ORANGE COUNTY
OC PublicWorks
Our Community. Our Commitment.

Jess A. Carbajal, Director
300 N. Flower Street
Santa Ana, CA

P.O. Box 4048
Santa Ana, CA 92702-4048

Telephone: (714) 834-2300
Fax: (714) 834-5188

OCRTN

The Orange County Real Time Network (OCRTN) consists of 12 Continuous Global Positioning System (CGPS) reference stations located in and around Orange County. These CGPS stations are part of the California Spatial Reference System (CSRS) and the California Real Time Network (CRTN). Stations TRAK and SBCC are now also part of the NGS CORS Network. OCRTN CGPS stations sample data at a 1 Hz interval (every second) and the raw data is streamed in real-time to a server located at the OC Survey office in Santa Ana. All stations contain dual-frequency receivers with choke ring style antennas. The raw data along with generated Rinex files are archived for each station in 24-hour files.

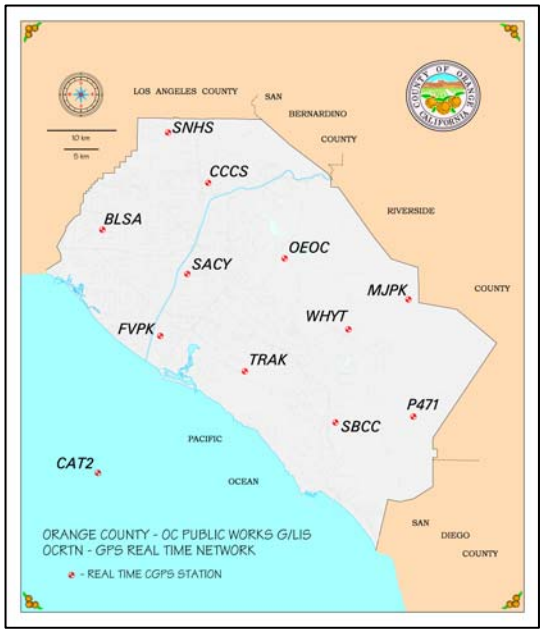
WHYT

At the same time, RTCM type 18, 19, 3, 22 (RTK carrier phase, RTK pseudo-ranges), messages, versions 2.2 and 2.3 are generated from each CGPS station and can be used for precise positioning such as RTK surveying and is available to anyone at no cost. Both OCS 1991.35 and CSRS 2007.00 epochs are available through OC Survey. Users can access this data via the Internet using TCP/IP. The most common way to receive this data for RTK surveying in the field is by using a wireless data modem.

Benefits:

<u>Static Surveying:</u>

OCRTN stations have become the County's primary control network. Because each station is a control station continuously collecting GPS data, these stations can take place of having to find and make GPS observations on local control stations. Using OCRTN requires less personnel and equipment which can save money and time. GPS 30-second Rinex data files are generated and can be downloaded at the Scripps Orbit and Permanent Array Center (SOPAC) website http://sopac.ucsd.edu/. If a 1, 5, 10 or 15 second Rinex file is needed, you can request this by contacting the Geodetic Unit @ (714) 834-6797.



Revised 06.14.11

ORANGE COUNTY PublicWorks
Our Community. Our Commitment.

Jess A. Carbajal, Director
300 N. Flower Street
Santa Ana, CA

P.O. Box 4048
Santa Ana, CA 92702-4048

Telephone: (714) 834-2300
Fax: (714) 834-5188

RTK Surveying:

OCRTN stations can replace your RTK base stations which simplifies RTK surveying in Orange County. No longer will you have to find a control point, setup a base station and worry about it being damaged or stolen. This method requires only one GPS receiver being the rover, which greatly reduces the cost of equipment and personnel. Radio line of site from base to rover is no longer an issue. The drawback, which may not be that significant at times, is longer baseline lengths (increased PPM error) and poor wireless network coverage.

Getting Started with OCRTN RTK Surveying:

A survey grade, dual-frequency GPS receiver must be used. A single frequency receiver would work but is not suggested due to the length of baselines. OCRTN supports an unlimited number of users on all base stations. The rover must have a wireless data modem to receive the base station RTCM data. Each OCRTN station is assigned an IP address and a unique port number. The IP addresses are the same for all stations.

Connecting:

To connect to a base station, the modem must connect to the specific IP address and port assignment of the requested base station. For example, to connect to a specific base station such as SBCC and requesting the OCS 1991.35 epoch, the modem would connect to: 206.194.127.187:8015. When the connection is established, RTCM version 2.2 data will be streamed from the host server to the client rover. The RTK rover will compute an OCS 1991.35 epoch position relative to base station SBCC.

RTK Modes:

There a currently two different modes in receiving the base station data, “single base station” and “nearest base station”.

Single base station – this mode allows the RTK user to select which base station data they desire simply by connecting to the base station’s unique port number. If he desires OEOC as a base station and CSRS epoch 2007.00, then his modem connects to: 206.194.127.187:8020.

Nearest base station – if the RTK user doesn’t know where the base stations are located, this mode will stream data from the nearest base station of the user’s location. Port 8000 (OCS 1991.35 epoch) and port 9000 (CSRS epoch 2007.00) are used for this mode. For example, if the user is RTK surveying in Fountain Valley, the server will stream data from base station FVPK which is the closest base station to the RTK user’s geographic location. The modem would connect to: 206.194.127.187:8000 or 9000.

ORANGE COUNTY PublicWorks
Our Community. Our Commitment.

Jess A. Carbajal, Director
300 N. Flower Street
Santa Ana, CA

P.O. Box 4048
Santa Ana, CA 92702-4048

Telephone: (714) 834-2300
Fax: (714) 834-5188

In order for the "nearest base station" mode to work, the rover receiver **must** output to the OCRTN server its' autonomous position in NMEA-0183 GGA format. We suggest that the GGA position output every 5 seconds.

Base Station Positions:

Base station positions are being broadcasted based on the North American Datum 1983 (NAD83), California coordinate system 1983 (CCS83) zone VI, OCS 1991.35 epoch adjustment and CSRC Epoch 2007.00. If you need base station positions relative to the CSRS Epoch 2009.00 positions (CSRS Epoch 2011.00 starting June 18, 2011), CSRC rebroadcasts the data streams using this epoch. For CSRC IP address and port numbers, go to:
http://sopac.ucsd.edu/input/realtime/CRTN_Access.xls

The position calculated at the RTK rover will be relative to the base station position. The base station height being broadcasted from the OCRTN server is an ellipsoid height to the L1 phase center on the base antenna. The base antenna settings in you RTK rover software should be; antenna HI = 0.00, antenna unknown, offset = 0.00.

Broadcast Positions (OCS 1991.35 Epoch):

IP Address: 206.194.127.187
Nearest Base Station Mode: Port 8000 (RTCM 2.2)

RTCM Version 2.2 Ports:	RTCM Version 2.3 Ports:	SITE ID	Latitude	Longitude	North (ft)	East (ft)	L1 Phase Center Ellipsoid Ht. (ft)
8001	**9001**	**BLSA**	33 47 58.32542	118 01 43.16991	2239161.740	6021327.055	-73.055
8002	**9002**	**CAT2**	33 18 41.78847	118 20 01.67021	2063367.920	5925092.044	1568.398
8005	**9005**	**CCCS**	33 51 45.84314	117 51 53.72640	2261348.063	6071420.013	107.196
8018	**9018**	**FVPK**	33 39 44.34593	117 56 08.50418	2188766.810	6048758.483	-35.094
8013	**9013**	**MJPK**	33 42 52.10268	117 33 01.62743	2206065.306	6166206.621	5015.815
8014	**9014**	**OEOC**	33 45 57.05877	117 44 38.82021	2225548.328	6107585.974	1179.340
8009	**9009**	**P471**	33 33 43.61732	117 32 27.04787	2150592.811	6168441.074	576.134
8012	**9012**	**SACY**	33 44 35.65207	117 53 44.01324	2218013.533	6061434.488	-34.064
8015	**9015**	**SBCC**	33 33 10.76922	117 39 41.28356	2147749.084	6131653.964	293.729
8017	**9017**	**SNHS**	33 55 38.38315	117 55 42.99266	2285157.080	6052467.039	220.664
8016	**9016**	**TRAK**	33 37 04.53575	117 48 12.29915	2171989.938	6088763.429	383.750
8011	**9011**	**WHYT**	33 40 28.13544	117 38 36.38008	2191879.593	6137737.003	873.559

ORANGE COUNTY PublicWorks
Our Community. Our Commitment.

Jess A. Carbajal, Director
300 N. Flower Street
Santa Ana, CA

P.O. Box 4048
Santa Ana, CA 92702-4048

Telephone: (714) 834-2300
Fax: (714) 834-5188

Broadcast Positions (CSRS Epoch 2007.00):

IP Address: 206.194.127.187
Nearest Base Station Mode: Port 9000 (RTCM 2.3)

RTCM Version 2.3 Ports	GPS#	Latitude	Longitude	North (ft)	East (ft)	L1 Phase Center Ellipsoid Height (ft)
8004	**BLSA**	33 47 58.342124	118 1 43.186539	2239163.452	6021325.681	-73.104
8006	**CAT2**	33 18 41.805689	118 20 1.686902	2063369.689	5925090.662	1568.501
8007	**CCCS**	33 51 45.859846	117 51 53.742844	2261349.773	6071418.654	107.172
8008	**FVPK**	33 39 44.362839	117 56 8.520633	2188768.543	6048757.120	-35.127
8019	**MJPK**	33 42 52.119387	117 33 1.643598	2206067.011	6166205.277	5015.842
8020	**OEOC**	33 45 57.075479	117 44 38.836680	2225550.037	6107584.607	1179.328
9003	**P471**	33 33 43.634192	117 32 27.064117	2150594.533	6168439.720	576.120
9004	**SACY**	33 44 35.668556	117 53 44.029680	2218015.222	6061433.127	-34.067
9006	**SBCC**	33 33 10.786102	117 39 41.299909	2147750.808	6131652.603	293.716
9007	**SNHS**	33 55 38.399797	117 55 43.009043	2285158.786	6052465.684	220.660
9008	**TRAK**	33 37 4.552726	117 48 12.315528	2171991.673	6088762.071	383.723
9010	**WHYT**	33 40 28.152253	117 38 36.396318	2191881.312	6137735.654	873.545

Support:

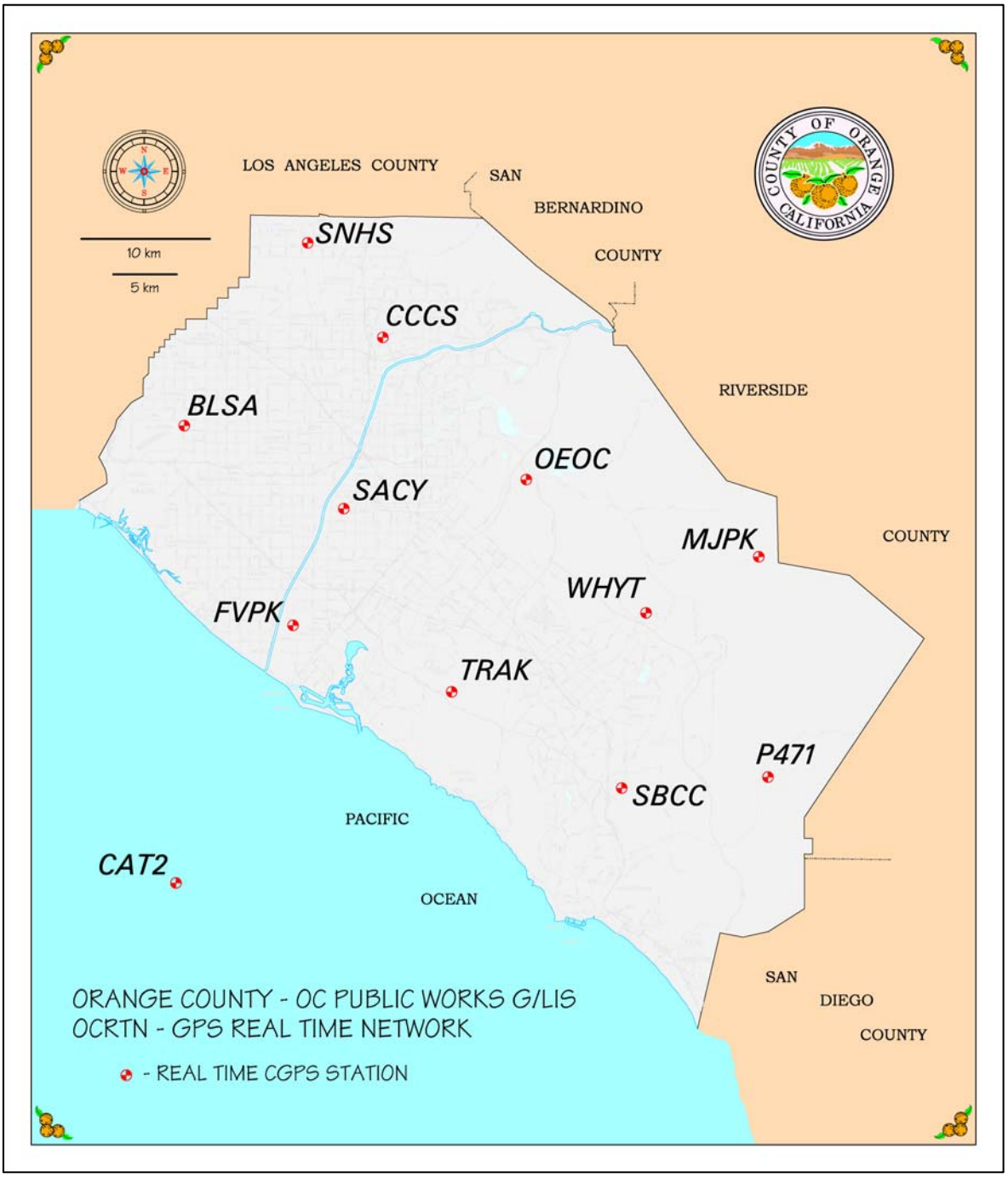
Geomatics will help you get your RTK rover up and running. We can assist you in assuring that you have the proper equipment and configuration. To help you get started in using OCRTN, contact us by: Geodetic Unit Phone: (714) 834-6797

ORANGE COUNTY
OC PublicWorks
Our Community. Our Commitment.

Jess A. Carbajal, Director
300 N. Flower Street
Santa Ana, CA

P.O. Box 4048
Santa Ana, CA 92702-4048

Telephone: (714) 834-2300
Fax: (714) 834-5188



Revised 06.14.11