

# OPUS-RS solution : 018506\_14\_231\_A3.14O OP1408627717757

opus <opus@ngs.noaa.gov>

Thu 8/21/2014 7:32 AM

To:Chad Mozol <Chad.Mozol@neciusa.com>;

FILE: 018506\_14\_231\_A3.14O OP1408627717757

## NGS OPUS-RS SOLUTION REPORT =====

All computed coordinate accuracies are listed as 1-sigma RMS values.  
For additional information: <http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: cmozol@neciusa.com                      DATE: August 21, 2014  
RINEX FILE: 0185231u.14o                      TIME: 13:32:18 UTC

SOFTWARE: rsgps 1.37 RS91.prl 1.99.2              START: 2014/08/19 20:30:15  
EPHEMERIS: igr18062.eph [rapid]              STOP: 2014/08/19 21:30:45  
NAV FILE: brdc2310.14n                      OBS USED: 3030 / 3410 : 89%  
ANT NAME: CHCX90D-OPUS    NONE              QUALITY IND. 24.02/ 37.74  
ARP HEIGHT: 1.8                      NORMALIZED RMS:    0.421

REF FRAME: NAD\_83(2011)(EPOCH:2010.0000)              IGS08 (EPOCH:2014.63254)

X:	-1337659.143(m)	0.008(m)	-1337660.018(m)	0.008(m)
Y:	-4042516.050(m)	0.010(m)	-4042514.825(m)	0.010(m)
Z:	4733765.655(m)	0.011(m)	4733765.646(m)	0.011(m)

LAT:	48 13 10.09914	0.005(m)	48 13 10.12038	0.005(m)
E LON:	251 41 26.66655	0.007(m)	251 41 26.60767	0.007(m)
W LON:	108 18 33.33345	0.007(m)	108 18 33.39233	0.007(m)
EL HGT:	797.750(m)	0.015(m)	797.151(m)	0.015(m)
ORTHO HGT:	814.239(m)	0.018(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 12)	SPC (2500 MT )
Northing (Y) [meters]	5344194.783	441761.516
Easting (X) [meters]	699856.184	688444.463
Convergence [degrees]	2.00715283	0.87103183
Point Scale	1.00009080	0.99961539
Combined Factor	0.99996577	0.99949042

US NATIONAL GRID DESIGNATOR: 12UXU9985644194(NAD 83)

## BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL7731	P053 WHITEWATERMT2007	CORS ARP	N484333.865 W1074331.456	70981.5
DG9749	MTMS MONTANA STATE UNI	CORS ARP	N483227.426 W1094111.858	108120.4
DI3425	P052 LRRNCHJRDNMT2006	CORS ARP	N472229.026 W1070107.185	134808.6
DM7133	MTLW LEWISTOWN	CORS ARP	N470314.929 W1092633.764	155072.2
DI2257	P049 ARMINGTON_MT2006	CORS ARP	N472059.850 W1105422.382	217303.0

## NEAREST NGS PUBLISHED CONTROL POINT

Information on nearest mark is not available due to database connectivity issues or has restrictions on when or how it can be published.

## OPUS-RS Extended Output, Level 2

## FINAL COORDINATES (ITRF at epoch of observations)

p053	-1283559.270	-4015770.336	4771131.620
mtms	-1425435.580	-3984013.212	4757493.871
p052	-1266648.339	-4138194.575	4670709.499
mtlw	-1449333.477	-4105829.814	4646773.500
p049	-1545099.830	-4044895.867	4669084.570
0185	-1337660.018	-4042514.825	4733765.646

## Covariance matrix of the stations:

1	2.9060E-07	5.8940E-07	-6.7950E-07	-3.0850E-08	-1.5350E-07	2.0060E-07	6.8490E-10	-1.5260E-07	1.5840E-07	-2.5150E-08	-1.5030E-07	1.6310E-07	-3.5290E-08	-1.3240E-07	1.5670E-07	5.9790E-08	3.1150E-08	-3.0100E-08
2	5.8940E-07	1.9660E-06	-2.2820E-06	-1.4110E-07	-4.3850E-07	5.4390E-07	-1.7150E-07	-4.3650E-07	5.7840E-07	-1.4350E-07	-4.3610E-07	5.7520E-07	-1.3340E-07	-4.5460E-07	5.8470E-07	-1.7800E-08	-8.4940E-09	6.3600E-08
3	-6.7950E-07	-2.2820E-06	2.9970E-06	1.6170E-07	5.9020E-07	-6.6190E-07	2.1710E-07	5.0910E-07	-6.6790E-07	1.5790E-07	5.5250E-07	-7.0490E-07	1.4340E-07	6.3110E-07	-7.6260E-07	4.8140E-08	1.1280E-07	-9.1950E-08
4	-3.0850E-08	-1.4110E-07	1.6170E-07	3.2000E-07	6.1110E-07	-7.4060E-07	-3.3460E-08	-1.3570E-07	1.7180E-07	-2.7700E-08	-1.5750E-07	1.9490E-07	-2.7810E-08	-1.7710E-07	2.1230E-07	2.1360E-08	-3.0000E-08	3.9170E-08
5	-1.5350E-07	-4.3850E-07	5.9020E-07	6.1110E-07	1.7790E-06	-2.0430E-06	-1.4290E-07	-4.5240E-07	5.5300E-07	-1.5740E-07	-3.7570E-07	4.7620E-07	-1.5670E-07	-3.1280E-07	4.2270E-07	-7.8380E-10	5.7470E-08	8.8340E-10
6	2.0060E-07	5.4390E-07	-6.6190E-07	-7.4060E-07	-2.0430E-06	2.7130E-06	1.9670E-07	5.2460E-07	-6.4680E-07	1.7510E-07	4.8870E-07	-6.0530E-07	1.6780E-07	4.8700E-07	-5.9880E-07	4.0570E-08	5.6420E-08	-4.5470E-08
7	6.8490E-10	-1.7150E-07	2.1710E-07	-3.3460E-08	-1.4290E-07	1.9670E-07	2.9590E-07	5.4970E-07	-6.4210E-07	-2.3360E-08	-1.3880E-07	1.2520E-07	-4.0090E-08	-9.5520E-08	1.0250E-07	7.4590E-08	5.0200E-08	-6.0050E-08
8	-1.5260E-07	-4.3650E-07	5.0910E-07	-1.3570E-07	-4.5240E-07	5.2460E-07	5.4970E-07	1.9980E-06	-2.1410E-06	-1.3470E-07	-4.4100E-07	5.4490E-07	-1.2800E-07	-4.6730E-07	5.6390E-07	-2.5950E-08	-6.5270E-08	9.2670E-08
9	1.5840E-07	5.7840E-07	-6.6790E-07	1.7180E-07	5.5300E-07	-6.4680E-07	-6.4210E-07	-2.1410E-06	2.6400E-06	1.5170E-07	5.1180E-07	-5.6410E-07	1.6140E-07	4.9670E-07	-5.6150E-07	-1.0200E-08	4.2400E-08	1.7390E-08
10	-2.5150E-08	-1.4350E-07	1.5790E-07	-2.7700E-08	-1.5740E-07	1.7510E-07	-2.3360E-08	-1.3470E-07	1.5170E-07	3.0450E-07	5.9730E-07	-6.6750E-07	-2.8320E-08	-1.6210E-07	1.8320E-07	2.9960E-08	-1.6940E-08	1.3690E-08
11	-1.5030E-07	-4.3610E-07	5.5250E-07	-1.5750E-07	-3.7570E-07	4.8870E-07	-1.3880E-07	-4.4100E-07	5.1180E-07	5.9730E-07	1.7730E-06	-1.9520E-06	-1.5080E-07	-3.2030E-07	3.9930E-07	-2.8060E-10	4.8310E-08	-2.1190E-08
12	1.6310E-07	5.7520E-07	-7.0490E-07	1.9490E-07	4.7620E-07	-6.0530E-07	1.2520E-07	5.4490E-07	-5.6410E-07	-6.6750E-07	-1.9520E-06	2.4780E-06	1.8410E-07	3.5510E-07	-4.0340E-07	-2.6760E-08	-6.2530E-08	1.2160E-07
13	-3.5290E-08	-1.3340E-07	1.4340E-07	-2.7810E-08	-1.5670E-07	1.6780E-07	-4.0090E-08	-1.2800E-07	1.6140E-07									

```

-2.8320E-08 -1.5080E-07 1.8410E-07 3.3160E-07 5.6790E-07 -6.5570E-07 1.4320E-08 -3.4420E-08 3.7460E-08
 14 -1.3240E-07 -4.5460E-07 6.3110E-07 -1.7710E-07 -3.1280E-07 4.8700E-07 -9.5520E-08 -4.6730E-07 4.9670E-07
-1.6210E-07 -3.2030E-07 3.5510E-07 5.6790E-07 1.7540E-06 -1.9700E-06 4.5280E-08 1.6840E-07 -1.3620E-07
 15 1.5670E-07 5.8470E-07 -7.6260E-07 2.1230E-07 4.2270E-07 -5.9880E-07 1.0250E-07 5.6390E-07 -5.6150E-07
1.8320E-07 3.9930E-07 -4.0340E-07 -6.5570E-07 -1.9700E-06 2.5270E-06 -5.2360E-08 -1.4990E-07 1.9920E-07
 16 5.9790E-08 -1.7800E-08 4.8140E-08 2.1360E-08 -7.8380E-10 4.0570E-08 7.4590E-08 -2.5950E-08 -1.0200E-08
2.9960E-08 -2.8060E-10 -2.6760E-08 1.4320E-08 4.5280E-08 -5.2360E-08 3.3100E-06 7.9440E-06 -9.2380E-06
 17 3.1150E-08 -8.4940E-09 1.1280E-07 -3.0000E-08 5.7470E-08 5.6420E-08 5.0200E-08 -6.5270E-08 4.2400E-08
-1.6940E-08 4.8310E-08 -6.2530E-08 -3.4420E-08 1.6840E-07 -1.4990E-07 7.9440E-06 2.4370E-05 -2.8290E-05
 18 -3.0100E-08 6.3600E-08 -9.1950E-08 3.9170E-08 8.8340E-10 -4.5470E-08 -6.0050E-08 9.2670E-08 1.7390E-08
1.3690E-08 -2.1190E-08 1.2160E-07 3.7460E-08 -1.3620E-07 1.9920E-07 -9.2380E-06 -2.8290E-05 3.5740E-05

```

Covariance Matrix for the xyz OPUS Rover Position (meters^2).

```

0.0000033100 0.0000079440 -0.0000092380
0.0000079440 0.0000243700 -0.0000282900
-0.0000092380 -0.0000282900 0.0000357400

```

Covariance Matrix for the enu OPUS Position (meters^2).

```

0.0000006499 0.0000001488 0.0000000233
0.0000001488 0.0000013318 0.0000011907
0.0000000233 0.0000011907 0.00000614383

```

Horizontal network accuracy = 0.00249 meters.

Vertical network accuracy = 0.01537 meters.

		Vectors		
To	From	X	Y	Z
p053	0185	54100.748	26744.489	37365.974
mtms	0185	-87775.563	58501.613	23728.225
p052	0185	71011.679	-95679.750	-63056.147
mtlw	0185	-111673.459	-63314.989	-86992.146
p049	0185	-207439.812	-2381.042	-64681.076

Covariance matrix of the 5 vectors

```

1 3.4810E-06 8.5200E-06 -9.9355E-06 3.1980E-06 7.7601E-06 -9.0479E-06 3.1763E-06 7.7862E-06 -9.0393E-06
3.1951E-06 7.7628E-06 -9.0180E-06 3.2006E-06 7.7352E-06 -8.9988E-06
2 8.5200E-06 2.6353E-05 -3.0748E-05 7.8507E-06 2.3883E-05 -2.7866E-05 7.7401E-06 2.4007E-05 -2.7818E-05
7.8352E-06 2.3894E-05 -2.7716E-05 7.8628E-06 2.3755E-05 -2.7619E-05
3 -9.9355E-06 -3.0748E-05 3.8921E-05 -9.1636E-06 -2.7813E-05 3.5216E-05 -9.0090E-06 -2.7986E-05 3.5147E-05
-9.1419E-06 -2.7829E-05 3.5005E-05 -9.1802E-06 -2.7635E-05 3.4870E-05
4 3.1980E-06 7.8507E-06 -9.1636E-06 3.5873E-06 8.5859E-06 -1.0058E-05 3.1806E-06 7.8643E-06 -9.0952E-06
3.2310E-06 7.8168E-06 -9.0555E-06 3.2465E-06 7.7516E-06 -9.0125E-06
5 7.7601E-06 2.3883E-05 -2.7813E-05 8.5859E-06 2.6034E-05 -3.0390E-05 7.7517E-06 2.3925E-05 -2.7780E-05
7.8043E-06 2.3889E-05 -2.7752E-05 7.8225E-06 2.3831E-05 -2.7718E-05
6 -9.0479E-06 -2.7866E-05 3.5216E-05 -1.0058E-05 -3.0390E-05 3.8544E-05 -9.0218E-06 -2.7914E-05 3.5121E-05
-9.1172E-06 -2.7837E-05 3.5059E-05 -9.1482E-06 -2.7723E-05 3.4987E-05
7 3.1763E-06 7.7401E-06 -9.0090E-06 3.1806E-06 7.7517E-06 -9.0218E-06 3.4567E-06 8.4695E-06 -9.8099E-06
3.1821E-06 7.7553E-06 -9.0260E-06 3.1810E-06 7.7530E-06 -9.0231E-06
8 7.7862E-06 2.4007E-05 -2.7986E-05 7.8643E-06 2.3925E-05 -2.7914E-05 8.4695E-06 2.6499E-05 -3.0566E-05
7.8522E-06 2.3946E-05 -2.7775E-05 7.8764E-06 2.3800E-05 -2.7669E-05
9 -9.0393E-06 -2.7818E-05 3.5147E-05 -9.0952E-06 -2.7780E-05 3.5121E-05 -9.8099E-06 -3.0566E-05 3.8345E-05
-9.0898E-06 -2.7799E-05 3.5037E-05 -9.1039E-06 -2.7699E-05 3.4962E-05

```

10 3.1951E-06 7.8352E-06 -9.1419E-06 3.2310E-06 7.8043E-06 -9.1172E-06 3.1821E-06 7.8522E-06 -9.0898E-06  
3.5546E-06 8.5585E-06 -9.8924E-06 3.2374E-06 7.7536E-06 -9.0161E-06  
11 7.7628E-06 2.3894E-05 -2.7829E-05 7.8168E-06 2.3889E-05 -2.7837E-05 7.7553E-06 2.3946E-05 -2.7799E-05  
8.5585E-06 2.6046E-05 -3.0158E-05 7.8279E-06 2.3833E-05 -2.7720E-05  
12 -9.0180E-06 -2.7716E-05 3.5005E-05 -9.0555E-06 -2.7752E-05 3.5059E-05 -9.0260E-06 -2.7775E-05 3.5037E-05  
-9.8924E-06 -3.0158E-05 3.7975E-05 -9.0646E-06 -2.7736E-05 3.5016E-05  
13 3.2006E-06 7.8628E-06 -9.1802E-06 3.2465E-06 7.8225E-06 -9.1482E-06 3.1810E-06 7.8764E-06 -9.1039E-06  
3.2374E-06 7.8279E-06 -9.0646E-06 3.6130E-06 8.5010E-06 -9.8788E-06  
14 7.7352E-06 2.3755E-05 -2.7635E-05 7.7516E-06 2.3831E-05 -2.7723E-05 7.7530E-06 2.3800E-05 -2.7699E-05  
7.7536E-06 2.3833E-05 -2.7736E-05 8.5010E-06 2.5787E-05 -2.9974E-05  
15 -8.9988E-06 -2.7619E-05 3.4870E-05 -9.0125E-06 -2.7718E-05 3.4987E-05 -9.0231E-06 -2.7669E-05 3.4962E-05  
-9.0161E-06 -2.7720E-05 3.5016E-05 -9.8788E-06 -2.9974E-05 3.7869E-05

Correlation matrix of the 5 vectors

1 1.0000E+00 8.8956E-01 -8.5359E-01 9.0499E-01 8.1516E-01 -7.8112E-01 9.1567E-01 8.1070E-01 -7.8239E-01  
9.0832E-01 8.1525E-01 -7.8435E-01 9.0250E-01 8.1642E-01 -7.8378E-01  
2 8.8956E-01 1.0000E+00 -9.6010E-01 8.0744E-01 9.1179E-01 -8.7435E-01 8.1096E-01 9.0848E-01 -8.7508E-01  
8.0955E-01 9.1201E-01 -8.7612E-01 8.0581E-01 9.1127E-01 -8.7429E-01  
3 -8.5359E-01 -9.6010E-01 1.0000E+00 -7.7552E-01 -8.7376E-01 9.0921E-01 -7.7670E-01 -8.7145E-01 9.0978E-01  
-7.7723E-01 -8.7405E-01 9.1053E-01 -7.7416E-01 -8.7232E-01 9.0829E-01  
4 9.0499E-01 8.0744E-01 -7.7552E-01 1.0000E+00 8.8845E-01 -8.5539E-01 9.0322E-01 8.0661E-01 -7.7548E-01  
9.0481E-01 8.0867E-01 -7.7586E-01 9.0178E-01 8.0595E-01 -7.7326E-01  
5 8.1516E-01 9.1179E-01 -8.7376E-01 8.8845E-01 1.0000E+00 -9.5937E-01 8.1713E-01 9.1091E-01 -8.7925E-01  
8.1128E-01 9.1737E-01 -8.8263E-01 8.0657E-01 9.1976E-01 -8.8279E-01  
6 -7.8112E-01 -8.7435E-01 9.0921E-01 -8.5539E-01 -9.5937E-01 1.0000E+00 -7.8160E-01 -8.7346E-01 9.1356E-01  
-7.7891E-01 -8.7854E-01 9.1636E-01 -7.7522E-01 -8.7935E-01 9.1579E-01  
7 9.1567E-01 8.1096E-01 -7.7670E-01 9.0322E-01 8.1713E-01 -7.8160E-01 1.0000E+00 8.8494E-01 -8.5207E-01  
9.0779E-01 8.1732E-01 -7.8780E-01 9.0012E-01 8.2117E-01 -7.8865E-01  
8 8.1070E-01 9.0848E-01 -8.7145E-01 8.0661E-01 9.1091E-01 -8.7346E-01 8.8494E-01 1.0000E+00 -9.5890E-01  
8.0907E-01 9.1148E-01 -8.7559E-01 8.0498E-01 9.1045E-01 -8.7346E-01  
9 -7.8239E-01 -8.7508E-01 9.0978E-01 -7.7548E-01 -8.7925E-01 9.1356E-01 -8.5207E-01 -9.5890E-01 1.0000E+00  
-7.7858E-01 -8.7964E-01 9.1817E-01 -7.7346E-01 -8.8087E-01 9.1749E-01  
10 9.0832E-01 8.0955E-01 -7.7723E-01 9.0481E-01 8.1128E-01 -7.7891E-01 9.0779E-01 8.0907E-01 -7.7858E-01  
1.0000E+00 8.8947E-01 -8.5145E-01 9.0338E-01 8.0985E-01 -7.7712E-01  
11 8.1525E-01 9.1201E-01 -8.7405E-01 8.0867E-01 9.1737E-01 -8.7854E-01 8.1732E-01 9.1148E-01 -8.7964E-01  
8.8947E-01 1.0000E+00 -9.5893E-01 8.0694E-01 9.1961E-01 -8.8262E-01  
12 -7.8435E-01 -8.7612E-01 9.1053E-01 -7.7586E-01 -8.8263E-01 9.1636E-01 -7.8780E-01 -8.7559E-01 9.1817E-01  
-8.5145E-01 -9.5893E-01 1.0000E+00 -7.7387E-01 -8.8633E-01 9.2337E-01  
13 9.0250E-01 8.0581E-01 -7.7416E-01 9.0178E-01 8.0657E-01 -7.7522E-01 9.0012E-01 8.0498E-01 -7.7346E-01  
9.0338E-01 8.0694E-01 -7.7387E-01 1.0000E+00 8.8072E-01 -8.4456E-01  
14 8.1642E-01 9.1127E-01 -8.7232E-01 8.0595E-01 9.1976E-01 -8.7935E-01 8.2117E-01 9.1045E-01 -8.8087E-01  
8.0985E-01 9.1961E-01 -8.8633E-01 8.8072E-01 1.0000E+00 -9.5918E-01  
15 -7.8378E-01 -8.7429E-01 9.0829E-01 -7.7326E-01 -8.8279E-01 9.1579E-01 -7.8865E-01 -8.7346E-01 9.1749E-01  
-7.7712E-01 -8.8262E-01 9.2337E-01 -8.4456E-01 -9.5918E-01 1.0000E+00

G-FILE for the vectors

Axx2014 8192014 819  
B201408192000201408192100 5 rsgps 1.37IGS  
lant\_info.003 NGS  
C00060001 541007476 18 267444887 51 373659742 62  
C00060002 -877755627 18 585016131 51 237282245 62

C00060003 710116785 18 -956797501 51 -630561470 61  
 C00060004-1116734592 18 -633149888 51 -869921461 61  
 C00060005-2074398120 19 -23810420 50 -646810758 61  
 D 1 2 8895573 1 3 -8535850 1 4 9049874 1 5 8151640 1 6 -7811151  
 D 1 7 9156654 1 8 8107021 1 9 -7823947 1 10 9083161 1 11 8152544  
 D 1 12 -7843522 1 13 9024986 1 14 8164216 1 15 -7837790 2 3 -9600992  
 D 2 4 8074410 2 5 9117889 2 6 -8743463 2 7 8109601 2 8 9084829  
 D 2 9 -8750827 2 10 8095491 2 11 9120145 2 12 -8761245 2 13 8058084  
 D 2 14 9112699 2 15 -8742857 3 4 -7755191 3 5 -8737616 3 6 9092108  
 D 3 7 -7766986 3 8 -8714533 3 9 9097813 3 10 -7772349 3 11 -8740458  
 D 3 12 9105346 3 13 -7741571 3 14 -8723159 3 15 9082862 4 5 8884467  
 D 4 6 -8553928 4 7 9032187 4 8 8066101 4 9 -7754835 4 10 9048101  
 D 4 11 8086704 4 12 -7758585 4 13 9017840 4 14 8059493 4 15 -7732563  
 D 5 6 -9593697 5 7 8171334 5 8 9109138 5 9 -8792453 5 10 8112789  
 D 5 11 9173701 5 12 -8826285 5 13 8065722 5 14 9197615 5 15 -8827866  
 D 6 7 -7815990 6 8 -8734552 6 9 9135591 6 10 -7789101 6 11 -8785436  
 D 6 12 9163647 6 13 -7752244 6 14 -8793535 6 15 9157878 7 8 8849365  
 D 7 9 -8520687 7 10 9077917 7 11 8173192 7 12 -7877982 7 13 9001191  
 D 7 14 8211747 7 15 -7886486 8 9 -9588993 8 10 8090692 8 11 9114809  
 D 8 12 -8755865 8 13 8049771 8 14 9104498 8 15 -8734555 9 10 -7785815  
 D 9 11 -8796426 9 12 9181685 9 13 -7734609 9 14 -8808748 9 15 9174869  
 D 10 11 8894691 10 12 -8514538 10 13 9033803 10 14 8098506 10 15 -7771169  
 D 11 12 -9589260 11 13 8069377 11 14 9196080 11 15 -8826200 12 13 -7738723  
 D 12 14 -8863324 12 15 9233719 13 14 8807210 13 15 -8445648 14 15 -9591831

ITRF position of 0185 as determined by individual baselines

	X	Y	Z
p053	-1337660.005	-4042514.823	4733765.647
mtms	-1337660.021	-4042514.831	4733765.664
p052	-1337660.021	-4042514.828	4733765.649
mtlw	-1337660.024	-4042514.844	4733765.660
p049	-1337660.025	-4042514.826	4733765.646

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
p053	0.013	0.002	0.000	0.012	0.005	-0.004
mtms	-0.003	-0.006	0.018	-0.001	0.007	0.018
p052	-0.004	-0.003	0.003	-0.002	-0.001	0.005
mtlw	-0.007	-0.019	0.013	-0.000	-0.006	0.024
p049	-0.007	-0.001	-0.000	-0.007	-0.003	0.002

STATE PLANE COORDINATES - International Foot

SPC (2500 MT )	
Northing (Y) [feet]	1449348.806
Easting (X) [feet]	2258676.060
Convergence [degrees]	0.87103183
Point Scale	0.99961539
Combined Factor	0.99949042

\*\* Orthometric Heights Above Future Geopotential Datum.

Prototype orthometric heights are now being made available as a precursor to the completion of GRAV-D and the replacement of NAVD 88 with a new geopotential reference system. The following height reflects the current best estimate of the true orthometric height, based on the existing gravimetric geoid model. This height is subject to change as data and modeling for the gravimetric geoid change throughout the lifetime of the GRAV-D project, or as new realizations of the ITRF are adopted. However, at the completion of GRAV-D, these heights will supersede the NAVD 88 heights

APPROX ORTHO HGT: 813.233 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.541  
scatter (mean square distance from rover) is 21231.411  
average edop for rover is 0.710  
average ndop for rover is 1.040  
average hdop for rover is 1.259  
average vdop for rover is 1.770  
average gdop for rover is 2.520

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.