpk	0.67	0.14	0.20	ash	ocrtn	99.911	22:49:13	28-Sep
oeoc	0.89	0.35	0.52	ash	ocrtn	98.972	21:20:36	30-Sep
sacy	0.52	0.10	0.14	ash	ocrtn	100.000	23:49:19	24-Sep
sbcc	0.46	0.11	0.17	tr	ocrtn	99.990	23:49:10	24-Sep
snhs	0.80	0.13	0.19	ash	ocrtn	86.144	19:40:33	28-Sep
trak	0.72	0.15	0.22	ash	ocrtn	99.999	22:59:54	27-Sep
whyt	0.63	0.13	0.19	ash	ocrtn	99.974	22:50:06	28-Sep

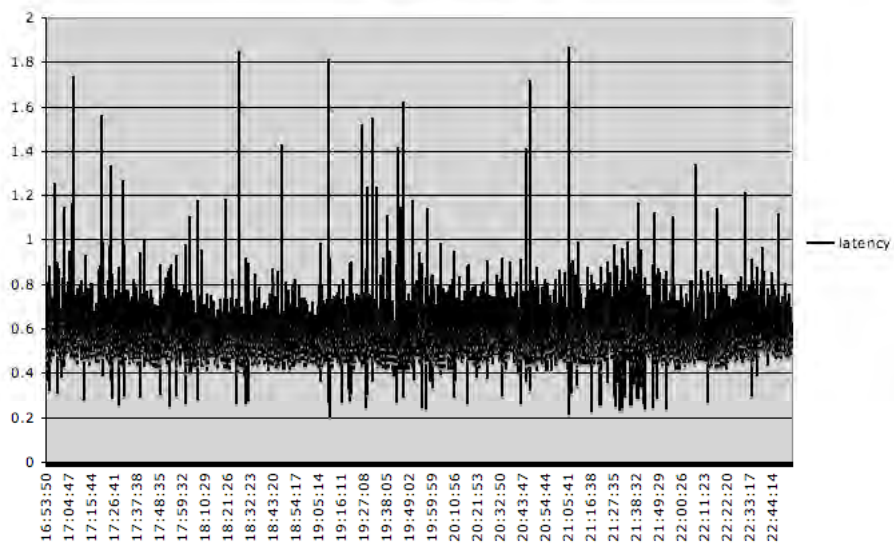
Latency Tests – CRTN/MWD

site	median (s)	iqr (s)	95% (s)	receiver	sub-net	% data	run length	start date
bill	0.78	0.58	0.85	tr	mwd	99.999	21:33:11	30-Sep
cnpp	0.78	0.60	0.89	tr	mwd	99.998	23:49:15	24-Sep
ewpp	0.76	0.60	0.88	tr	mwd	99.997	23:49:14	24-Sep
gnps	0.75	0.57	0.85	tr	mwd	99.995	22:52:07	25-Sep
hnps	0.76	0.57	0.85	tr	mwd	99.988	22:50:30	25-Sep
imps	0.76	0.57	0.84	tr	mwd	99.995	22:52:07	25-Sep
mat2	0.78	0.57	0.85	tr	mwd	99.999	24:06:41	26-Sep
ppbf	0.99	1.07	1.58	tr	mwd	99.635	24:02:55	26-Sep

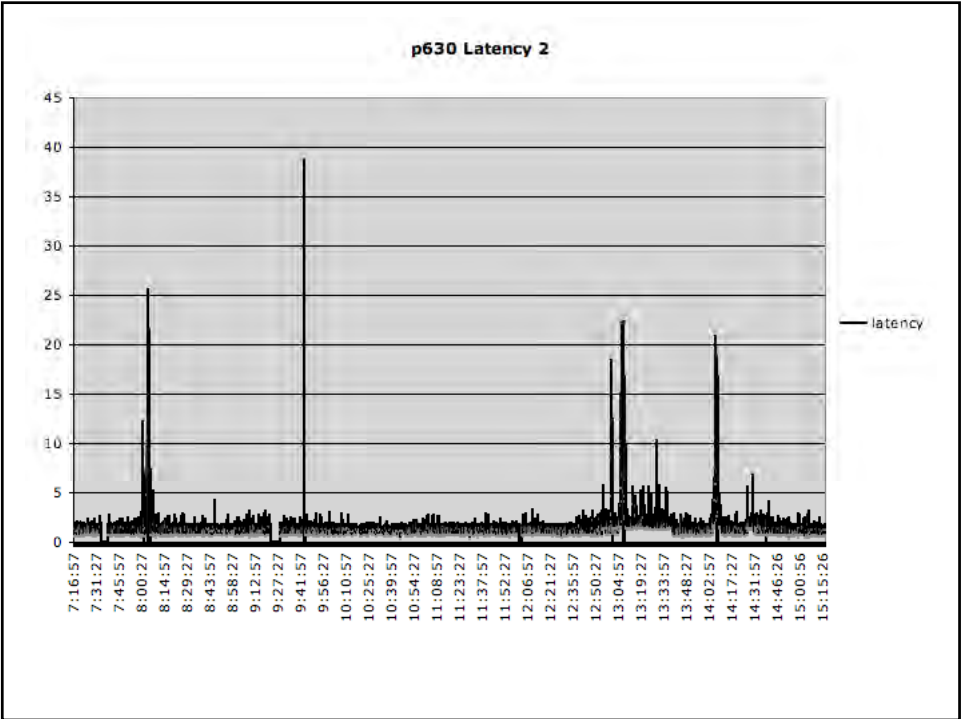
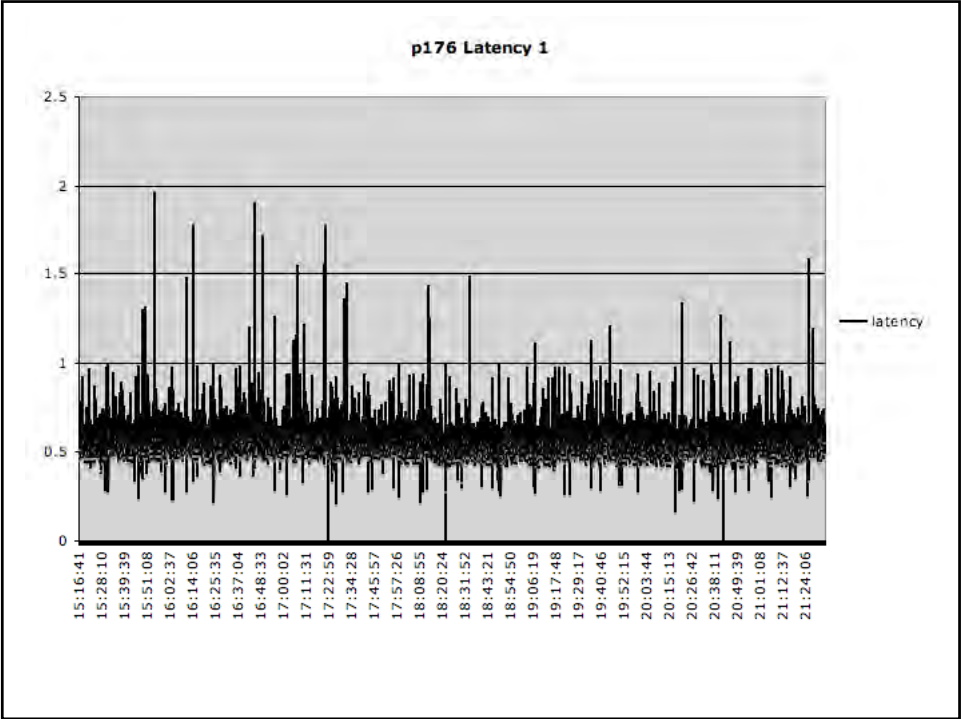
Latency Tests – PBO

site	median (s)	iqr (s)	95% (s)	receiver	sub-net	% data	run length	start date	Notes
p176	0.56	0.08	0.12	tr	unavco	98.17	21:52:41	29-Sep	CDMA
p217	1.23	0.50	0.75	tr	unavco	99.361	9:58:12	29-Sep	CDMA
p229	1.43	1.39	2.06	tr	unavco	73.607	16:24:07	29-Sep	Radio to CDMA
p602	0.75	0.15	0.22	tr	unavco	99.086	22:04:56	29-Sep	LanCell2 CDMA
p630	1.51	0.54	0.80	tr	unavco	97.852	21:48:17	29-Sep	CDMA
p781	0.56	0.09	0.13	tr	unavco	100	6:00:01	29-Sep	LanCell2 CDMA

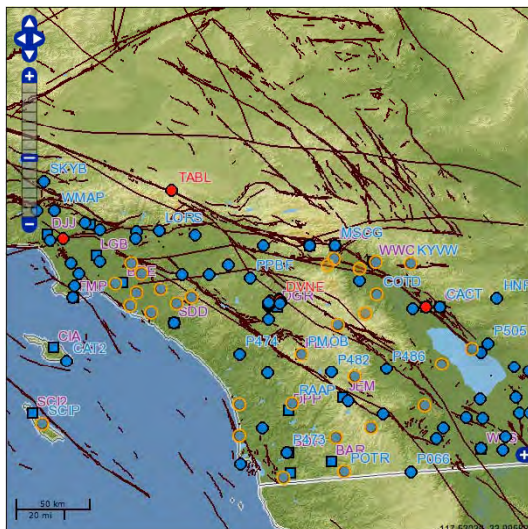
p781 Latency 1



Appendix C: CSRC Director’s Report



Proposal for USGS ARRA Funds



- Includes upgrades to 32 stations
- Replace Ashtech Z-12 receivers (GPS and some GNSS)
- Improve telemetry links

Conclusions

- Poised for CRTN expansion into 4 significant regions in California – requires establishment of CRTN Consortium
- Significant outreach efforts are needed
- Endorsement from NSF/UNAVCO/PBO to proceed with UCSD/SOPAC agreement
- Endorsement from NOAA for GPS Meteorology applications
- Applying for USGS Stimulus (ARRA) Funding – Upgrade of SCIGN&PBO stations in southern California (new receivers, real-time telemetry)

Appendix D: CSRC Financial Report

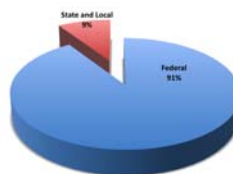
CSRC Financial Report, Funding Sources, and CSRC Council Membership

Maria Turingan

CSRC Coordinating Council Fall Meeting, October 15, 2009
Scripps Institution of Oceanography

Funds Received All Sources through FY 2009 (through June 2010)

Sources of Support	Jul-98 Jun-01	Jul-01 Jun-02	Jul-02 Jun-03	Jul-03 Jun-04	Jul-04 Jun-05	Jul-05 Jun-06	Jul-06 Jun-07	Jul-07 Jun-08	Jul-08 Jun-09	Jul-09 Jun-10	Total
Federal											
<i>Federal FY</i>	<i>FY98-00</i>	<i>FY01</i>	<i>FY02</i>	<i>FY03</i>	<i>FY04</i>	<i>FY05</i>	<i>FY06</i>	<i>FY07</i>	<i>FY08</i>	<i>FY09</i>	
NOAA's National Geodetic Survey	200,000	998,000	998,000	1,058,000	989,477	492,829	854,100	960,000	300,000	100,000	6,950,406
JPL/NASA									50,000		50,000
Federal Subtotal	200,000	998,000	998,000	1,058,000	989,477	492,829	854,100	960,000	350,000	100,000	7,000,406
State & Local											
Caltrans			59,897			138,399		44,701			424,597
Contra Costa County	181,600										16,750
County of Riverside	16,750										12,000
Glenn County			12,000		14,500						14,500
Riverside County Flood Control			25,000								25,000
San Diego County	10,000				174,515						184,515
Yolo County	14,500		14,000								28,500
State & Local Subtotal	222,850	-	110,897	-	189,015	138,399	-	44,701	-	-	705,862
TOTAL	422,850	998,000	1,108,897	1,058,000	1,178,492	631,228	854,100	1,004,701	350,000	100,000	7,706,268

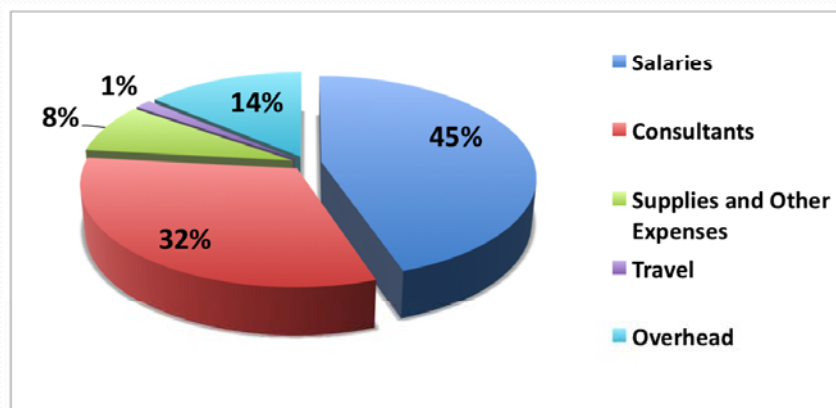


Appendix D: CSRC Financial Report

Latest Monthly Financial Report for FY09-10 (Jul09 to Aug09)

TASK	Education and Outreach	CGPS Operations and Maintenance	Management and Administration	Executive Manager	TOTAL
REVENUE					
FY08-09 Carry Forward Balance	0	1,000	0	0	1,000
FY09-10 Award	20,000	30,000	20,000	30,000	100,000
FY09-10 Budget	20,000	31,000	20,000	30,000	101,000
EXPENSES					
Salaries*	0	0	0	0	0
Consultants	0	0	0	0	0
Subcontractors	0	0	0	0	0
Supplies and Other Expenses	97	0	3	0	100
Equipment	0	0	0	0	0
Travel	0	0	0	0	0
Total Direct Costs (DC)	97	0	3	0	100
Indirect Costs (IDC)	16	0	0	0	16
EXPENSES THROUGH AUG 31, 09	113	0	3	0	116
BALANCE	19,887	31,000	19,997	30,000	100,944
PROJECTED EXPENSES					
Salaries*	9,088	22,081	14,101	0	45,270
Consultants	3,000	0	2,500	26,776	32,276
Subcontractors	0	0	0	0	0
Supplies and Other Expenses	4,026	3,341	638	0	8,005
Equipment	0	0	0	0	0
Travel	1,030	440	0	0	1,470
Projected Total DC	17,144	25,862	17,239	26,776	87,020
Projected Total IDC	2,743	4,138	2,758	4,284	13,923
PROJECTED THROUGH JUNE 30, 10	19,887	30,000	19,997	31,000	100,944
PROJECTED BALANCE	0	1,000	0	(1,000)	0

FY2009-10 Budget of \$100K: Projected Expenses



Appendix D: CSRC Financial Report

FY2009-10 Budget of \$100K: CSRC Personnel

CSRC Personnel	% of Effort	No. of Mos.	No. of Person Mos.
Yehuda Bock, CSRC Director	5.00%	12.00	0.60
Paul Jamason, Programmer/Analyst	5.50%	12.00	0.66
Melinda Squibb, Programmer/Analyst	3.00%	12.00	0.36
Brent Gilmore, Programmer/Analyst	3.00%	12.00	0.36
Donald Glen Offield, Development Engineer	5.00%	12.00	0.60
Maria Turingan, Coordinator	5.00%	12.00	0.60
<i>Total # of Person Months =</i>			<i>3.18</i>

Coordinating Council Membership (Part 1)

Membership Subgroup	Organization	No.	Incumbent	Comments
Professional Surveying Organizations (Active, State Legislation)	CELSOC, North	1	Vacant	
	CELSOC, South	1	Clyde C. Cabrinha	
	CLSA, President	1	Matt Vernon	
	CLSA, North	1	David Ryan	
	CLSA, South	1	Michael McGee	
	Total	5		
Professional Surveying Organizations (Other)	ACSM	1	Vacant	
	ASPRS	1	Jerry A. Wagner	
	League of California Surveying Organizations (LCSO)	1	Vacant	
	Total	3		
GIS Organizations and Professionals	CGIA	1	Vacant	
	URISA, North (BAAMA)	1	Dennis Wuthrich	
	URISA, South	1	Vacant	
	GIS Professionals (at large)	2	Bruce Joffe Kevin M. Kelly	
	Total	5		
Geophysical Research Professionals	BARD	1	Dr. Nicolas Houle	
	BARGEN	1	Dr. Brian Wernicke	
	PANGA	1	Dr. Timothy Melbourne	
	PBO, North	1	Vacant	
	PBO, South	1	Chris Walls	
	Southern California Geophysical Researchers	2	Dr. Nancy King Dr. Frank Webb	
	Geophysical Professional (at large)	1	Dr. Duncan Agnew	
	Total	8		
Federal Government	BLM	1	Daniel Schank	
	Bureau of Reclamation	1	Vacant	
	FEMA	1	Vacant	
	Forest Service	1	Vacant	
	GPS/USPO	1	Thomas J. Nagle	
	NGS, Director	1	Juliana Blackwell	
	NGS, State Geodetic Advisor	1	Marti Ikehara***	
	USGS	1		
	Total	9	Dr. Kenneth W. Hudnut	
State Resources Agency	BCDC	1	Vacant	
	Coastal Commission	1	Jonathan Van Coops	
	DWR	1	Scott Martin	
	Geological Survey	1	Vacant	
	Resources Agency (at large)	1	Gary Darling	
	Total	5		

Appendix D: CSRC Financial Report

Coordinating Council Membership (Part 2)

Membership Subgroup	Organization	No.	Incumbent
Other State Agencies	BP&LS	1	Ric Moore
	Caltrans	2	Giana (Gigi) Cardoza**
	Food and Agriculture	1	Mark Turner
	Forestry and Fire Protection	1	Vacant
	OES	1	Edward Bortugno
	Other State Agencies (at large)	1	Vacant
	Total	7	
Cities, Counties, and Local Agencies	County Engineers Association, North	1	Tony Pratt
	County Engineers Association, South	1	Michael Emmons
	League of California Cities	1	Vacant
	City/County/Local Agency Professionals (at large)	2	Art Andrew*
	Local Agencies (at large)	1	Bob Packard
	Total	6	Ross Carlson*
Utility Firms, Organizations and Districts	MWD	1	Michael Duffy
	Water, Utility, Flood, Irrigation/etc. Prof. (at large)	2	Brian Wiseman
	Flood/Irrigation Districts (at large)	1	Brett Baker
	Utility Companies (at large)	1	Bill Hofferber
	Total	5	Jeff Little
Educational Professionals (Surveying, GIS, and Geophysical)	UC-San Diego	1	Vacant
	CSU-Fresno	1	Dr. Mushaq Hussain
	Educational Professional (at large)	1	Jose Javier Gonzalez Garcia
	Total	3	
Non-Designated Professionals	Various Professionals (at large)	12	Michael Butcher
			John Canas
			Adrian (Dick) Davis*
			Larry Fenske
			Dan Gileland
			Greg Helmer
			Karl Launen
			Steve Martin**
			Ray Mathe
			Steve Sansfield*
			Jim Swanson
			Darrell Bain
	Total	12	
UCSD/SIO	Director of Center	1	Dr. Yehuda Bock***
	Chancellor of UCSD (or designee)	1	Dr. John Orcutt***
	Director of IGPP (or designee)	1	Guy Masters***
	Total	3	

Questions and Contact Information

Maria Turingan

mariaturingan@ucsd.edu

858.822.2156

9500 Gilman Drive, Dept IGPP #0225

La Jolla, California 92093

Business Model for a Statewide California Real Time Network

California Spatial Reference
Center

July 15, 2009



Business Model for a Statewide California Real Time Network

- Developed in response to comments to the CRTN Proposal that we received from members of the GPS and GIS communities.
- Is an attachment to the previously distributed "Proposal for a Statewide California Real Time Network Version 5.0," dated October 16, 2008.

Business Model for a Statewide California Real Time Network (Page 3-4)

■ Introduction

- This document complements CSRC's **Proposal for a Statewide California Real Time Network – Version 5.01** ("**CRTN Proposal**"), specifically the sections on "Management and Governance" and "Cost Recovery."

■ Objectives

- The main objective of CRTN is to develop a multipurpose statewide network that utilizes the existing geophysical GPS infrastructure in California, and provides the backbone for the geodetic control network that is outlined in the CSRC Master Plan.

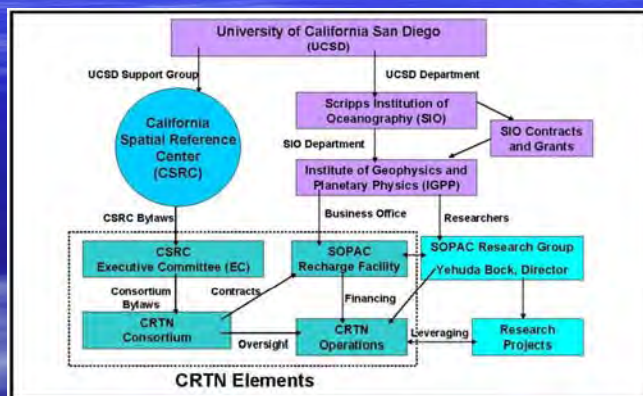
Business Model for a Statewide California Real Time Network (Page 3-4 cont.)

■ CRTN Consortium

– Structure

- The governance of CRTN will take advantage of the existing CSRC governing structure, as a Support Group of the University of California San Diego. The Support Group umbrella includes CSRC Bylaws, the CSRC Coordinating Council (CC), and the CSRC Executive Committee (EC).
- The Consortium will be formed and will initially operate under the overall supervision of the EC.
- The primary responsibilities of the Consortium are to underwrite CRTN's operating costs, provide governance, and to exercise overall oversight/management of the network.
- The Consortium will delegate the day-to-day management of the project to the Scripps Orbit and Permanent Array Center (SOPAC) Director.

Business Model for a Statewide California Real Time Network (Page 4)



- CRTN Elements in Relation to Other Entities at UCSD

Business Model for a Statewide California Real Time Network (Page 4)

- Membership

- Annual fee \$15,000
- Scale up to Full Statewide Membership in increments of \$15,000 to a maximum of \$150,000

Business Model for a Statewide California Real Time Network (Page 5)

■ Benefits

- *Multiple Data Streams*
 - Members are entitled to access real-time data streams from multiple stations in all supported formats.
 - Basic membership (\$15,000) entitles real-time access to 20 stations, scaling up in increments of 20 stations for each additional \$15,000 membership fee, up to full access with \$150,000 statewide membership.
- *Voting Privileges*
 - Members are part of the team that will oversee the development and management of CRTN. The basic membership fee of \$15,000 will be worth one vote with a limit of three votes for statewide members.
- *Public Service*
 - Member fees support free and open access to basic services for all users in California as outlined in the CRTN Proposal.

Business Model for a Statewide California Real Time Network (Page 5)

■ Benefits

- *Supporting the Maintenance of the CSRS and NSRS*
 - The CSRC is responsible for maintaining the California Spatial Reference System. The changing positions of the stations are continuously updated for tectonic and seismic motions, and velocity models are maintained.
- *Densification*
 - CRTN will include about 250 stations with a minimum spacing of 50 km. Current real time network operators can make use of this statewide spatial referencing backbone to densify their networks as needed.

Business Model for a Statewide California Real Time Network (Page 5-6)

- Roles of the Consortium
 - *Advocacy*
 - *Funding*
 - *Governance*
 - *Oversight*
 - *Education and Outreach*
 - *Longevity and Succession Plan*

Business Model for a Statewide California Real Time Network (Page 6)

- Data Availability
 - *Single-port Access (Freely available to all users)*
 - *a) RTCM versions 2.2, 2.3, 3.0 for any station*
 - *b) Positioning Service (epoch-date positions tied to CSRS/NSRS)*
 - *Single-port Access (Freely*
 - *Multi-port Access (Only available to Consortium members)*
 - *a) Receiver proprietary format (as available)*
 - *b) BINEX format (provide by PBO-hosted stations)*
 - *c) RTCM versions 2.2, 2.3, 3.0 for any station*

Business Model for a Statewide California Real Time Network (Page 6)

■ Cost Recovery

- *As UCSD is a public institution, CRTN is required to recover the costs of developing, operating, and maintaining its open and free service, but is not allowed to make a profit.*
- *Consortium members will enter into service contracts with the SOPAC recharge facility.*

Business Model for a Statewide California Real Time Network (Page 7)

■ Infrastructure Support

- *UNAVCO has proposed to CRTN to upgrade up to 200 PBO stations to real-time operations, at a nominal spacing of 50 km statewide, for an annual maintenance fee of \$1300/station.*
- *Operational costs for maintaining the current set of CRTN stations by SOPAC and CRTN Providers will become part of the CRTN budget, and will require negotiations with the CRTN Providers.*

Appendix E: CRTN Business Model

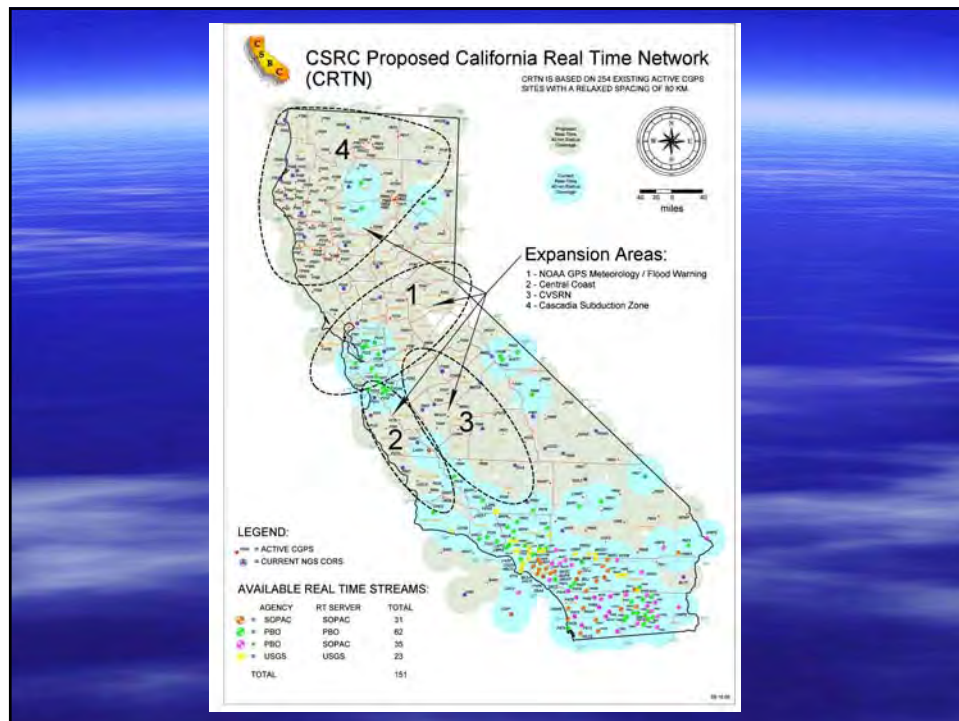
Business Model for a Statewide California Real Time Network (Page 7-8)

■ CRTN Providers

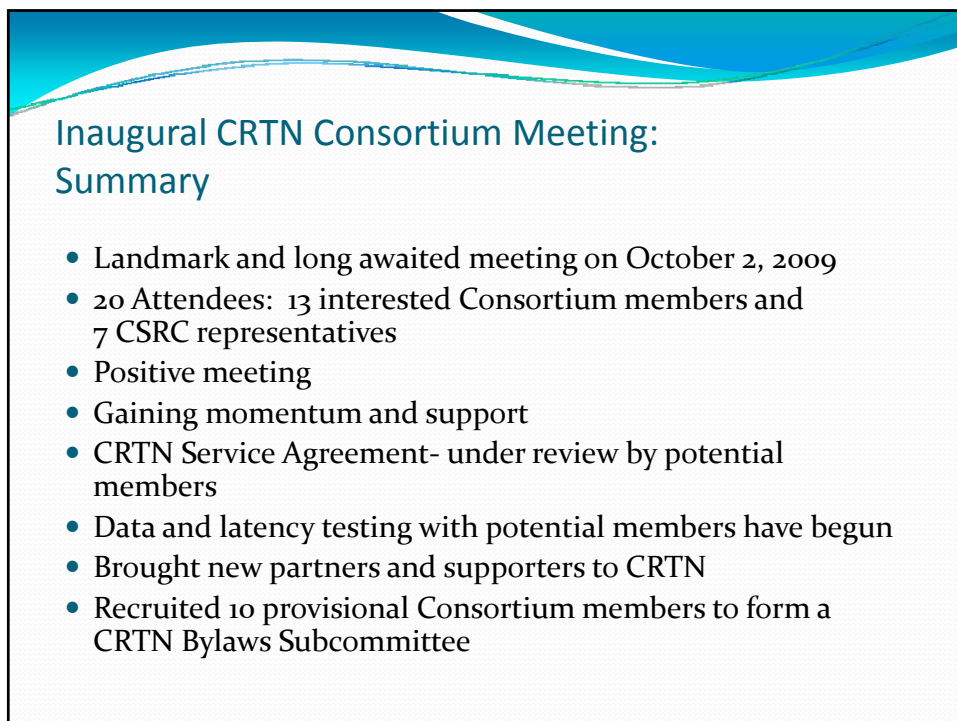
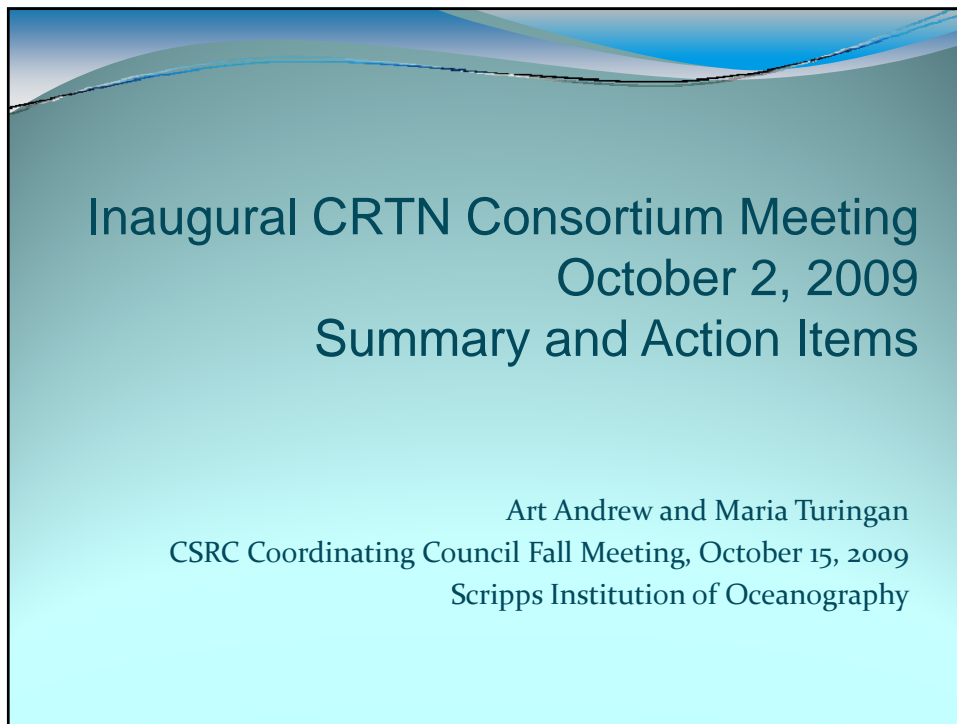
- *CRTN Providers are agencies that provide data or services through a partnership with SOPAC, such as (PBO, Counties, and Metropolitan Water District). Providers may negotiate an annual maintenance fee with the Consortium for cost recovery which should be based on a level of dependability and support.*

■ Implementation Schedule

- (1) Run high-stress performance tests with UNAVCO
- (2) Incorporate CVSRN4 stations (Area 3).
- (3) Incorporate NOAA stations for GPS meteorology and flood warning (Area 1)
- (4) Incorporate PBO stations along the Central Coast (Area 2),
- (5) Incorporate PBO stations in the Cascadia subduction zone (Area 4)
- (6) Fill in remaining areas of the state through UNAVCO subcontract
 - a. Phase 2 (50 more stations)
 - b. Phase 3 (50 more stations)
 - c. Phase 4 (50 more stations)



Appendix F: Consortium Meeting Summary



Appendix F: Consortium Meeting Summary

Inaugural CRTN Consortium Meeting: Action Items

Moving Forward

- Distribute the final draft of the CRTN Service Agreement- emailed to attendees on 10/07/09
- Generate revenue through Consortium memberships
- Continue latency testing
- Review PBO maintenance costs of \$1.3K per station
- Establish UNAVCO Memorandum of Understanding and subcontract
- Establish contracts with CRTN Providers

Inaugural CRTN Consortium Meeting: Action Items

Provisional Consortium Members

- Begin engaging provisional Consortium members
- Form a CRTN Bylaws Subcommittee of provisional Consortium members
- Draft CRTN Bylaws within 90 days
- Hold quarterly Consortium meetings
- Develop CRTN marketing materials for target audience such as agriculture, etc.

CSRC Outreach

History

- 2001 Orange County/CSRC Network
- 2003 CSRC's "Master Plan for a Modern California Geodetic Control Network" accepted by NOAA/ NOS National Geodetic Survey (NGS)
- 2005 CSRC Bylaws
- 2006 Public Resources Code Amended
- 2006 Greg Helmer/ Consulting Engineers and Land Surveyors of California Endorsement (CELSOC)
- 2008 California Land Surveyors Association (CLSA) Endorsement

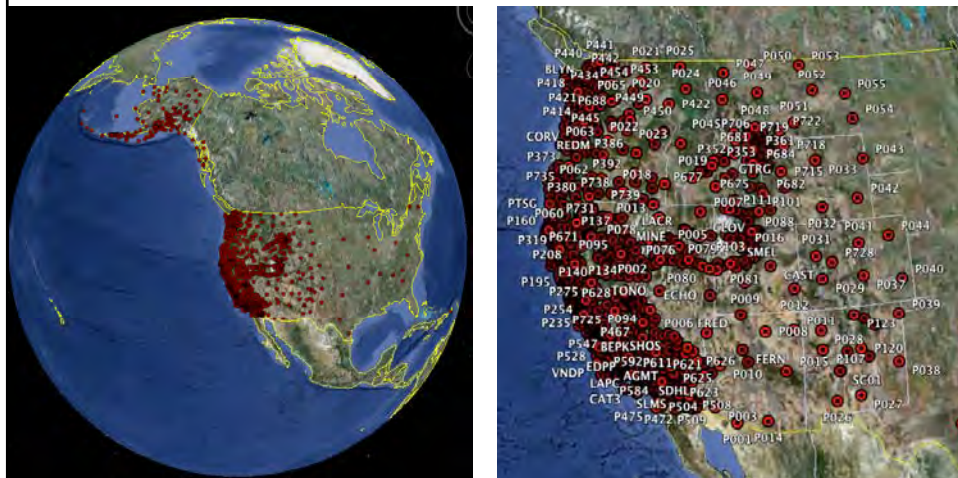
Recent Outreach Efforts

- Plate Boundary Observatory (PBO)/UNAVCO
- 2008 CSRC/CRTN Business Plan
- 2009 League of California Surveying Organizations Endorsement
- County Engineers Association of California (CEAC)
- Caltrans District – Headquarters, District 8,11, and 6
- 2009 CRTN Business Plan
- 2009, October 2nd, First CRTN Consortium Meeting
- 2009 American Congress on Surveying and Mapping (ACSM)/NGS Height Modernization Participation
- NOAA Grant/ACSM is requesting 22 Million Earmark/ Senator Durbin from Illinois

PBO/UNAVCO Report

Adrian Borsa
Plate Boundary Observatory
UNAVCO, Inc.

The PBO GPS Network



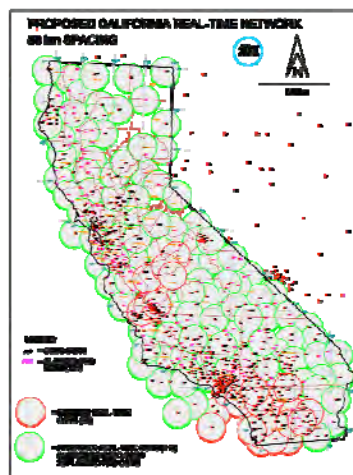
CRTN-PBO Partnership

What PBO would provide CRTN

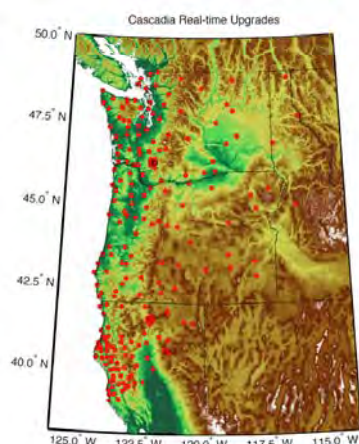
- Backbone network of ~150 stations on 80km grid.
- Upgraded communications (LanCell2 3G modem).
- Realtime 1 Hz data in BINEX format.

How CRTN benefits PBO

- Handle data load from non-science users.
- Handle user support for non-science users.
- Outreach to important community that PBO does not serve.
- Cost sharing partner for PBO GPS network comm upgrades.

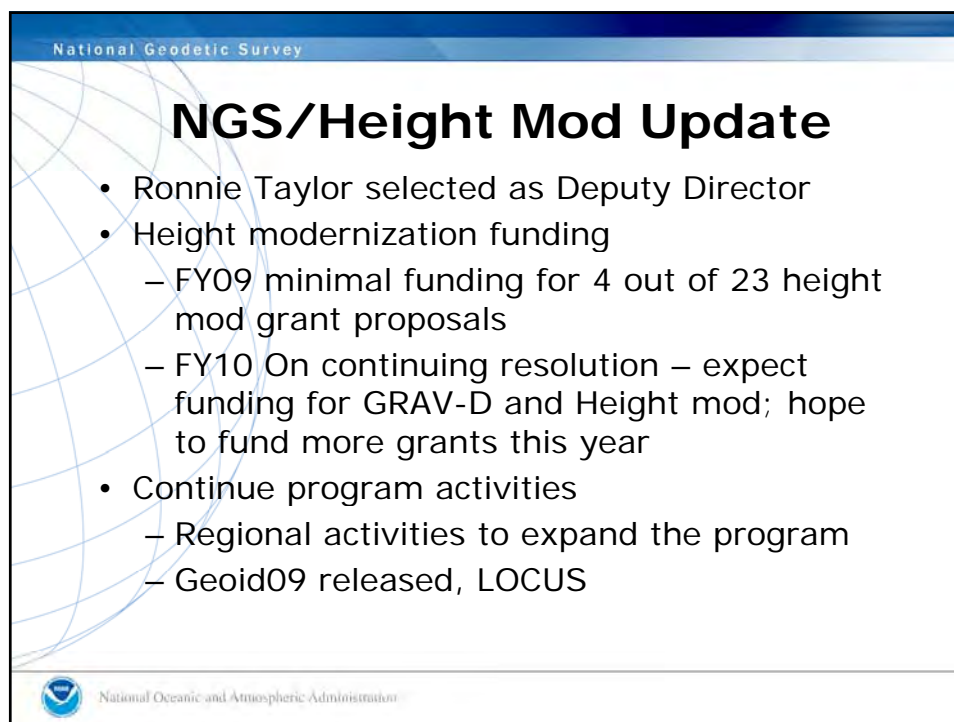
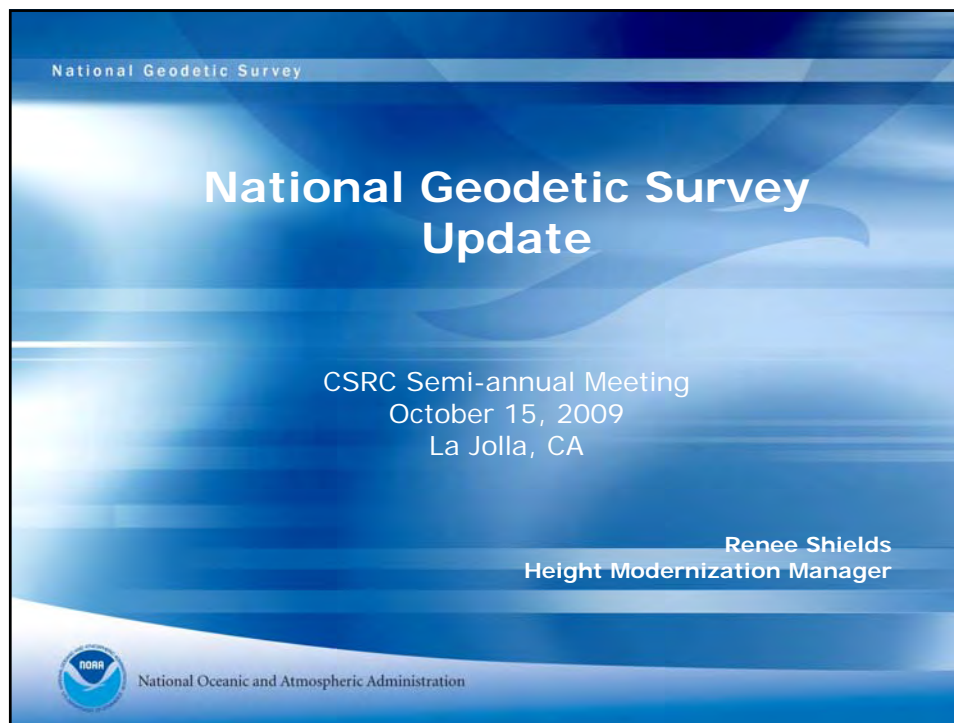


PBO Cascadia Realtime Project



ARRA-funded project to support science and hazards research.

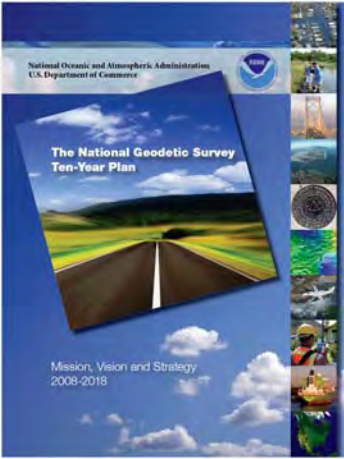
- Significant field component to upgrade station communications.
- Purchase realtime network control software.
- Personnel for system/network administration.



National Geodetic Survey

The National Geodetic Survey 10 year plan -- Mission, Vision and Strategy 2008-2018

- To define, maintain and provide access to the **National Spatial Reference System** to meet our nation's economic, social, and environmental needs
- 2018 Targets:
 - NAD 83 and NAVD 88 replaced
 - Modernize the Geopotential (Vertical) Datum



The cover of the report features a blue sky with white clouds and a green landscape with a winding road. The title 'The National Geodetic Survey Ten-Year Plan' is prominently displayed. To the right of the main image is a vertical strip of smaller images showing various geodetic surveying activities and equipment. The NOAA logo and the text 'National Oceanic and Atmospheric Administration U.S. Department of Commerce' are at the top right of the cover.


<http://www.ngs.noaa.gov/INFO/NGS10yearplan.pdf>

National Oceanic and Atmospheric Administration

National Geodetic Survey

NGS/Height Mod Update

- Future role for Height mod – pave the way for the new vertical datum as outlined in 10-year plan
 - GRAV-D is becoming operational
 - Implementation of Height Mod is well established
 - Instead of activities being driven solely by state level needs, partners are asking what NGS needs from them
- Use FGCS Vertical Reference System Work Group to help move these activities forward



National Oceanic and Atmospheric Administration

National Geodetic Survey

New Vertical Datum – Short Term Goals


- Define vertical datum
- Choose vertical datum project manager
- Draft implementation plan – address policy issues, impact issues
- Address maintenance of vertical datum – Boulder workshop next week
- Hold Federal (and Canada/Mexico) Summit – include Canada/Mexico – discuss plan, impact issues, publish proceedings
- Meet with partners to get input/feedback on NGS operating plan – make this part of operations

 National Oceanic and Atmospheric Administration

National Geodetic Survey

New Vertical Datum – Long Term Goals

- Create plan for development of guidelines, tools
 - Transformations between datums
 - Guidelines, software for using GNSS/traditional techniques to get heights
 - Special needs cases
 - Dynamic areas
 - Tree cover and urban canyon areas; mountains
 - Sub-centimeter requirements
- New products to address delivery/maintenance of new vertical datum
 - Databases/Datasheets
 - Delivery and use of accuracies – FGDC Standards
 - Velocity models/epochs

 National Oceanic and Atmospheric Administration

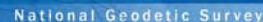


New Vertical Datum – Long Term Goals

- Outreach, education, capacity building
 - Develop comprehensive pro-active outreach plan – Height mod/GRAV-D/New datum
 - Proactive workshop program
 - Publish technical papers – ACSM, trade magazines, scientific journals
 - Publish annual status report
 - Conference circuit
 - Work with professional organizations
 - Repeat Federal Summit every 3-4 years




National Oceanic and Atmospheric Administration



GRAV-D Status

- This is the field operations side of the new vertical datum
- Complete ALL of AK over next couple of years
- Processing gravity data
 - Need more people
 - Comparing different kinds of software
 - Identifying problems, biases related to corrections applied
 - Expect to resolve problems within next couple of weeks
- Operational – once everything is working, expectation is to be able to process data for each project in 1 week, give final processed data to geoid team
- Education, Outreach



National Oceanic and Atmospheric Administration

Appendix J: Email to the CSRC Coordinating Council dated October 13, 2009 regarding the executive decision to change the two NGS positions to non-voting CSRC Coordinating Council Members

From: Maria Turingan <mariaturingan@ucsd.edu>
Date: October 13, 2009 12:24:30 PM PDT
To: "csrccouncil@gpsmail.ucsd.edu" <csrccouncil@gpsmail.ucsd.edu>
Cc: "csrcexec@gpsmail.ucsd.edu" <csrcexec@gpsmail.ucsd.edu>
Subject: [csrcexec-1158] Revisions to CSRC Bylaws Approved by Executive Decision

Dear CRSC Coordinating Council Members,

To follow-up on the vote to revise the CSRC Bylaws, Art Andrew, Executive Committee Chairperson, and Yehuda Bock, Director, acting on the authority of an EC quorum to approve the changes, conferring with John Canas, Executive Manager, and consulting with UCSD External Relations and Legal Counsel, have moved to implement the proposed changes by executive decision, effective October 13, 2009. Thus, the two NGS positions will be non-voting ex-officio CSRC members. Several factors lead to this executive decision:

1. In an email from Ronnie Taylor, Assistant Director of NGS, to CSRC dated June 29, 2009, NGS requested that we revise the CSRC Bylaws to make the Director of NGS and NGS State Geodetic Advisor for California non-voting members to mitigate perceived or implied conflict of interest.
2. Over three monthly EC teleconferences, the EC members discussed the requested changes; its repercussions to the EC quorum, EC membership, and Council membership; and its boarder implications. During an EC teleconference on September 30, 2009, a quorum voted to approve the changes.
3. In an email to the Council on October 3, 2009, we proposed a vote to be held at the meeting on October 15, 2009. However, there are two opposing CSRC Bylaw Articles, XIV and X, which make it difficult to revise the Bylaws by Council vote:

Article XIV - Amendments (page 8)

"These Bylaws may be amended by a resolution that is approved by a two-thirds majority of the Council members voting at a legally convened meeting of the Council membership..."

Article X - Meeting, Quorums (page 7)

"Council Membership Meetings: A quorum to conduct official business at Council membership meetings shall be 50 percent of the members."

Currently, with 55 Council seats filled, we need 28 members to be present on October 15th to meet a quorum and, over the years, we have not had 20-25 Council members attend. Thus, it leaves the CSRC with no procedure to amend its Bylaws, as it is currently written.

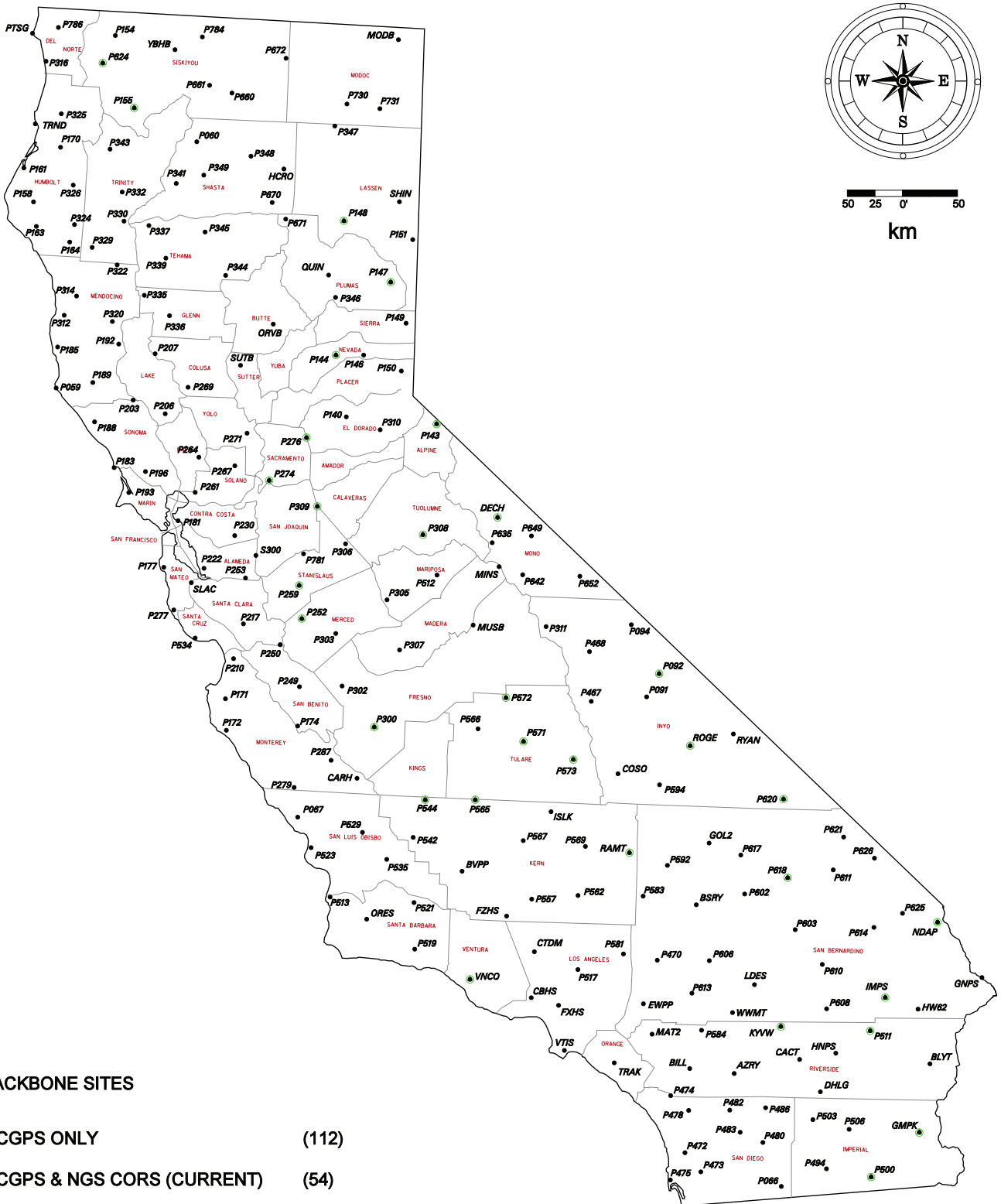
Our main consideration is that, as a petition from the primary funding agency for CSRC, NGS' request to amend the bylaws regarding their own participation in CSRC governance is sufficient. Given these factors, Art Andrew and Yehuda Bock came to the executive decision to revise the CSRC Bylaws, as proposed in the October 3, 2009 email to the Council (attached- note that corrections were made to the earlier attachment: bullets and numbering errors were corrected on page 7 and 8).

Over the upcoming months, we plan to form a CSRC Bylaws Subcommittee to simplify and to make additional updates to the articles and we welcome your participation.

Sincerely,
Maria Turingan



CSRC - California Real Time Network (CRTN) Proposed Backbone Network



BACKBONE SITES

- = CGPS ONLY (112)
- = CGPS & NGS CORS (CURRENT) (54)
- = CGPS & NGS CORS (PROPOSED) (41)

TOTAL (207)



COUNTY ENGINEERS ASSOCIATION OF CALIFORNIA



November 25, 2009

OFFICERS 2009 - 2010

PRESIDENT ~ PATRICK DECHELLIS
Deputy Director of Public Works
County of Los Angeles
900 S. Fremont Avenue, 11th Floor
Alhambra, CA 91803

PRESIDENT-ELECT ~ JULIE BUEREN
Director of Public Works
Contra Costa County
255 Glacier Drive
Martinez, CA 94553

SECRETARY ~ DANIEL WOLDESENBET
Director of Public Works
Alameda County
399 Elmhurst Street, Room 307A
Hayward, CA 94544

TREASURER ~ MEHDI SADJADI
120 Round Court
Petaluma, CA 94952

PARLIAMENTARIAN ~ DOUG WILSON
735 W. Cambridge
Visalia, CA 93277

PAST-PRESIDENT ~ PETER REI
Director of Public Works
County of Tuolumne
2 South Green Street
Sonora, CA 95370

**NACE REPRESENTATIVE ~
GEORGE JOHNSON**
Director TLMA
County of Riverside
4080 Lemon Street, 14th Floor
Riverside, CA 92502

HISTORIAN ~ DAVE GRAVENKAMP
105 4th Street
Yreka, CA 96097

NEWSLETTER EDITOR ~ KEN A. MILLER
11374 Oak Hill Lane
Yucaipa, CA 92399

TREASURER EMERITUS ~ WILLIAM MCINTOSH
1200 Running Springs Road, #6
Walnut Creek, CA 94595

DIRECTORS 2008 ~ 2009

NORTHERN CALIFORNIA ~ TOM MATTSO
Director of Public Works
County of Humboldt
1106 Second Street
Eureka, CA 95501

NORTH BAY ~ BIRGITTA CORSELLO
Resource Management Director
County of Solano
675 Texas Street Suite 5000
Fairfield, CA 94533

CENTRAL COAST ~ JIM PORTER
Director of Public Works
County of San Mateo
555 County Center, 5th Floor
Redwood City, CA 94063

**SACRAMENTO-MOTHER LODE ~
MIKE PENROSE**
Director, Department of Transportation
County of Sacramento
827 7th Street, Room 304
Sacramento, CA 95814

SAN JOAQUIN VALLEY ~ TOM FLINN
Director of Public Works
County of San Joaquin
PO Box 1810
Stockton, CA 95201

SOUTH CENTRAL COAST ~ PAUL GREENWAY
Assistant Public Works Director
County of Monterey
168 W. Alisal Street, 2nd Floor
Salinas, CA 93901

SOUTHERN CALIFORNIA ~ IGNACIO OCHOA
Director of Engineering
County of Orange
PO Box 4048
Santa Ana, CA 92702

Mr Art Andrew, Chairperson
California Spatial Reference Center (CSRC)
Scripps Institute of Oceanography
9500 Gillman Drive, Dept. IGPP Mail Code 0225
La Jolla, CA 92093-0225

Dear Mr Andrew

The County Engineers Association of California received your letter of September 14, 2009 requesting CEAC endorsement to use the CSRC/CRTN for geodetic surveying and engineering. The endorsement was considered and supported by the CEAC Survey Policy Committee October 14, 2009 and again November 18, 2009

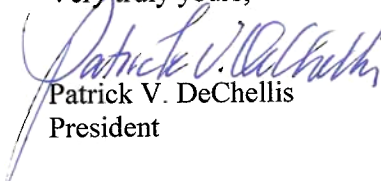
CEAC was formed 1914 to "advance county engineering and management by providing a forum for the exchange of ideas and information aimed at improving service to the public." Furthermore, the objective of CEAC is "To accommodate the advancement of engineering methods and ethical practice through networking efforts for all 58 counties in the state." Through discussion, interchange, and dissemination of engineering and administrative data and ideas, the organization strives to affect "maximum efficiency and modernization in engineering and administrative units of local Government."

CEAC believes the following benefits, as outlined in your letter, to be particularly relevant for any GPS Real Time Network:

- A system in partnership with the National Geodetic Survey and in compliance with the California Public Resources Code
- A system that provides for continual statewide positioning analysis as well a rapid updated positioning following seismic events
- Free Access to any site data port through out the state for single base RTK surveying
- Free access to Epoch-Date Positioning service
- System should require no user fees as system should be funded by public/private monies

In closing, CEAC would like to congratulate CSRC on its efforts and hereby endorses the use of the CRTN as the geodetic backbone for California as defined by CRTN Version 5.0 of the Proposal for a Statewide California Real Time Network. CEAC looks forward to the development of this important infrastructure for the State and we thank you for your time spent to inform and solicit comments from our membership.

Very truly yours,


Patrick V. DeChellis
President