

# OPUS-RS solution : 401289226V.14O OP1408550278327

opus <opus@ngs.noaa.gov>

Wed 8/20/2014 10:01 AM

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

FILE: 401289226V.14O OP1408550278327

## 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 20, 2014  
RINEX FILE: 4012226v.14o                      TIME: 16:00:40 UTC

SOFTWARE: rsgps 1.37 RS53.prl 1.99.2              START: 2014/08/14 21:38:20  
EPHEMERIS: igr18054.eph [rapid]              STOP: 2014/08/14 22:38:30  
NAV FILE: brdc2260.14n                      OBS USED: 3275 / 3335 : 98%  
ANT NAME: CHCX91R              NONE              QUALITY IND. 21.71/ 48.36  
ARP HEIGHT: 1.8                      NORMALIZED RMS:              0.367

REF FRAME: NAD\_83(2011)(EPOCH:2010.0000)              IGS08 (EPOCH:2014.61897)

X:	-1385662.160(m)	0.009(m)	-1385663.036(m)	0.009(m)
Y:	-4030164.592(m)	0.016(m)	-4030163.369(m)	0.016(m)
Z:	4730778.014(m)	0.012(m)	4730778.006(m)	0.012(m)

LAT:	48 10 37.77868	0.010(m)	48 10 37.79953	0.010(m)
E LON:	251 1 33.11736	0.004(m)	251 1 33.05802	0.004(m)
W LON:	108 58 26.88264	0.004(m)	108 58 26.94198	0.004(m)
EL HGT:	997.334(m)	0.019(m)	996.747(m)	0.019(m)
ORTHO HGT:	1012.639(m)	0.021(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 12)	SPC (2500 MT )
Northing (Y) [meters]	5337975.681	436517.533
Easting (X) [meters]	650598.929	639092.448
Convergence [degrees]	1.50997835	0.38467314
Point Scale	0.99987868	0.99959999
Combined Factor	0.99972241	0.99944377

US NATIONAL GRID DESIGNATOR: 12UXU5059837975(NAD 83)

## BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DG9749	MTMS MONTANA STATE UNI CORS ARP	N483227.426	W1094111.858	66523.9
DL7731	P053 WHITEWATERMT2007 CORS ARP	N484333.865	W1074331.456	110728.3
DM7133	MTLW LEWISTOWN CORS ARP	N470314.929	W1092633.764	129754.0
DI2257	P049 ARMINGTON_MT2006 CORS ARP	N472059.850	W1105422.382	171590.3
DI3425	P052 LRRNCHJRDNMT2006 CORS ARP	N472229.026	W1070107.185	171591.0

## 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	-1425435.575	-3984013.199	4757493.876
p053	-1283559.265	-4015770.341	4771131.615
mtlw	-1449333.490	-4105829.835	4646773.505
p049	-1545099.838	-4044895.874	4669084.580
p052	-1266648.327	-4138194.554	4670709.486
4012	-1385663.036	-4030163.369	4730778.006

## Covariance matrix of the stations:

1	1.7900E-07	3.2020E-07	-4.1280E-07	1.3730E-10	-8.1600E-08	9.5110E-08	9.0340E-09	-7.7520E-08	1.0490E-07	
2	1.3770E-08	-8.5780E-08	1.0640E-07	-1.8060E-09	-7.5520E-08	1.0650E-07	3.5600E-08	-1.3860E-08	1.6020E-08	
3	3.2020E-07	1.2210E-06	-1.4210E-06	-4.9900E-08	-2.0280E-07	3.1870E-07	-9.7550E-08	-2.8810E-07	3.8040E-07	
4	-1.2600E-07	-2.9880E-07	4.2570E-07	-4.5930E-08	-2.3120E-07	2.9550E-07	1.4930E-08	1.0660E-07	-6.1040E-08	
5	-4.1280E-07	-1.4210E-06	2.0440E-06	1.2460E-07	3.7990E-07	-4.6330E-07	8.9080E-08	3.3700E-07	-4.5240E-07	
6	6.9550E-08	3.4580E-07	-4.3890E-07	1.2890E-07	3.5940E-07	-4.8930E-07	1.5790E-08	3.5350E-08	-4.1750E-09	
7	1.3730E-10	-4.9900E-08	1.2460E-07	1.9850E-07	3.3170E-07	-3.7060E-07	-1.2020E-08	-1.1720E-07	1.0040E-07	
8	-6.2760E-08	-1.4320E-07	1.8510E-07	7.5840E-08	-2.0700E-08	-4.0240E-08	6.8320E-08	9.0720E-08	-9.1800E-08	
9	-8.1600E-08	-2.0280E-07	3.7990E-07	3.3170E-07	1.2240E-06	-1.3810E-06	-1.0090E-07	-3.0610E-07	3.6000E-07	
10	-1.6780E-07	-3.3230E-07	4.6560E-07	1.8030E-08	-1.8230E-07	1.7550E-07	4.0080E-08	1.5500E-07	-1.1260E-07	
11	9.5110E-08	3.1870E-07	-4.6330E-07	-3.7060E-07	-1.3810E-06	1.8810E-06	1.0390E-07	3.7730E-07	-4.2380E-07	
12	1.5820E-07	4.1310E-07	-5.2400E-07	1.3840E-08	2.7250E-07	-2.7030E-07	-3.0750E-08	-7.6840E-08	1.1070E-07	
13	9.0340E-09	-9.7550E-08	8.9080E-08	-1.2020E-08	-1.0090E-07	1.0390E-07	1.9060E-07	3.6260E-07	-4.0850E-07	
14	2.8480E-08	-7.8130E-08	8.8020E-08	-1.5990E-08	-8.6370E-08	1.2790E-07	2.5230E-08	-4.8850E-08	4.8230E-08	
15	-7.7520E-08	-2.8810E-07	3.3700E-07	-1.1720E-07	-3.0610E-07	3.7730E-07	3.6260E-07	1.3360E-06	-1.4750E-06	
16	-4.1770E-08	-2.4960E-07	3.2990E-07	-1.2610E-07	-2.9250E-07	4.3110E-07	-3.1680E-08	-6.2770E-08	9.9440E-08	
17	1.0490E-07	3.8040E-07	-4.5240E-07	1.0040E-07	3.6000E-07	-4.2380E-07	-4.0850E-07	-1.4750E-06	1.9450E-06	
18	1.0680E-07	3.8950E-07	-4.6440E-07	9.6490E-08	3.4430E-07	-4.0440E-07	1.5660E-08	4.7170E-08	-3.5360E-10	
19	1.3770E-08	-1.2600E-07	6.9550E-08	-6.2760E-08	-1.6780E-07	1.5820E-07	2.8480E-08	-4.1770E-08	1.0680E-07	
20	2.9850E-07	4.6510E-07	-5.7890E-07	-7.7600E-08	-1.3040E-07	2.4530E-07	-4.0990E-09	-1.3790E-07	1.4390E-07	
21	-8.5780E-08	-2.9880E-07	3.4580E-07	-1.4320E-07	-3.3230E-07	4.1310E-07	-7.8130E-08	-2.4960E-07	3.8950E-07	
22	4.6510E-07	1.3970E-06	-1.6410E-06	-1.5660E-07	-3.1690E-07	4.9180E-07	-5.0730E-08	-9.3380E-08	1.4510E-07	
23	1.0640E-07	4.2570E-07	-4.3890E-07	1.8510E-07	4.6560E-07	-5.2400E-07	8.8020E-08	3.2990E-07	-4.6440E-07	
24	-5.7890E-07	-1.6410E-06	2.2310E-06	1.9830E-07	4.2000E-07	-6.0320E-07	6.7980E-08	1.8280E-07	-1.5850E-07	
25	13	-1.8060E-09	-4.5930E-08	1.2890E-07	7.5840E-08	1.8030E-08	1.3840E-08	-1.5990E-08	-1.2610E-07	9.6490E-08

```

-7.7600E-08 -1.5660E-07 1.9830E-07 2.1920E-07 3.1140E-07 -4.3830E-07 7.4910E-08 1.1010E-07 -1.1650E-07
 14 -7.5520E-08 -2.3120E-07 3.5940E-07 -2.0700E-08 -1.8230E-07 2.7250E-07 -8.6370E-08 -2.9250E-07 3.4430E-07
-1.3040E-07 -3.1690E-07 4.2000E-07 3.1140E-07 1.2230E-06 -1.3950E-06 2.7500E-08 9.4790E-08 -7.0760E-08
 15 1.0650E-07 2.9550E-07 -4.8930E-07 -4.0240E-08 1.7550E-07 -2.7030E-07 1.2790E-07 4.3110E-07 -4.0440E-07
2.4530E-07 4.9180E-07 -6.0320E-07 -4.3830E-07 -1.3950E-06 1.9660E-06 -6.8810E-08 -1.8900E-07 2.5260E-07
 16 3.5600E-08 1.4930E-08 1.5790E-08 6.8320E-08 4.0080E-08 -3.0750E-08 2.5230E-08 -3.1680E-08 1.5660E-08
-4.0990E-09 -5.0730E-08 6.7980E-08 7.4910E-08 2.7500E-08 -6.8810E-08 1.6410E-06 3.9160E-06 -4.7700E-06
 17 -1.3860E-08 1.0660E-07 3.5350E-08 9.0720E-08 1.5500E-07 -7.6840E-08 -4.8850E-08 -6.2770E-08 4.7170E-08
-1.3790E-07 -9.3380E-08 1.8280E-07 1.1010E-07 9.4790E-08 -1.8900E-07 3.9160E-06 1.4870E-05 -1.7850E-05
 18 1.6020E-08 -6.1040E-08 -4.1750E-09 -9.1800E-08 -1.1260E-07 1.1070E-07 4.8230E-08 9.9440E-08 -3.5360E-10
1.4390E-07 1.4510E-07 -1.5850E-07 -1.1650E-07 -7.0760E-08 2.5260E-07 -4.7700E-06 -1.7850E-05 2.4100E-05

```

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

```

0.0000016410 0.0000039160 -0.0000047700
0.0000039160 0.0000148700 -0.0000178500
-0.0000047700 -0.0000178500 0.0000241000

```

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

```

0.0000006314 0.0000001376 0.0000016163
0.0000001376 0.0000012312 0.0000021704
0.0000016163 0.0000021704 0.0000387485

```

Horizontal network accuracy = 0.00240 meters.

Vertical network accuracy = 0.01221 meters.

		Vectors		
To	From	X	Y	Z
mtms	4012	-39772.539	46150.170	26715.870
p053	4012	102103.771	14393.028	40353.609
mtlw	4012	-63670.454	-75666.466	-84004.502
p049	4012	-159436.802	-14732.504	-61693.426
p052	4012	119014.709	-108031.185	-60068.520

Covariance matrix of the 5 vectors

```

1 1.7488E-06 4.2351E-06 -5.2146E-06 1.5372E-06 3.8082E-06 -4.6602E-06 1.5892E-06 3.8840E-06 -4.6968E-06
1.6233E-06 3.8948E-06 -4.7476E-06 1.5287E-06 3.8268E-06 -4.6107E-06
2 4.2351E-06 1.5878E-05 -1.9245E-05 3.7605E-06 1.4406E-05 -1.7393E-05 3.8524E-06 1.4538E-05 -1.7456E-05
3.9130E-06 1.4558E-05 -1.7546E-05 3.7450E-06 1.4437E-05 -1.7304E-05
3 -5.2146E-06 -1.9245E-05 2.6152E-05 -4.5694E-06 -1.7393E-05 2.3530E-05 -4.7449E-06 -1.7648E-05 2.3652E-05
-4.8601E-06 -1.7685E-05 2.3824E-05 -4.5404E-06 -1.7455E-05 2.3362E-05
4 1.5372E-06 3.7605E-06 -4.5694E-06 1.7029E-06 4.1169E-06 -5.0181E-06 1.5354E-06 3.7398E-06 -4.5935E-06
1.5140E-06 3.7328E-06 -4.5611E-06 1.5736E-06 3.7771E-06 -4.6496E-06
5 3.8082E-06 1.4406E-05 -1.7393E-05 4.1169E-06 1.5784E-05 -1.9042E-05 3.8239E-06 1.4472E-05 -1.7425E-05
3.8460E-06 1.4476E-05 -1.7455E-05 3.7839E-06 1.4438E-05 -1.7373E-05
6 -4.6602E-06 -1.7393E-05 2.3530E-05 -5.0181E-06 -1.9042E-05 2.5760E-05 -4.6836E-06 -1.7495E-05 2.3566E-05
-4.7250E-06 -1.7505E-05 2.3624E-05 -4.6089E-06 -1.7430E-05 2.3466E-05
7 1.5892E-06 3.8524E-06 -4.7449E-06 1.5354E-06 3.8239E-06 -4.6836E-06 1.7811E-06 4.3591E-06 -5.2424E-06
1.6483E-06 3.9374E-06 -4.7982E-06 1.5249E-06 3.8510E-06 -4.6215E-06
8 3.8840E-06 1.4538E-05 -1.7648E-05 3.7398E-06 1.4472E-05 -1.7495E-05 4.3591E-06 1.6332E-05 -1.9472E-05
4.0438E-06 1.4777E-05 -1.7802E-05 3.7115E-06 1.4545E-05 -1.7329E-05
9 -4.6968E-06 -1.7456E-05 2.3652E-05 -4.5935E-06 -1.7425E-05 2.3566E-05 -5.2424E-06 -1.9472E-05 2.6046E-05
-4.8228E-06 -1.7653E-05 2.3794E-05 -4.5727E-06 -1.7482E-05 2.3443E-05

```

10 1.6233E-06 3.9130E-06 -4.8601E-06 1.5140E-06 3.8460E-06 -4.7250E-06 1.6483E-06 4.0438E-06 -4.8228E-06  
1.9477E-06 4.5697E-06 -5.5608E-06 1.4926E-06 3.8960E-06 -4.5998E-06  
11 3.8948E-06 1.4558E-05 -1.7685E-05 3.7328E-06 1.4476E-05 -1.7505E-05 3.9374E-06 1.4777E-05 -1.7653E-05  
4.5697E-06 1.6454E-05 -1.9819E-05 3.7000E-06 1.4552E-05 -1.7314E-05  
12 -4.7476E-06 -1.7546E-05 2.3824E-05 -4.5611E-06 -1.7455E-05 2.3624E-05 -4.7982E-06 -1.7802E-05 2.3794E-05  
-5.5608E-06 -1.9819E-05 2.6648E-05 -4.5232E-06 -1.7542E-05 2.3403E-05  
13 1.5287E-06 3.7450E-06 -4.5404E-06 1.5736E-06 3.7839E-06 -4.6089E-06 1.5249E-06 3.7115E-06 -4.5727E-06  
1.4926E-06 3.7000E-06 -4.5232E-06 1.7104E-06 4.0898E-06 -5.0230E-06  
14 3.8268E-06 1.4437E-05 -1.7455E-05 3.7771E-06 1.4438E-05 -1.7430E-05 3.8510E-06 1.4545E-05 -1.7482E-05  
3.8960E-06 1.4552E-05 -1.7542E-05 4.0898E-06 1.5903E-05 -1.8985E-05  
15 -4.6107E-06 -1.7304E-05 2.3362E-05 -4.6496E-06 -1.7373E-05 2.3466E-05 -4.6215E-06 -1.7329E-05 2.3443E-05  
-4.5998E-06 -1.7314E-05 2.3403E-05 -5.0230E-06 -1.8985E-05 2.5561E-05

Correlation matrix of the 5 vectors

1 1.0000E+00 8.0371E-01 -7.7107E-01 8.9079E-01 7.2483E-01 -6.9432E-01 9.0045E-01 7.2677E-01 -6.9592E-01  
8.7955E-01 7.2608E-01 -6.9546E-01 8.8390E-01 7.2565E-01 -6.8962E-01  
2 8.0371E-01 1.0000E+00 -9.4444E-01 7.2319E-01 9.0997E-01 -8.6004E-01 7.2441E-01 9.0281E-01 -8.5837E-01  
7.0364E-01 9.0069E-01 -8.5301E-01 7.1865E-01 9.0855E-01 -8.5897E-01  
3 -7.7107E-01 -9.4444E-01 1.0000E+00 -6.8472E-01 -8.5607E-01 9.0657E-01 -6.9523E-01 -8.5393E-01 9.0625E-01  
-6.8098E-01 -8.5253E-01 9.0245E-01 -6.7888E-01 -8.5590E-01 9.0359E-01  
4 8.9079E-01 7.2319E-01 -6.8472E-01 1.0000E+00 7.9409E-01 -7.5766E-01 8.8164E-01 7.0915E-01 -6.8974E-01  
8.3134E-01 7.0520E-01 -6.7709E-01 9.2206E-01 7.2581E-01 -7.0476E-01  
5 7.2483E-01 9.0997E-01 -8.5607E-01 7.9409E-01 1.0000E+00 -9.4433E-01 7.2118E-01 9.0136E-01 -8.5938E-01  
6.9365E-01 8.9828E-01 -8.5108E-01 7.2825E-01 9.1128E-01 -8.6492E-01  
6 -6.9432E-01 -8.6004E-01 9.0657E-01 -7.5766E-01 -9.4433E-01 1.0000E+00 -6.9145E-01 -8.5298E-01 9.0980E-01  
-6.6706E-01 -8.5028E-01 9.0167E-01 -6.9436E-01 -8.6115E-01 9.1451E-01  
7 9.0045E-01 7.2441E-01 -6.9523E-01 8.8164E-01 7.2118E-01 -6.9145E-01 1.0000E+00 8.0823E-01 -7.6968E-01  
8.8499E-01 7.2733E-01 -6.9646E-01 8.7365E-01 7.2356E-01 -6.8493E-01  
8 7.2677E-01 9.0281E-01 -8.5393E-01 7.0915E-01 9.0136E-01 -8.5298E-01 8.0823E-01 1.0000E+00 -9.4410E-01  
7.1700E-01 9.0142E-01 -8.5336E-01 7.0224E-01 9.0255E-01 -8.4817E-01  
9 -6.9592E-01 -8.5837E-01 9.0625E-01 -6.8974E-01 -8.5938E-01 9.0980E-01 -7.6968E-01 -9.4410E-01 1.0000E+00  
-6.7712E-01 -8.5273E-01 9.0318E-01 -6.8510E-01 -8.5897E-01 9.0858E-01  
10 8.7955E-01 7.0364E-01 -6.8098E-01 8.3134E-01 6.9365E-01 -6.6706E-01 8.8499E-01 7.1700E-01 -6.7712E-01  
1.0000E+00 8.0723E-01 -7.7187E-01 8.1777E-01 7.0002E-01 -6.5191E-01  
11 7.2608E-01 9.0069E-01 -8.5253E-01 7.0520E-01 8.9828E-01 -8.5028E-01 7.2733E-01 9.0142E-01 -8.5273E-01  
8.0723E-01 1.0000E+00 -9.4649E-01 6.9747E-01 8.9957E-01 -8.4428E-01  
12 -6.9546E-01 -8.5301E-01 9.0245E-01 -6.7709E-01 -8.5108E-01 9.0167E-01 -6.9646E-01 -8.5336E-01 9.0318E-01  
-7.7187E-01 -9.4649E-01 1.0000E+00 -6.6999E-01 -8.5212E-01 8.9670E-01  
13 8.8390E-01 7.1865E-01 -6.7888E-01 9.2206E-01 7.2825E-01 -6.9436E-01 8.7365E-01 7.0224E-01 -6.8510E-01  
8.1777E-01 6.9747E-01 -6.6999E-01 1.0000E+00 7.8417E-01 -7.5968E-01  
14 7.2565E-01 9.0855E-01 -8.5590E-01 7.2581E-01 9.1128E-01 -8.6115E-01 7.2356E-01 9.0255E-01 -8.5897E-01  
7.0002E-01 8.9957E-01 -8.5212E-01 7.8417E-01 1.0000E+00 -9.4164E-01  
15 -6.8962E-01 -8.5897E-01 9.0359E-01 -7.0476E-01 -8.6492E-01 9.1451E-01 -6.8493E-01 -8.4817E-01 9.0858E-01  
-6.5191E-01 -8.4428E-01 8.9670E-01 -7.5968E-01 -9.4164E-01 1.0000E+00

G-FILE for the vectors

Axx2014 8142014 814  
B201408142100201408142200 5 rsgps 1.37IGS  
lant\_info.003 NGS  
C00060001 -397725386 13 461501700 39 267158699 51  
C00060002 1021037714 13 143930284 39 403536086 50

C00060003 -636704536 13 -756664656 40 -840045016 51  
 C00060004 -1594368020 13 -147325043 40 -616934261 51  
 C00060005 1190147093 13 -1080311849 39 -600685200 50  
 D 1 2 8037139 1 3 -7710746 1 4 8907907 1 5 7248345 1 6 -6943224  
 D 1 7 9004519 1 8 7267713 1 9 -6959244 1 10 8795481 1 11 7260785  
 D 1 12 -6954593 1 13 8838963 1 14 7256462 1 15 -6896210 2 3 -9444400  
 D 2 4 7231946 2 5 9099712 2 6 -8600431 2 7 7244089 2 8 9028134  
 D 2 9 -8583704 2 10 7036400 2 11 9006859 2 12 -8530060 2 13 7186459  
 D 2 14 9085500 2 15 -8589653 3 4 -6847206 3 5 -8560652 3 6 9065676  
 D 3 7 -6952265 3 8 -8539282 3 9 9062474 3 10 -6809772 3 11 -8525277  
 D 3 12 9024495 3 13 -6788776 3 14 -8559018 3 15 9035923 4 5 7940947  
 D 4 6 -7576627 4 7 8816404 4 8 7091542 4 9 -6897351 4 10 8313445  
 D 4 11 7052024 4 12 -6770892 4 13 9220645 4 14 7258074 4 15 -7047607  
 D 5 6 -9443314 5 7 7211831 5 8 9013563 5 9 -8593804 5 10 6936528  
 D 5 11 8982761 5 12 -8510773 5 13 7282476 5 14 9112772 5 15 -8649212  
 D 6 7 -6914477 6 8 -8529788 6 9 9097991 6 10 -6670629 6 11 -8502838  
 D 6 12 9016705 6 13 -6943562 6 14 -8611525 6 15 9145125 7 8 8082341  
 D 7 9 -7696835 7 10 8849919 7 11 7273332 7 12 -6964598 7 13 8736500  
 D 7 14 7235640 7 15 -6849337 8 9 -9441048 8 10 7169953 8 11 9014193  
 D 8 12 -8533578 8 13 7022427 8 14 9025457 8 15 -8481667 9 10 -6771217  
 D 9 11 -8527313 9 12 9031821 9 13 -6851023 9 14 -8589749 9 15 9085826  
 D 10 11 8072297 10 12 -7718672 10 13 8177736 10 14 7000239 10 15 -6519134  
 D 11 12 -9464870 11 13 6974713 11 14 8995712 11 15 -8442773 12 13 -6699852  
 D 12 14 -8521234 12 15 8966984 13 14 7841705 13 15 -7596766 14 15 -9416371

ITRF position of 4012 as determined by individual baselines

	X	Y	Z
mtms	-1385663.042	-4030163.380	4730778.007
p053	-1385663.031	-4030163.359	4730778.010
mtlw	-1385663.028	-4030163.364	4730778.013
p049	-1385663.036	-4030163.370	4730778.005
p052	-1385663.050	-4030163.396	4730778.028

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
mtms	-0.006	-0.011	0.001	-0.002	-0.008	0.009
p053	0.005	0.011	0.004	0.002	0.012	-0.005
mtlw	0.008	0.006	0.007	0.006	0.010	-0.000
p049	-0.000	-0.001	-0.001	0.000	-0.001	0.000
p052	-0.014	-0.027	0.022	-0.004	-0.007	0.036

STATE PLANE COORDINATES - International Foot

SPC (2500 MT )	
Northing (Y) [feet]	1432144.137
Easting (X) [feet]	2096760.000
Convergence [degrees]	0.38467314
Point Scale	0.99959999
Combined Factor	0.99944377

\*\* 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: 1011.639 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.508  
scatter (mean square distance from rover) is 18479.651  
average edop for rover is 0.790  
average ndop for rover is 1.080  
average hdop for rover is 1.338  
average vdop for rover is 2.080  
average gdop for rover is 2.930

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.