

# OPUS-RS solution : 940123226T.14O OP1408550461996

opus <opus@ngs.noaa.gov>

Wed 8/20/2014 10:04 AM

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

FILE: 940123226T.14O OP1408550461996

## 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: 9401226t.14o                      TIME: 16:03:47 UTC

SOFTWARE: rsgps 1.37 RS94.prl 1.99.2              START: 2014/08/14 19:34:25  
EPHEMERIS: igr18054.eph [rapid]                  STOP: 2014/08/14 20:36:25  
NAV FILE: brdc2260.14n                      OBS USED: 3080 / 3745 : 82%  
ANT NAME: CHCX91R                      NONE              QUALITY IND. 32.70/ 47.74  
ARP HEIGHT: 1.8                      NORMALIZED RMS:              0.385

REF FRAME: NAD\_83(2011)(EPOCH:2010.0000)              IGS08 (EPOCH:2014.61873)

X: -1387973.848(m) 0.007(m)              -1387974.723(m) 0.007(m)  
Y: -4031952.466(m) 0.008(m)              -4031951.243(m) 0.008(m)  
Z: 4728683.925(m) 0.015(m)              4728683.917(m) 0.015(m)

LAT: 48 8 53.65242 0.006(m)              48 8 53.67327 0.006(m)  
E LON: 251 0 15.49187 0.007(m)              251 0 15.43259 0.007(m)  
W LON: 108 59 44.50813 0.007(m)              108 59 44.56741 0.007(m)  
EL HGT: 1066.446(m) 0.016(m)              1065.859(m) 0.016(m)  
ORTHO HGT: 1081.682(m) 0.019(m) [NAVD88 (Computed using GEOID12A)]

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 12)	SPC (2500 MT )
Northing (Y) [meters]	5334719.000	433292.206
Easting (X) [meters]	649079.894	637510.220
Convergence [degrees]	1.49322603	0.36889998
Point Scale	0.99987308	0.99958978
Combined Factor	0.99970599	0.99942273

US NATIONAL GRID DESIGNATOR: 12UXU4907934719(NAD 83)

## BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DG9749	MTMS MONTANA STATE UNI CORS ARP	N483227.426	W1094111.858	67315.6
DL7731	P053 WHITEWATERMT2007 CORS ARP	N484333.865	W1074331.456	113869.3
DM7133	MTLW LEWISTOWN CORS ARP	N470314.929	W1092633.764	126223.0
DI2257	P049 ARMINGTON_MT2006 CORS ARP	N472059.850	W1105422.382	168546.6
DI3425	P052 LRRNCHJRDNMT2006 CORS ARP	N472229.026	W1070107.185	171373.2

## 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	-1425435.580	-3984013.217	4757493.890
p053	-1283559.257	-4015770.312	4771131.593
mtlw	-1449333.482	-4105829.826	4646773.497
p049	-1545099.847	-4044895.882	4669084.585
p052	-1266648.329	-4138194.566	4670709.496
9401	-1387974.723	-4031951.243	4728683.917

## Covariance matrix of the stations:

1	5.1340E-07	1.1100E-06	-1.4570E-06	-8.8370E-08	-2.7730E-07	3.3930E-07	-7.0190E-08	-2.7480E-07	3.7330E-07	-6.3920E-08	-3.0060E-07	3.9080E-07	-9.1150E-08	-2.5680E-07	3.5390E-07	-2.1840E-09	-1.1010E-07	1.3570E-07
2	1.1100E-06	3.0020E-06	-3.7020E-06	-2.3780E-07	-6.3130E-07	8.7080E-07	-2.9810E-07	-7.3740E-07	9.5450E-07	-3.4530E-07	-8.0020E-07	1.0480E-06	-2.2810E-07	-6.3190E-07	8.2840E-07	1.1240E-08	9.7330E-08	-3.8490E-08
3	-1.4570E-06	-3.7020E-06	4.9360E-06	4.1540E-07	9.9070E-07	-1.1990E-06	3.3110E-07	8.8410E-07	-1.1670E-06	2.9570E-07	9.1170E-07	-1.1620E-06	4.1520E-07	9.1520E-07	-1.2090E-06	1.2640E-07	3.1710E-07	-3.5490E-07
4	-8.8370E-08	-2.3780E-07	4.1540E-07	5.1150E-07	1.0610E-06	-1.2760E-06	-1.0080E-07	-3.1320E-07	3.1140E-07	-2.3080E-07	-4.3160E-07	5.2030E-07	1.0770E-07	-7.7640E-08	2.7680E-08	1.9160E-07	4.0000E-07	-4.5100E-07
5	-2.7730E-07	-6.3130E-07	9.9070E-07	1.0610E-06	2.9090E-06	-3.4710E-06	-2.9830E-07	-7.4600E-07	8.6050E-07	-4.7320E-07	-8.9720E-07	1.1340E-06	-1.3930E-08	-4.3450E-07	4.8400E-07	1.9680E-07	5.3340E-07	-5.4280E-07
6	3.3930E-07	8.7080E-07	-1.1990E-06	-1.2760E-06	-3.4710E-06	4.4850E-06	3.3570E-07	9.0010E-07	-1.0470E-06	4.7180E-07	1.0460E-06	-1.2860E-06	1.3160E-07	6.5410E-07	-7.5260E-07	-1.2280E-07	-2.7790E-07	3.2810E-07
7	-7.0190E-08	-2.9810E-07	3.3110E-07	-1.0080E-07	-2.9830E-07	3.3570E-07	5.2280E-07	1.1510E-06	-1.3780E-06	-4.6520E-08	-2.8570E-07	3.5440E-07	-1.0480E-07	-2.6890E-07	3.5700E-07	-3.0410E-08	-1.8980E-07	2.0920E-07
8	-2.7480E-07	-7.3740E-07	8.8410E-07	-3.1320E-07	-7.4600E-07	9.0010E-07	1.1510E-06	3.1090E-06	-3.6100E-06	-2.4430E-07	-7.1550E-07	9.0300E-07	-3.1740E-07	-7.1070E-07	9.2400E-07	-1.1790E-07	-2.7030E-07	3.3270E-07
9	3.7330E-07	9.5450E-07	-1.1670E-06	3.1140E-07	8.6050E-07	-1.0470E-06	-1.3780E-06	-3.6100E-06	4.5150E-06	4.1140E-07	9.9970E-07	-1.1810E-06	2.8000E-07	7.9530E-07	-9.2070E-07	2.8660E-08	6.1900E-08	-2.4150E-09
10	-6.3920E-08	-3.4530E-07	2.9570E-07	-2.3080E-07	-4.7320E-07	4.7180E-07	-4.6520E-08	-2.4430E-07	4.1140E-07	8.0470E-07	1.4760E-06	-1.7970E-06	-2.6270E-07	-4.1330E-07	6.1900E-07	-1.9360E-07	-6.1050E-07	6.9890E-07
11	-3.0060E-07	-8.0020E-07	9.1170E-07	-4.3160E-07	-8.9720E-07	1.0460E-06	-2.8570E-07	-7.1550E-07	9.9970E-07	1.4760E-06	3.4570E-06	-4.1140E-06	-4.5520E-07	-8.4350E-07	1.1570E-06	-2.5570E-07	-5.7890E-07	7.0690E-07
12	3.9080E-07	1.0480E-06	-1.1620E-06	5.2030E-07	1.1340E-06	-1.2860E-06	3.5440E-07	9.0300E-07	-1.1810E-06	-1.7970E-06	-4.1140E-06	5.1650E-06	5.2850E-07	1.0280E-06	-1.3370E-06	2.8140E-07	6.7240E-07	-7.2610E-07
13	-9.1150E-08	-2.2810E-07	4.1520E-07	1.0770E-07	-1.3930E-08	1.3160E-07	-1.0480E-07	-3.1740E-07	2.8000E-07									

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-2.6270E-07 -4.5520E-07 5.2850E-07 5.5060E-07 1.0150E-06 -1.3560E-06 2.3440E-07 5.1020E-07 -5.9240E-07
 14 -2.5680E-07 -6.3190E-07 9.1520E-07 -7.7640E-08 -4.3450E-07 6.5410E-07 -2.6890E-07 -7.1070E-07 7.9530E-07
-4.1330E-07 -8.4350E-07 1.0280E-06 1.0150E-06 2.8200E-06 -3.3930E-06 1.6590E-07 4.1940E-07 -4.5920E-07
 15 3.5390E-07 8.2840E-07 -1.2090E-06 2.7680E-08 4.8400E-07 -7.5260E-07 3.5700E-07 9.2400E-07 -9.2070E-07
6.1900E-07 1.1570E-06 -1.3370E-06 -1.3560E-06 -3.3930E-06 4.4200E-06 -3.1400E-07 -7.7430E-07 9.5610E-07
 16 -2.1840E-09 1.1240E-08 1.2640E-07 1.9160E-07 1.9680E-07 -1.2280E-07 -3.0410E-08 -1.1790E-07 2.8660E-08
-1.9360E-07 -2.5570E-07 2.8140E-07 2.3440E-07 1.6590E-07 -3.1400E-07 5.8220E-06 1.4320E-05 -1.8170E-05
 17 -1.1010E-07 9.7330E-08 3.1710E-07 4.0000E-07 5.3340E-07 -2.7790E-07 -1.8980E-07 -2.7030E-07 6.1900E-08
-6.1050E-07 -5.7890E-07 6.7240E-07 5.1020E-07 4.1940E-07 -7.7430E-07 1.4320E-05 3.9450E-05 -4.8710E-05
 18 1.3570E-07 -3.8490E-08 -3.5490E-07 -4.5100E-07 -5.4280E-07 3.2810E-07 2.0920E-07 3.3270E-07 -2.4150E-09
6.9890E-07 7.0690E-07 -7.2610E-07 -5.9240E-07 -4.5920E-07 9.5610E-07 -1.8170E-05 -4.8710E-05 6.2380E-05

```

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

```

0.0000058220 0.0000143200 -0.0000181700
0.0000143200 0.0000394500 -0.0000487100
-0.0000181700 -0.0000487100 0.0000623800

```

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

```

0.0000005703 -0.0000001927 -0.0000016111
-0.0000001927 0.0000009351 0.0000034373
-0.0000016111 0.0000034373 0.0001061467

```

Horizontal network accuracy = 0.00216 meters.

Vertical network accuracy = 0.02020 meters.

		Vectors		
To	From	X	Y	Z
mtms	9401	-37460.857	47938.026	28809.974
p053	9401	104415.467	16180.931	42447.677
mtlw	9401	-61358.758	-73878.582	-81910.420
p049	9401	-157125.124	-12944.639	-59599.331
p052	9401	121326.394	-106243.323	-57974.421

Covariance matrix of the 5 vectors

```

1 6.3398E-06 1.5529E-05 -1.9889E-05 5.5442E-06 1.3956E-05 -1.7844E-05 5.7844E-06 1.4273E-05 -1.7961E-05
5.9539E-06 1.4385E-05 -1.8196E-05 5.4986E-06 1.4007E-05 -1.7638E-05
2 1.5529E-05 4.2257E-05 -5.2691E-05 1.3671E-05 3.8188E-05 -4.7523E-05 1.4200E-05 3.8886E-05 -4.7779E-05
1.4574E-05 3.9131E-05 -4.8296E-05 1.3570E-05 3.8301E-05 -4.7069E-05
3 -1.9889E-05 -5.2691E-05 6.8026E-05 -1.7430E-05 -4.7494E-05 6.1208E-05 -1.8175E-05 -4.8476E-05 6.1570E-05
-1.8700E-05 -4.8822E-05 6.2299E-05 -1.7289E-05 -4.7653E-05 6.0570E-05
4 5.5442E-06 1.3671E-05 -1.7430E-05 5.9503E-06 1.4784E-05 -1.8872E-05 5.5600E-06 1.3725E-05 -1.7436E-05
5.5932E-06 1.3744E-05 -1.7480E-05 5.5037E-06 1.3676E-05 -1.7377E-05
5 1.3956E-05 3.8188E-05 -4.7494E-05 1.4784E-05 4.1292E-05 -5.1360E-05 1.4015E-05 3.8441E-05 -4.7369E-05
1.4261E-05 3.8598E-05 -4.7706E-05 1.3599E-05 3.8063E-05 -4.6909E-05
6 -1.7844E-05 -4.7523E-05 6.1208E-05 -1.8872E-05 -5.1360E-05 6.6209E-05 -1.7921E-05 -4.7865E-05 6.1007E-05
-1.8274E-05 -4.8093E-05 6.1492E-05 -1.7323E-05 -4.7319E-05 6.0343E-05
7 5.7844E-06 1.4200E-05 -1.8175E-05 5.5600E-06 1.4015E-05 -1.7921E-05 6.4056E-06 1.5779E-05 -1.9786E-05
5.9995E-06 1.4480E-05 -1.8306E-05 5.5132E-06 1.4075E-05 -1.7708E-05
8 1.4273E-05 3.8886E-05 -4.8476E-05 1.3725E-05 3.8441E-05 -4.7865E-05 1.5779E-05 4.3100E-05 -5.2715E-05
1.4804E-05 3.9584E-05 -4.8812E-05 1.3610E-05 3.8590E-05 -4.7344E-05
9 -1.7961E-05 -4.7779E-05 6.1570E-05 -1.7436E-05 -4.7369E-05 6.1007E-05 -1.9786E-05 -5.2715E-05 6.6900E-05
-1.8486E-05 -4.8479E-05 6.1928E-05 -1.7326E-05 -4.7517E-05 6.0506E-05

```

10 5.9539E-06 1.4574E-05 -1.8700E-05 5.5932E-06 1.4261E-05 -1.8274E-05 5.9995E-06 1.4804E-05 -1.8486E-05  
7.0139E-06 1.6662E-05 -2.0947E-05 5.5185E-06 1.4351E-05 -1.7936E-05  
11 1.4385E-05 3.9131E-05 -4.8822E-05 1.3744E-05 3.8598E-05 -4.8093E-05 1.4480E-05 3.9584E-05 -4.8479E-05  
1.6662E-05 4.4065E-05 -5.4203E-05 1.3610E-05 3.8766E-05 -4.7486E-05  
12 -1.8196E-05 -4.8296E-05 6.2299E-05 -1.7480E-05 -4.7706E-05 6.1492E-05 -1.8306E-05 -4.8812E-05 6.1928E-05  
-2.0947E-05 -5.4203E-05 6.8997E-05 -1.7330E-05 -4.7895E-05 6.0813E-05  
13 5.4986E-06 1.3570E-05 -1.7289E-05 5.5037E-06 1.3599E-05 -1.7323E-05 5.5132E-06 1.3610E-05 -1.7326E-05  
5.5185E-06 1.3610E-05 -1.7330E-05 5.9038E-06 1.4659E-05 -1.8620E-05  
14 1.4007E-05 3.8301E-05 -4.7653E-05 1.3676E-05 3.8063E-05 -4.7319E-05 1.4075E-05 3.8590E-05 -4.7517E-05  
1.4351E-05 3.8766E-05 -4.7895E-05 1.4659E-05 4.1431E-05 -5.0869E-05  
15 -1.7638E-05 -4.7069E-05 6.0570E-05 -1.7377E-05 -4.6909E-05 6.0343E-05 -1.7708E-05 -4.7344E-05 6.0506E-05  
-1.7936E-05 -4.7486E-05 6.0813E-05 -1.8620E-05 -5.0869E-05 6.4888E-05

Correlation matrix of the 5 vectors

1 1.0000E+00 9.4875E-01 -9.5773E-01 9.0268E-01 8.6256E-01 -8.7094E-01 9.0770E-01 8.6347E-01 -8.7213E-01  
8.9286E-01 8.6066E-01 -8.7002E-01 8.9878E-01 8.6429E-01 -8.6961E-01  
2 9.4875E-01 1.0000E+00 -9.8276E-01 8.6214E-01 9.1420E-01 -8.9845E-01 8.6312E-01 9.1117E-01 -8.9861E-01  
8.4654E-01 9.0683E-01 -8.9442E-01 8.5917E-01 9.1538E-01 -8.9888E-01  
3 -9.5773E-01 -9.8276E-01 1.0000E+00 -8.6635E-01 -8.9612E-01 9.1204E-01 -8.7065E-01 -8.9526E-01 9.1269E-01  
-8.5608E-01 -8.9173E-01 9.0934E-01 -8.6270E-01 -8.9761E-01 9.1167E-01  
4 9.0268E-01 8.6214E-01 -8.6635E-01 1.0000E+00 9.4318E-01 -9.5081E-01 9.0059E-01 8.5703E-01 -8.7392E-01  
8.6579E-01 8.4879E-01 -8.6270E-01 9.2858E-01 8.7104E-01 -8.8437E-01  
5 8.6256E-01 9.1420E-01 -8.9612E-01 9.4318E-01 1.0000E+00 -9.8228E-01 8.6173E-01 9.1122E-01 -9.0125E-01  
8.3796E-01 9.0487E-01 -8.9376E-01 8.7098E-01 9.2024E-01 -9.0623E-01  
6 -8.7094E-01 -8.9845E-01 9.1204E-01 -9.5081E-01 -9.8228E-01 1.0000E+00 -8.7019E-01 -8.9603E-01 9.1667E-01  
-8.4801E-01 -8.9039E-01 9.0980E-01 -8.7620E-01 -9.0347E-01 9.2064E-01  
7 9.0770E-01 8.6312E-01 -8.7065E-01 9.0059E-01 8.6173E-01 -8.7019E-01 1.0000E+00 9.4963E-01 -9.5579E-01  
8.9506E-01 8.6186E-01 -8.7077E-01 8.9652E-01 8.6398E-01 -8.6858E-01  
8 8.6347E-01 9.1117E-01 -8.9526E-01 8.5703E-01 9.1122E-01 -8.9603E-01 9.4963E-01 1.0000E+00 -9.8171E-01  
8.5146E-01 9.0831E-01 -8.9511E-01 8.5323E-01 9.1322E-01 -8.9526E-01  
9 -8.7213E-01 -8.9861E-01 9.1269E-01 -8.7392E-01 -9.0125E-01 9.1667E-01 -9.5579E-01 -9.8171E-01 1.0000E+00  
-8.5340E-01 -8.9289E-01 9.1150E-01 -8.7182E-01 -9.0256E-01 9.1834E-01  
10 8.9286E-01 8.4654E-01 -8.5608E-01 8.6579E-01 8.3796E-01 -8.4801E-01 8.9506E-01 8.5146E-01 -8.5340E-01  
1.0000E+00 9.4778E-01 -9.5221E-01 8.5758E-01 8.4188E-01 -8.4074E-01  
11 8.6066E-01 9.0683E-01 -8.9173E-01 8.4879E-01 9.0487E-01 -8.9039E-01 8.6186E-01 9.0831E-01 -8.9289E-01  
9.4778E-01 1.0000E+00 -9.8302E-01 8.4383E-01 9.0728E-01 -8.8804E-01  
12 -8.7002E-01 -8.9442E-01 9.0934E-01 -8.6270E-01 -8.9376E-01 9.0980E-01 -8.7077E-01 -8.9511E-01 9.1150E-01  
-9.5221E-01 -9.8302E-01 1.0000E+00 -8.5868E-01 -8.9580E-01 9.0886E-01  
13 8.9878E-01 8.5917E-01 -8.6270E-01 9.2858E-01 8.7098E-01 -8.7620E-01 8.9652E-01 8.5323E-01 -8.7182E-01  
8.5758E-01 8.4383E-01 -8.5868E-01 1.0000E+00 9.3729E-01 -9.5131E-01  
14 8.6429E-01 9.1538E-01 -8.9761E-01 8.7104E-01 9.2024E-01 -9.0347E-01 8.6398E-01 9.1322E-01 -9.0256E-01  
8.4188E-01 9.0728E-01 -8.9580E-01 9.3729E-01 1.0000E+00 -9.8110E-01  
15 -8.6961E-01 -8.9888E-01 9.1167E-01 -8.8437E-01 -9.0623E-01 9.2064E-01 -8.6858E-01 -8.9526E-01 9.1834E-01  
-8.4074E-01 -8.8804E-01 9.0886E-01 -9.5131E-01 -9.8110E-01 1.0000E+00

G-FILE for the vectors

Axx2014 8142014 814  
B201408141900201408142000 5 rsgps 1.37IGS  
lant\_info.003 NGS  
C00060001 -374608570 25 479380263 65 288099739 82  
C00060002 1044154665 24 161809314 64 424476766 81

C00060003 -613587584 25 -738785823 65 -819104196 81  
 C00060004 -1571251236 26 -129446390 66 -595993313 83  
 C00060005 1213263942 24 -1062433229 64 -579744208 80  
 D 1 2 9487500 1 3 -9577267 1 4 9026801 1 5 8625618 1 6 -8709394  
 D 1 7 9076979 1 8 8634715 1 9 -8721331 1 10 8928580 1 11 8606633  
 D 1 12 -8700228 1 13 8987777 1 14 8642852 1 15 -8696133 2 3 -9827551  
 D 2 4 8621414 2 5 9142005 2 6 -8984484 2 7 8631191 2 8 9111728  
 D 2 9 -8986129 2 10 8465384 2 11 9068345 2 12 -8944242 2 13 8591671  
 D 2 14 9153759 2 15 -8988777 3 4 -8663455 3 5 -8961160 3 6 9120362  
 D 3 7 -8706529 3 8 -8952630 3 9 9126873 3 10 -8560826 3 11 -8917343  
 D 3 12 9093446 3 13 -8627047 3 14 -8976084 3 15 9116702 4 5 9431795  
 D 4 6 -9508132 4 7 9005867 4 8 8570315 4 9 -8739194 4 10 8657871  
 D 4 11 8487914 4 12 -8626979 4 13 9285803 4 14 8710448 4 15 -8843656  
 D 5 6 -9822808 5 7 8617260 5 8 9112193 5 9 -9012474 5 10 8379555  
 D 5 11 9048743 5 12 -8937573 5 13 8709824 5 14 9202415 5 15 -9062326  
 D 6 7 -8701948 6 8 -8960265 6 9 9166668 6 10 -8480141 6 11 -8903855  
 D 6 12 9097981 6 13 -8762024 6 14 -9034666 6 15 9206381 7 8 9496290  
 D 7 9 -9557885 7 10 8950637 7 11 8618587 7 12 -8707668 7 13 8965161  
 D 7 14 8639807 7 15 -8685849 8 9 -9817067 8 10 8514626 8 11 9083095  
 D 8 12 -8951073 8 13 8532283 8 14 9132226 8 15 -8952626 9 10 -8534034  
 D 9 11 -8928862 9 12 9114973 9 13 -8718193 9 14 -9025606 9 15 9183360  
 D 10 11 9477780 10 12 -9522095 10 13 8575815 10 14 8418751 10 15 -8407402  
 D 11 12 -9830239 11 13 8438319 11 14 9072799 11 15 -8880440 12 13 -8586764  
 D 12 14 -8958029 12 15 9088645 13 14 9372853 13 15 -9513120 14 15 -9810975

ITRF position of 9401 as determined by individual baselines

	X	Y	Z
mtms	-1387974.721	-4031951.228	4728683.892
p053	-1387974.717	-4031951.241	4728683.916
mtlw	-1387974.722	-4031951.242	4728683.928
p049	-1387974.715	-4031951.239	4728683.908
p052	-1387974.733	-4031951.237	4728683.906

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
mtms	0.003	0.015	-0.024	-0.002	-0.005	-0.028
p053	0.006	0.002	-0.001	0.005	0.002	-0.003
mtlw	0.001	0.002	0.012	0.001	0.010	0.007
p049	0.009	0.004	-0.008	0.007	-0.000	-0.011
p052	-0.009	0.007	-0.010	-0.011	-0.004	-0.010

STATE PLANE COORDINATES - International Foot

SPC (2500 MT )	
Northing (Y) [feet]	1421562.356
Easting (X) [feet]	2091568.963
Convergence [degrees]	0.36889998
Point Scale	0.99958978
Combined Factor	0.99942273

\*\* 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: 1080.683 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.500  
scatter (mean square distance from rover) is 18239.005  
average edop for rover is 0.690  
average ndop for rover is 0.920  
average hdop for rover is 1.150  
average vdop for rover is 2.310  
average gdop for rover is 3.010

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.