

## OPUS-RS solution : 018772\_14\_226\_A0.14O OP1408200288175

opus &lt;opus@ngs.noaa.gov&gt;

Sat 8/16/2014 8:47 AM

To:John Freetly &lt;John.Freetly@neciusa.com&gt;;

FILE: 018772\_14\_226\_A0.14O OP1408200288175

## NGS OPUS-RS SOLUTION REPORT

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All computed coordinate accuracies are listed as 1-sigma RMS values.

For additional information: <http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: john.freetly@neciusa.com                      DATE: August 16, 2014  
 RINEX FILE: 0187226q.14o                              TIME: 14:47:29 UTC

SOFTWARE: rsgps 1.37 RS50.prl 1.99.2              START: 2014/08/14 16:38:30  
 EPHEMERIS: igr18054.eph [rapid]                      STOP: 2014/08/14 17:36:30  
 NAV FILE: brdc2260.14n                              OBS USED: 4335 / 4845 : 89%  
 ANT NAME: CHCX91R                      NONE                      QUALITY IND. 26.08/ 65.47  
 ARP HEIGHT: 1.80000                      NORMALIZED RMS:              0.306

REF FRAME: NAD\_83(2011)(EPOCH:2010.0000)              IGS08 (EPOCH:2014.61839)

X: -1379167.834(m) 0.007(m)              -1379168.710(m) 0.007(m)  
 Y: -4031072.467(m) 0.014(m)              -4031071.244(m) 0.014(m)  
 Z: 4731826.854(m) 0.018(m)              4731826.846(m) 0.018(m)

LAT: 48 11 30.52872 0.006(m)              48 11 30.54962 0.006(m)  
 E LON: 251 6 44.73854 0.005(m)              251 6 44.67925 0.005(m)  
 W LON: 108 53 15.26146 0.005(m)              108 53 15.32075 0.005(m)  
 EL HGT: 946.835(m) 0.022(m)              946.247(m) 0.022(m)  
 ORTHO HGT: 962.354(m) 0.024(m) [NAVD88 (Computed using GEOID12A)]

## UTM COORDINATES    STATE PLANE COORDINATES

UTM (Zone 12)              SPC (2500 MT )

Northing (Y) [meters]    5339777.450              438192.895  
 Easting (X) [meters]    656988.655              645514.499  
 Convergence [degrees]    1.57488266              0.44799320  
 Point Scale              0.99990283              0.99960526  
 Combined Factor              0.99975447              0.99945694

US NATIONAL GRID DESIGNATOR: 12UXU5698839777(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DG9749	MTMS MONTANA STATE UNI CORS ARP	N483227.426	W1094111.858	70808.7
DL7731	P053 WHITEWATERMT2007 CORS ARP	N484333.865	W1074331.456	104499.5
DM7133	MTLW LEWISTOWN CORS ARP	N470314.929	W1092633.764	133214.2
DI3425	P052 LRRNCHJRDNMT2006 CORS ARP	N472229.026	W1070107.185	166947.8
DI2257	P049 ARMINGTON_MT2006 CORS ARP	N472059.850	W1105422.382	177935.0

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)

mtms	-1425435.579	-3984013.206	4757493.885
p053	-1283559.258	-4015770.338	4771131.611
mtlw	-1449333.476	-4105829.811	4646773.486
p052	-1266648.333	-4138194.566	4670709.493
p049	-1545099.850	-4044895.882	4669084.587
0187	-1379168.710	-4031071.244	4731826.846

Covariance matrix of the stations:

1	2.7160E-07	5.6610E-07	-5.8390E-07	-9.4020E-09	-1.2060E-07	1.2540E-07	-2.2330E-08	-1.5440E-07	1.5820E-07
	-9.3560E-09	-1.2220E-07	1.2640E-07	-3.0490E-08	-1.6900E-07	1.7420E-07	3.8600E-08	2.2490E-09	1.1390E-09
2	5.6610E-07	1.8120E-06	-1.7240E-06	-5.9930E-08	-2.9050E-07	3.8340E-07	-1.9880E-07	-4.8680E-07	4.8330E-07
	-5.8540E-08	-4.3610E-07	3.9760E-07	-2.4830E-07	-3.9750E-07	4.6030E-07	5.3890E-08	2.2680E-07	-1.5260E-07
3	-5.8390E-07	-1.7240E-06	1.8940E-06	1.1310E-07	3.8510E-07	-4.0150E-07	1.6830E-07	4.6450E-07	-4.4530E-07
	1.1110E-07	4.3400E-07	-4.0280E-07	1.9120E-07	4.4020E-07	-4.4520E-07	-1.4190E-08	-7.0000E-08	9.3120E-08
4	-9.4020E-09	-5.9930E-08	1.1310E-07	2.7170E-07	5.4270E-07	-5.2170E-07	-3.9780E-08	-1.9230E-07	1.6060E-07
	5.6790E-08	-1.3100E-07	7.7520E-08	-7.9820E-08	-1.5860E-07	1.7000E-07	8.3290E-08	1.1620E-07	-9.8790E-08
5	-1.2060E-07	-2.9050E-07	3.8510E-07	5.4270E-07	1.7670E-06	-1.7020E-06	-1.6290E-07	-4.5920E-07	4.6570E-07
	-6.2500E-08	-4.1290E-07	3.9660E-07	-1.9930E-07	-4.0310E-07	4.5440E-07	4.7670E-08	1.4520E-07	-8.3380E-08
6	1.2540E-07	3.8340E-07	-4.0150E-07	-5.2170E-07	-1.7020E-06	1.8590E-06	1.4320E-07	4.5670E-07	-4.3250E-07
	8.9200E-08	4.1930E-07	-3.8520E-07	1.6660E-07	4.4300E-07	-4.4010E-07	-2.4770E-08	-3.5260E-08	6.1870E-08
7	-2.2330E-08	-1.9880E-07	1.6830E-07	-3.9780E-08	-1.6290E-07	1.4320E-07	3.0710E-07	6.6980E-07	-6.3630E-07
	-4.2050E-08	-1.2180E-07	1.4700E-07	-2.7390E-09	-1.8680E-07	1.7790E-07	1.1040E-08	-8.3240E-08	6.9460E-08
8	-1.5440E-07	-4.8680E-07	4.6450E-07	-1.9230E-07	-4.5920E-07	4.5670E-07	6.6980E-07	2.0210E-06	-1.8820E-06
	-2.0330E-07	-4.1920E-07	4.9030E-07	-1.1840E-07	-4.5640E-07	4.7020E-07	-5.9210E-08	-1.2300E-07	1.3370E-07
9	1.5820E-07	4.8330E-07	-4.4530E-07	1.6060E-07	4.6570E-07	-4.3250E-07	-6.3630E-07	-1.8820E-06	1.9650E-06
	1.5970E-07	4.4560E-07	-4.3000E-07	1.5620E-07	4.8700E-07	-4.5680E-07	3.2680E-08	8.5120E-08	-2.6210E-08
10	-9.3560E-09	-5.8540E-08	1.1110E-07	5.6790E-08	-6.2500E-08	8.9200E-08	-4.2050E-08	-2.0330E-07	1.5970E-07
	2.8140E-07	4.9080E-07	-5.3170E-07	-8.7290E-08	-1.6570E-07	1.7080E-07	8.9120E-08	1.2460E-07	-1.1250E-07
11	-1.2220E-07	-4.3610E-07	4.3400E-07	-1.3100E-07	-4.1290E-07	4.1930E-07	-1.2180E-07	-4.1920E-07	4.4560E-07

```

4.9080E-07 1.9130E-06 -1.7580E-06 -1.1850E-07 -4.4640E-07 4.5810E-07 -5.8330E-09 -4.8610E-08 6.1320E-08
 12 1.2640E-07 3.9760E-07 -4.0280E-07 7.7520E-08 3.9660E-07 -3.8520E-07 1.4700E-07 4.9030E-07 -4.3000E-07
-5.3170E-07 -1.7580E-06 1.8650E-06 1.8280E-07 4.7370E-07 -4.4580E-07 -3.7240E-08 -4.0340E-08 8.9660E-08
 13 -3.0490E-08 -2.4830E-07 1.9120E-07 -7.9820E-08 -1.9930E-07 1.6660E-07 -2.7390E-09 -1.1840E-07 1.5620E-07
-8.7290E-08 -1.1850E-07 1.8280E-07 4.0100E-07 6.8340E-07 -6.9600E-07 -2.2110E-08 -1.5990E-07 1.4090E-07
 14 -1.6900E-07 -3.9750E-07 4.4020E-07 -1.5860E-07 -4.0310E-07 4.4300E-07 -1.8680E-07 -4.5640E-07 4.8700E-07
-1.6570E-07 -4.4640E-07 4.7370E-07 6.8340E-07 1.9030E-06 -1.8430E-06 -3.6100E-08 8.0810E-10 4.0260E-08
 15 1.7420E-07 4.6030E-07 -4.4520E-07 1.7000E-07 4.5440E-07 -4.4010E-07 1.7790E-07 4.7020E-07 -4.5680E-07
1.7080E-07 4.5810E-07 -4.4580E-07 -6.9600E-07 -1.8430E-06 1.9870E-06 4.3470E-08 6.0510E-08 -1.8640E-08
 16 3.8600E-08 5.3890E-08 -1.4190E-08 8.3290E-08 4.7670E-08 -2.4770E-08 1.1040E-08 -5.9210E-08 3.2680E-08
8.9120E-08 -5.8330E-09 -3.7240E-08 -2.2110E-08 -3.6100E-08 4.3470E-08 2.7670E-06 7.0480E-06 -7.0970E-06
 17 2.2490E-09 2.2680E-07 -7.0000E-08 1.1620E-07 1.4520E-07 -3.5260E-08 -8.3240E-08 -1.2300E-07 8.5120E-08
1.2460E-07 -4.8610E-08 -4.0340E-08 -1.5990E-07 8.0810E-10 6.0510E-08 7.0480E-06 2.1950E-05 -2.1790E-05
 18 1.1390E-09 -1.5260E-07 9.3120E-08 -9.8790E-08 -8.3380E-08 6.1870E-08 6.9460E-08 1.3370E-07 -2.6210E-08
-1.1250E-07 6.1320E-08 8.9660E-08 1.4090E-07 4.0260E-08 -1.8640E-08 -7.0970E-06 -2.1790E-05 2.3230E-05

```

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

```

0.0000027670 0.0000070480 -0.0000070970
0.0000070480 0.0000219500 -0.0000217900
-0.0000070970 -0.0000217900 0.0000232300

```

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

```

0.0000004598 0.0000000004 0.0000004556
0.0000000004 0.0000010087 -0.0000029064
0.0000004556 -0.0000029064 0.0000464784

```

Horizontal network accuracy = 0.00214 meters.

Vertical network accuracy = 0.01337 meters.

		Vectors		
To	From	X	Y	Z
mtms	0187	-46266.868	47058.038	25667.038
p053	0187	95609.453	15300.906	39304.764
mtlw	0187	-70164.766	-74758.567	-85053.360
p052	0187	112520.377	-107123.321	-61117.353
p049	0187	-165931.139	-13824.638	-62742.260

Covariance matrix of the 5 vectors

```

 1 2.9614E-06 7.5580E-06 -7.6678E-06 2.6357E-06 6.8775E-06 -6.9480E-06 2.6950E-06 6.9506E-06 -6.9726E-06
2.6299E-06 6.9294E-06 -6.9345E-06 2.7200E-06 6.9129E-06 -6.9674E-06
 2 7.5580E-06 2.3308E-05 -2.3291E-05 6.8180E-06 2.1288E-05 -2.1219E-05 6.8786E-06 2.1359E-05 -2.1239E-05
6.8110E-06 2.1336E-05 -2.1199E-05 6.9057E-06 2.1325E-05 -2.1238E-05
 3 -7.6678E-06 -2.3291E-05 2.4938E-05 -6.8709E-06 -2.1252E-05 2.2674E-05 -6.9840E-06 -2.1389E-05 2.2718E-05
-6.8592E-06 -2.1347E-05 2.2644E-05 -7.0325E-06 -2.1320E-05 2.2710E-05
 4 2.6357E-06 6.8180E-06 -6.8709E-06 2.8721E-06 7.4268E-06 -7.4951E-06 2.6329E-06 6.7987E-06 -6.8703E-06
2.6514E-06 6.8066E-06 -6.8835E-06 2.6260E-06 6.8093E-06 -6.8717E-06
 5 6.8775E-06 2.1288E-05 -2.1252E-05 7.4268E-06 2.3427E-05 -2.3373E-05 6.9207E-06 2.1469E-05 -2.1326E-05
6.8132E-06 2.1441E-05 -2.1270E-05 6.9609E-06 2.1401E-05 -2.1313E-05
 6 -6.9480E-06 -2.1219E-05 2.2674E-05 -7.4951E-06 -2.3373E-05 2.4965E-05 -6.9985E-06 -2.1432E-05 2.2762E-05
-6.8705E-06 -2.1397E-05 2.2693E-05 -7.0465E-06 -2.1352E-05 2.2747E-05

```

7 2.6950E-06 6.8786E-06 -6.9840E-06 2.6329E-06 6.9207E-06 -6.9985E-06 3.0520E-06 7.8602E-06 -7.8354E-06  
 06 2.6248E-06 7.0153E-06 -6.9822E-06 2.7753E-06 6.9805E-06 -7.0320E-06  
 8 6.9506E-06 2.1359E-05 -2.1389E-05 6.7987E-06 2.1469E-05 -2.1432E-05 7.8602E-06 2.4217E-05 -2.3891E-05  
 6.7793E-06 2.1702E-05 -2.1393E-05 7.1487E-06 2.1616E-05 -2.1514E-05  
 9 -6.9726E-06 -2.1239E-05 2.2718E-05 -6.8703E-06 -2.1326E-05 2.2762E-05 -7.8354E-06 -2.3891E-05 2.5247E-05  
 -6.8575E-06 -2.1491E-05 2.2737E-05 -7.1144E-06 -2.1428E-05 2.2818E-05  
 10 2.6299E-06 6.8110E-06 -6.8592E-06 2.6514E-06 6.8132E-06 -6.8705E-06 2.6248E-06 6.7793E-06 -6.8575E-06  
 2.8702E-06 7.4200E-06 -7.4790E-06 2.6127E-06 6.7938E-06 -6.8572E-06  
 11 6.9294E-06 2.1336E-05 -2.1347E-05 6.8066E-06 2.1441E-05 -2.1397E-05 7.0153E-06 2.1702E-05 -2.1491E-05  
 7.4200E-06 2.3960E-05 -2.3569E-05 7.0952E-06 2.1551E-05 -2.1454E-05  
 12 -6.9345E-06 -2.1199E-05 2.2644E-05 -6.8835E-06 -2.1270E-05 2.2693E-05 -6.9822E-06 -2.1393E-05 2.2737E-05  
 -7.4790E-06 -2.3569E-05 2.4916E-05 -7.0179E-06 -2.1316E-05 2.2713E-05  
 13 2.7200E-06 6.9057E-06 -7.0325E-06 2.6260E-06 6.9609E-06 -7.0465E-06 2.7753E-06 7.1487E-06 -7.1144E-06  
 2.6127E-06 7.0952E-06 -7.0179E-06 3.2122E-06 7.9274E-06 -7.9774E-06  
 14 6.9129E-06 2.1325E-05 -2.1320E-05 6.8093E-06 2.1401E-05 -2.1352E-05 6.9805E-06 2.1616E-05 -2.1428E-05  
 6.7938E-06 2.1551E-05 -2.1316E-05 7.9274E-06 2.3851E-05 -2.3734E-05  
 15 -6.9674E-06 -2.1238E-05 2.2710E-05 -6.8717E-06 -2.1313E-05 2.2747E-05 -7.0320E-06 -2.1514E-05 2.2818E-05  
 -6.8572E-06 -2.1454E-05 2.2713E-05 -7.9774E-06 -2.3734E-05 2.5254E-05

Correlation matrix of the 5 vectors

1 1.0000E+00 9.0970E-01 -8.9227E-01 9.0375E-01 8.2571E-01 -8.0806E-01 8.9644E-01 8.2075E-01 -8.0638E-01  
 9.0207E-01 8.2262E-01 -8.0729E-01 8.8190E-01 8.2253E-01 -8.0567E-01  
 2 9.0970E-01 1.0000E+00 -9.6607E-01 8.3329E-01 9.1099E-01 -8.7962E-01 8.1554E-01 8.9903E-01 -8.7554E-01  
 8.3272E-01 9.0283E-01 -8.7970E-01 7.9809E-01 9.0443E-01 -8.7535E-01  
 3 -8.9227E-01 -9.6607E-01 1.0000E+00 -8.1187E-01 -8.7924E-01 9.0870E-01 -8.0053E-01 -8.7037E-01 9.0538E-01  
 -8.1076E-01 -8.7331E-01 9.0844E-01 -7.8574E-01 -8.7418E-01 9.0496E-01  
 4 9.0375E-01 8.3329E-01 -8.1187E-01 1.0000E+00 9.0541E-01 -8.8514E-01 8.8928E-01 8.1520E-01 -8.0680E-01  
 9.2346E-01 8.2051E-01 -8.1371E-01 8.6455E-01 8.2271E-01 -8.0685E-01  
 5 8.2571E-01 9.1099E-01 -8.7924E-01 9.0541E-01 1.0000E+00 -9.6649E-01 8.1846E-01 9.0134E-01 -8.7689E-01  
 8.3089E-01 9.0497E-01 -8.8038E-01 8.0244E-01 9.0536E-01 -8.7623E-01  
 6 -8.0806E-01 -8.7962E-01 9.0870E-01 -8.8514E-01 -9.6649E-01 1.0000E+00 -8.0176E-01 -8.7162E-01 9.0663E-01  
 -8.1165E-01 -8.7485E-01 9.0990E-01 -7.8687E-01 -8.7501E-01 9.0590E-01  
 7 8.9644E-01 8.1554E-01 -8.0053E-01 8.8928E-01 8.1846E-01 -8.0176E-01 1.0000E+00 9.1429E-01 -8.9261E-01  
 8.8685E-01 8.2036E-01 -8.0069E-01 8.8638E-01 8.1816E-01 -8.0098E-01  
 8 8.2075E-01 8.9903E-01 -8.7037E-01 8.1520E-01 9.0134E-01 -8.7162E-01 9.1429E-01 1.0000E+00 -9.6619E-01  
 8.1315E-01 9.0095E-01 -8.7092E-01 8.1052E-01 8.9940E-01 -8.6995E-01  
 9 -8.0638E-01 -8.7554E-01 9.0538E-01 -8.0680E-01 -8.7689E-01 9.0663E-01 -8.9261E-01 -9.6619E-01 1.0000E+00  
 -8.0557E-01 -8.7377E-01 9.0652E-01 -7.9000E-01 -8.7322E-01 9.0365E-01  
 10 9.0207E-01 8.3272E-01 -8.1076E-01 9.2346E-01 8.3089E-01 -8.1165E-01 8.8685E-01 8.1315E-01 -8.0557E-01  
 1.0000E+00 8.9476E-01 -8.8441E-01 8.6047E-01 8.2111E-01 -8.0542E-01  
 11 8.2262E-01 9.0283E-01 -8.7331E-01 8.2051E-01 9.0497E-01 -8.7485E-01 8.2036E-01 9.0095E-01 -8.7377E-01  
 8.9476E-01 1.0000E+00 -9.6463E-01 8.0876E-01 9.0152E-01 -8.7215E-01  
 12 -8.0729E-01 -8.7970E-01 9.0844E-01 -8.1371E-01 -8.8038E-01 9.0990E-01 -8.0069E-01 -8.7092E-01 9.0652E-01  
 -8.8441E-01 -9.6463E-01 1.0000E+00 -7.8445E-01 -8.7441E-01 9.0547E-01  
 13 8.8190E-01 7.9809E-01 -7.8574E-01 8.6455E-01 8.0244E-01 -7.8687E-01 8.8638E-01 8.1052E-01 -7.9000E-01  
 8.6047E-01 8.0876E-01 -7.8445E-01 1.0000E+00 9.0567E-01 -8.8571E-01  
 14 8.2253E-01 9.0443E-01 -8.7418E-01 8.2271E-01 9.0536E-01 -8.7501E-01 8.1816E-01 8.9940E-01 -8.7322E-01  
 8.2111E-01 9.0152E-01 -8.7441E-01 9.0567E-01 1.0000E+00 -9.6704E-01  
 15 -8.0567E-01 -8.7535E-01 9.0496E-01 -8.0685E-01 -8.7623E-01 9.0590E-01 -8.0098E-01 -8.6995E-01 9.0365E-01  
 -8.0542E-01 -8.7215E-01 9.0547E-01 -8.8571E-01 -9.6704E-01 1.0000E+00

G-FILE for the vectors

```

Axx2014 8142014 814
B201408141600201408141700 5 rsgps 1.37IGS
lant_info.003 NGS
C00060001 -462668683 17 470580381 48 256670381 49
C00060002 956094527 16 153009064 48 393047643 49
C00060003 -701647656 17 -747585665 49 -850533599 50
C00060004 1125203773 16-1071233211 48 -611173531 49
C00060005-1659311394 17 -138246376 48 -627422598 50
D 1 2 9097035 1 3 -8922700 1 4 9037482 1 5 8257075 1 6 -8080556
D 1 7 8964403 1 8 8207504 1 9 -8063784 1 10 9020728 1 11 8226227
D 1 12 -8072911 1 13 8819032 1 14 8225302 1 15 -8056664 2 3 -9660745
D 2 4 8332938 2 5 9109903 2 6 -8796204 2 7 8155432 2 8 8990268
D 2 9 -8755356 2 10 8327213 2 11 9028289 2 12 -8796951 2 13 7980855
D 2 14 9044276 2 15 -8753503 3 4 -8118669 3 5 -8792383 3 6 9087030
D 3 7 -8005343 3 8 -8703734 3 9 9053757 3 10 -8107600 3 11 -8733116
D 3 12 9084397 3 13 -7857402 3 14 -8741841 3 15 9049551 4 5 9054147
D 4 6 -8851368 4 7 8892783 4 8 8152016 4 9 -8067988 4 10 9234590
D 4 11 8205133 4 12 -8137078 4 13 8645513 4 14 8227054 4 15 -8068524
D 5 6 -9664924 5 7 8184644 5 8 9013405 5 9 -8768939 5 10 8308935
D 5 11 9049718 5 12 -8803795 5 13 8024352 5 14 9053582 5 15 -8762276
D 6 7 -8017567 6 8 -8716240 6 9 9066315 6 10 -8116506 6 11 -8748519
D 6 12 9098978 6 13 -7868729 6 14 -8750114 6 15 9059042 7 8 9142869
D 7 9 -8926088 7 10 8868452 7 11 8203619 7 12 -8006882 7 13 8863769
D 7 14 8181605 7 15 -8009760 8 9 -9661896 8 10 8131530 8 11 9009535
D 8 12 -8709161 8 13 8105221 8 14 8994027 8 15 -8699488 9 10 -8055694
D 9 11 -8737747 9 12 9065248 9 13 -7899978 9 14 -8732207 9 15 9036547
D 10 11 8947616 10 12 -8844062 10 13 8604662 10 14 8211129 10 15 -8054236
D 11 12 -9646261 11 13 8087580 11 14 9015157 11 15 -8721474 12 13 -7844507
D 12 14 -8744138 12 15 9054700 13 14 9056728 13 15 -8857060 14 15 -9670355
    
```

ITRF position of 0187 as determined by individual baselines

	X	Y	Z
mtms	-1379168.713	-4031071.249	4731826.841
p053	-1379168.714	-4031071.246	4731826.861
mtlw	-1379168.717	-4031071.265	4731826.873
p052	-1379168.721	-4031071.258	4731826.862
p049	-1379168.706	-4031071.256	4731826.858

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
mtms	-0.003	-0.004	-0.006	-0.001	-0.008	-0.001
p053	-0.003	-0.002	0.014	-0.003	0.008	0.012
mtlw	-0.006	-0.021	0.026	0.001	0.001	0.034
p052	-0.011	-0.014	0.015	-0.006	-0.002	0.022
p049	0.005	-0.012	0.011	0.008	0.000	0.015

STATE PLANE COORDINATES - International Foot

SPC (2500 MT )

Northing (Y) [feet] 1437640.732  
Easting (X) [feet] 2117829.721  
Convergence [degrees] 0.44799320  
Point Scale 0.99960526  
Combined Factor 0.99945694

\*\* 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: 961.353 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.511  
scatter (mean square distance from rover) is 18640.488  
average edop for rover is 0.590  
average ndop for rover is 0.820  
average hdop for rover is 1.010  
average vdop for rover is 1.760  
average gdop for rover is 2.340

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.