

OPUS-RS solution : 401289225V.14O OP1408549785956

opus <opus@ngs.noaa.gov>

Wed 8/20/2014 9:53 AM

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

FILE: 401289225V.14O OP1408549785956

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: 4012225v.14o TIME: 15:52:32 UTC

SOFTWARE: rsgps 1.37 RS50.prl 1.99.2 START: 2014/08/13 21:13:25
EPHEMERIS: igr18053.eph [rapid] STOP: 2014/08/13 22:14:00
NAV FILE: brdc2250.14n OBS USED: 2705 / 3285 : 82%
ANT NAME: CHCX91R NONE QUALITY IND. 17.55/ 48.14
ARP HEIGHT: 1.722 NORMALIZED RMS: 0.342

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.61618)

X: -1395288.623(m) 0.007(m) -1395289.498(m) 0.007(m)
Y: -4033422.888(m) 0.015(m) -4033421.665(m) 0.015(m)
Z: 4725295.872(m) 0.019(m) 4725295.863(m) 0.019(m)

LAT: 48 6 9.42641 0.011(m) 48 6 9.44717 0.011(m)
E LON: 250 55 4.35939 0.004(m) 250 55 4.30010 0.004(m)
W LON: 109 4 55.64061 0.004(m) 109 4 55.69990 0.004(m)
EL HGT: 1064.257(m) 0.022(m) 1063.670(m) 0.022(m)
ORTHO HGT: 1079.338(m) 0.024(m) [NAVD88 (Computed using GEOID12A)]

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 12)	SPC (2500 MT)
Northing (Y) [meters]	5329484.957	428184.127
Easting (X) [meters]	642778.243	631108.971
Convergence [degrees]	1.42779692	0.30567923
Point Scale	0.99985049	0.99957420
Combined Factor	0.99968374	0.99940750

US NATIONAL GRID DESIGNATOR: 12UXU4277829484(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DG9749	MTMS MONTANA STATE UNI CORS ARP	N483227.426	W1094111.858	66232.1
DM7133	MTLW LEWISTOWN CORS ARP	N470314.929	W1092633.764	119705.7
DL7731	P053 WHITEWATERMT2007 CORS ARP	N484333.865	W1074331.456	122049.7
DI2257	P049 ARMINGTON_MT2006 CORS ARP	N472059.850	W1105422.382	160419.8
DI3425	P052 LRRNCHJRDNMT2006 CORS ARP	N472229.026	W1070107.185	174658.5

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	-1425435.584	-3984013.211	4757493.874
mtlw	-1449333.477	-4105829.827	4646773.505
p053	-1283559.260	-4015770.324	4771131.598
p049	-1545099.834	-4044895.873	4669084.597
p052	-1266648.340	-4138194.567	4670709.488
4012	-1395289.498	-4033421.665	4725295.863

Covariance matrix of the stations:

1	2.7980E-07	6.3440E-07	-8.5960E-07	-1.9880E-08	-1.6750E-07	2.2940E-07	-1.7200E-08	-1.4020E-07	1.8320E-07	-2.5760E-08	-1.9430E-07	2.6440E-07	-1.6660E-08	-1.3270E-07	1.8280E-07	2.8480E-08	-3.8480E-08	5.7990E-08
2	6.3440E-07	2.3100E-06	-3.0200E-06	-1.9750E-07	-6.1620E-07	8.4670E-07	-9.5330E-08	-3.9420E-07	6.2430E-07	-2.3940E-07	-6.0870E-07	8.8760E-07	-1.0110E-07	-4.9160E-07	6.6060E-07	3.6660E-08	2.0320E-07	-1.7970E-07
3	-8.5960E-07	-3.0200E-06	4.4470E-06	2.1920E-07	7.7990E-07	-1.0960E-06	2.0350E-07	7.1150E-07	-9.9740E-07	2.3460E-07	8.2010E-07	-1.1590E-06	2.0120E-07	7.1020E-07	-9.9390E-07	3.6020E-08	9.5130E-08	-1.2030E-07
4	-1.9880E-08	-1.9750E-07	2.1920E-07	3.1330E-07	7.4990E-07	-9.2740E-07	-4.8000E-08	-2.0110E-07	2.3220E-07	1.6170E-09	-1.9070E-07	2.4460E-07	-4.7110E-08	-1.6080E-07	2.3180E-07	-7.1060E-09	-1.7070E-07	2.1420E-07
5	-1.6750E-07	-6.1620E-07	7.7990E-07	7.4990E-07	2.6730E-06	-3.3160E-06	-2.2740E-07	-6.5280E-07	8.4270E-07	-1.2310E-07	-5.9190E-07	8.1250E-07	-2.3210E-07	-6.1170E-07	8.8140E-07	-1.1110E-07	-3.5280E-07	4.8690E-07
6	2.2940E-07	8.4670E-07	-1.0960E-06	-9.2740E-07	-3.3160E-06	4.5430E-06	2.4140E-07	8.2230E-07	-1.0600E-06	2.2030E-07	8.6220E-07	-1.1430E-06	2.3660E-07	7.8440E-07	-1.0440E-06	8.7330E-08	2.9980E-07	-3.2120E-07
7	-1.7200E-08	-9.5330E-08	2.0350E-07	-4.8000E-08	-2.2740E-07	2.4140E-07	2.9490E-07	6.2680E-07	-7.7120E-07	-1.0780E-07	-2.3370E-07	3.1190E-07	7.8040E-08	-6.9790E-08	1.3740E-08	1.2350E-07	2.9320E-07	-3.7520E-07
8	-1.4020E-07	-3.9420E-07	7.1150E-07	-2.0110E-07	-6.5280E-07	8.2230E-07	6.2680E-07	2.2850E-06	-2.8940E-06	-2.9510E-07	-6.3720E-07	9.0930E-07	9.6300E-09	-4.0080E-07	4.5110E-07	1.4000E-07	5.0330E-07	-5.8540E-07
9	1.8320E-07	6.2430E-07	-9.9740E-07	2.3220E-07	8.4270E-07	-1.0600E-06	-7.7120E-07	-2.8940E-06	4.1040E-06	3.3510E-07	8.6540E-07	-1.1970E-06	2.0600E-08	5.6210E-07	-6.5040E-07	-1.3630E-07	-4.2650E-07	5.7340E-07
10	-2.5760E-08	-2.3940E-07	2.3460E-07	1.6170E-09	-1.2310E-07	2.2030E-07	-1.0780E-07	-2.9510E-07	3.3510E-07	4.3990E-07	8.5920E-07	-1.1310E-06	-1.0760E-07	-2.0240E-07	3.4170E-07	-6.9900E-08	-3.7450E-07	4.8540E-07
11	-1.9430E-07	-6.0870E-07	8.2010E-07	-1.9070E-07	-5.9190E-07	8.6220E-07	-2.3370E-07	-6.3720E-07	8.6540E-07	8.5920E-07	2.6620E-06	-3.4550E-06	-2.3940E-07	-6.2500E-07	9.0640E-07	-1.1720E-07	-2.9000E-07	4.3590E-07
12	2.6440E-07	8.8760E-07	-1.1590E-06	2.4460E-07	8.1250E-07	-1.1430E-06	3.1190E-07	9.0930E-07	-1.1970E-06	-1.1310E-06	-3.4550E-06	4.8910E-06	3.0880E-07	8.4620E-07	-1.1900E-06	1.6070E-07	4.5360E-07	-5.5910E-07
13	-1.6660E-08	-1.0110E-07	2.0120E-07	-4.7110E-08	-2.3210E-07	2.3660E-07	7.8040E-08	9.6300E-09	2.0600E-08									

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-1.0760E-07 -2.3940E-07 3.0880E-07 2.9280E-07 5.6390E-07 -7.6790E-07 1.2500E-07 2.9050E-07 -3.8220E-07
 14 -1.3270E-07 -4.9160E-07 7.1020E-07 -1.6080E-07 -6.1170E-07 7.8440E-07 -6.9790E-08 -4.0080E-07 5.6210E-07
-2.0240E-07 -6.2500E-07 8.4620E-07 5.6390E-07 2.3300E-06 -2.9010E-06 5.1550E-08 1.3600E-07 -1.5720E-07
 15 1.8280E-07 6.6060E-07 -9.9390E-07 2.3180E-07 8.8140E-07 -1.0440E-06 1.3740E-08 4.5110E-07 -6.5040E-07
3.4170E-07 9.0640E-07 -1.1900E-06 -7.6790E-07 -2.9010E-06 4.0770E-06 -1.4820E-07 -4.2380E-07 6.2910E-07
 16 2.8480E-08 3.6660E-08 3.6020E-08 -7.1060E-09 -1.1110E-07 8.7330E-08 1.2350E-07 1.4000E-07 -1.3630E-07
-6.9900E-08 -1.1720E-07 1.6070E-07 1.2500E-07 5.1550E-08 -1.4820E-07 3.2690E-06 9.3210E-06 -1.2310E-05
 17 -3.8480E-08 2.0320E-07 9.5130E-08 -1.7070E-07 -3.5280E-07 2.9980E-07 2.9320E-07 5.0330E-07 -4.2650E-07
-3.7450E-07 -2.9000E-07 4.5360E-07 2.9050E-07 1.3600E-07 -4.2380E-07 9.3210E-06 3.4380E-05 -4.5740E-05
 18 5.7990E-08 -1.7970E-07 -1.2030E-07 2.1420E-07 4.8690E-07 -3.2120E-07 -3.7520E-07 -5.8540E-07 5.7340E-07
4.8540E-07 4.3590E-07 -5.5910E-07 -3.8220E-07 -1.5720E-07 6.2910E-07 -1.2310E-05 -4.5740E-05 6.4740E-05

```

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

```

0.0000032690 0.0000093210 -0.0000123100
0.0000093210 0.0000343800 -0.0000457400
-0.0000123100 -0.0000457400 0.0000647400

```

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

```

0.0000008345 0.0000005307 0.0000039943
0.0000005307 0.0000023535 0.0000090972
0.0000039943 0.0000090972 0.0000992010

```

Horizontal network accuracy = 0.00324 meters.

Vertical network accuracy = 0.01953 meters.

		Vectors		
To	From	X	Y	Z
mtms	4012	-30146.086	49408.454	32198.011
mtlw	4012	-54043.980	-72408.162	-78522.359
p053	4012	111730.237	17651.341	45835.734
p049	4012	-149810.336	-11474.208	-56211.266
p052	4012	128641.157	-104772.902	-54586.375

Covariance matrix of the 5 vectors

```

1 3.4918E-06 9.9572E-06 -1.3264E-05 3.2277E-06 9.3031E-06 -1.2226E-05 3.0998E-06 9.0793E-06 -1.2048E-05
3.2847E-06 9.2824E-06 -1.2264E-05 3.0989E-06 9.1752E-06 -1.2037E-05
2 9.9572E-06 3.6284E-05 -4.8675E-05 9.2575E-06 3.3913E-05 -4.5013E-05 8.8958E-06 3.3279E-05 -4.4509E-05
9.4194E-06 3.3858E-05 -4.5126E-05 8.8927E-06 3.3549E-05 -4.4476E-05
3 -1.3264E-05 -4.8675E-05 6.9428E-05 -1.2341E-05 -4.5542E-05 6.4085E-05 -1.1767E-05 -4.4538E-05 6.3289E-05
-1.2597E-05 -4.5451E-05 6.4260E-05 -1.1763E-05 -4.4968E-05 6.3237E-05
4 3.2277E-06 9.2575E-06 -1.2341E-05 3.5965E-06 1.0353E-05 -1.3539E-05 3.1046E-06 9.1506E-06 -1.2156E-05
3.3476E-06 9.4182E-06 -1.2440E-05 3.1040E-06 9.2793E-06 -1.2144E-05
5 9.3031E-06 3.3913E-05 -4.5542E-05 1.0353E-05 3.7759E-05 -4.9843E-05 8.9115E-06 3.3577E-05 -4.4958E-05
9.6835E-06 3.4431E-05 -4.5868E-05 8.9095E-06 3.3985E-05 -4.4922E-05
6 -1.2226E-05 -4.5013E-05 6.4085E-05 -1.3539E-05 -4.9843E-05 6.9925E-05 -1.1781E-05 -4.4632E-05 6.3428E-05
-1.2662E-05 -4.5613E-05 6.4477E-05 -1.1779E-05 -4.5098E-05 6.3388E-05
7 3.0998E-06 8.8958E-06 -1.1767E-05 3.1046E-06 8.9115E-06 -1.1781E-05 3.3169E-06 9.5146E-06 -1.2570E-05
3.1076E-06 8.9113E-06 -1.1784E-05 3.0985E-06 8.9065E-06 -1.1773E-05
8 9.0793E-06 3.3279E-05 -4.4538E-05 9.1506E-06 3.3577E-05 -4.4632E-05 9.5146E-06 3.5658E-05 -4.7622E-05
9.2604E-06 3.3529E-05 -4.4699E-05 8.9001E-06 3.3340E-05 -4.4280E-05
9 -1.2048E-05 -4.4509E-05 6.3289E-05 -1.2156E-05 -4.4958E-05 6.3428E-05 -1.2570E-05 -4.7622E-05 6.7697E-05
-1.2324E-05 -4.4884E-05 6.3529E-05 -1.1771E-05 -4.4594E-05 6.2887E-05

```

10 3.2847E-06 9.4194E-06 -1.2597E-05 3.3476E-06 9.6835E-06 -1.2662E-05 3.1076E-06 9.2604E-06 -1.2324E-05
3.8487E-06 1.0672E-05 -1.4087E-05 3.1063E-06 9.4415E-06 -1.2306E-05
11 9.2824E-06 3.3858E-05 -4.5451E-05 9.4182E-06 3.4431E-05 -4.5613E-05 8.9113E-06 3.3529E-05 -4.4884E-05
1.0672E-05 3.7622E-05 -5.0084E-05 8.9083E-06 3.3909E-05 -4.4846E-05
12 -1.2264E-05 -4.5126E-05 6.4260E-05 -1.2440E-05 -4.5868E-05 6.4477E-05 -1.1784E-05 -4.4699E-05 6.3529E-05
-1.4087E-05 -5.0084E-05 7.0749E-05 -1.1780E-05 -4.5190E-05 6.3480E-05
13 3.0989E-06 8.8927E-06 -1.1763E-05 3.1040E-06 8.9095E-06 -1.1779E-05 3.0985E-06 8.9001E-06 -1.1771E-05
3.1063E-06 8.9083E-06 -1.1780E-05 3.3118E-06 9.5428E-06 -1.2548E-05
14 9.1752E-06 3.3549E-05 -4.4968E-05 9.2793E-06 3.3985E-05 -4.5098E-05 8.9065E-06 3.3340E-05 -4.4594E-05
9.4415E-06 3.3909E-05 -4.5190E-05 9.5428E-06 3.6438E-05 -4.8060E-05
15 -1.2037E-05 -4.4476E-05 6.3237E-05 -1.2144E-05 -4.4922E-05 6.3388E-05 -1.1773E-05 -4.4280E-05 6.2887E-05
-1.2306E-05 -4.4846E-05 6.3480E-05 -1.2548E-05 -4.8060E-05 6.7559E-05

Correlation matrix of the 5 vectors

1 1.0000E+00 8.8462E-01 -8.5186E-01 9.1082E-01 8.1020E-01 -7.8241E-01 9.1084E-01 8.1366E-01 -7.8365E-01
8.9600E-01 8.0986E-01 -7.8029E-01 9.1126E-01 8.1342E-01 -7.8370E-01
2 8.8462E-01 1.0000E+00 -9.6981E-01 8.1040E-01 9.1624E-01 -8.9365E-01 8.1089E-01 9.2521E-01 -8.9807E-01
7.9710E-01 9.1640E-01 -8.9066E-01 8.1124E-01 9.2268E-01 -8.9831E-01
3 -8.5186E-01 -9.6981E-01 1.0000E+00 -7.8099E-01 -8.8949E-01 9.1976E-01 -7.7543E-01 -8.9513E-01 9.2317E-01
-7.7062E-01 -8.8932E-01 9.1689E-01 -7.7572E-01 -8.9404E-01 9.2335E-01
4 9.1082E-01 8.1040E-01 -7.8099E-01 1.0000E+00 8.8839E-01 -8.5374E-01 8.9888E-01 8.0803E-01 -7.7903E-01
8.9979E-01 8.0967E-01 -7.7988E-01 8.9939E-01 8.1059E-01 -7.7909E-01
5 8.1020E-01 9.1624E-01 -8.8949E-01 8.8839E-01 1.0000E+00 -9.7001E-01 7.9630E-01 9.1506E-01 -8.8922E-01
8.0328E-01 9.1352E-01 -8.8744E-01 7.9673E-01 9.1623E-01 -8.8942E-01
6 -7.8241E-01 -8.9365E-01 9.1976E-01 -8.5374E-01 -9.7001E-01 1.0000E+00 -7.7355E-01 -8.9382E-01 9.2189E-01
-7.7187E-01 -8.8931E-01 9.1670E-01 -7.7400E-01 -8.9344E-01 9.2225E-01
7 9.1084E-01 8.1089E-01 -7.7543E-01 8.9888E-01 7.9630E-01 -7.7355E-01 1.0000E+00 8.7487E-01 -8.3883E-01
8.6976E-01 7.9773E-01 -7.6922E-01 9.3489E-01 8.1014E-01 -7.8646E-01
8 8.1366E-01 9.2521E-01 -8.9513E-01 8.0803E-01 9.1506E-01 -8.9382E-01 8.7487E-01 1.0000E+00 -9.6926E-01
7.9048E-01 9.1543E-01 -8.8993E-01 8.1900E-01 9.2492E-01 -9.0216E-01
9 -7.8365E-01 -8.9807E-01 9.2317E-01 -7.7903E-01 -8.8922E-01 9.2189E-01 -8.3883E-01 -9.6926E-01 1.0000E+00
-7.6350E-01 -8.8938E-01 9.1796E-01 -7.8613E-01 -8.9787E-01 9.2990E-01
10 8.9600E-01 7.9710E-01 -7.7062E-01 8.9979E-01 8.0328E-01 -7.7187E-01 8.6976E-01 7.9048E-01 -7.6350E-01
1.0000E+00 8.8688E-01 -8.5370E-01 8.7007E-01 7.9728E-01 -7.6313E-01
11 8.0986E-01 9.1640E-01 -8.8932E-01 8.0967E-01 9.1352E-01 -8.8931E-01 7.9773E-01 9.1543E-01 -8.8938E-01
8.8688E-01 1.0000E+00 -9.7078E-01 7.9807E-01 9.1583E-01 -8.8953E-01
12 -7.8029E-01 -8.9066E-01 9.1689E-01 -7.7988E-01 -8.8744E-01 9.1670E-01 -7.6922E-01 -8.8993E-01 9.1796E-01
-8.5370E-01 -9.7078E-01 1.0000E+00 -7.6956E-01 -8.9003E-01 9.1820E-01
13 9.1126E-01 8.1124E-01 -7.7572E-01 8.9939E-01 7.9673E-01 -7.7400E-01 9.3489E-01 8.1900E-01 -7.8613E-01
8.7007E-01 7.9807E-01 -7.6956E-01 1.0000E+00 8.6870E-01 -8.3885E-01
14 8.1342E-01 9.2268E-01 -8.9404E-01 8.1059E-01 9.1623E-01 -8.9344E-01 8.1014E-01 9.2492E-01 -8.9787E-01
7.9728E-01 9.1583E-01 -8.9003E-01 8.6870E-01 1.0000E+00 -9.6865E-01
15 -7.8370E-01 -8.9831E-01 9.2335E-01 -7.7909E-01 -8.8942E-01 9.2225E-01 -7.8646E-01 -9.0216E-01 9.2990E-01
-7.6313E-01 -8.8953E-01 9.1820E-01 -8.3885E-01 -9.6865E-01 1.0000E+00

G-FILE for the vectors

Axx2014 8132014 813
B201408132100201408132200 5 rsgps 1.37IGS
lant_info.003 NGS
C00060001 -301460859 18 494084539 60 321980109 83
C00060002 -540439795 18 -724081617 61 -785223585 83

C00060003 1117302372 18 176513409 59 458357343 82
 C00060004-1498103359 19 -114742077 61 -562112664 84
 C00060005 1286411573 18-1047729022 60 -545863747 82
 D 1 2 8846179 1 3 -8518605 1 4 9108176 1 5 8101988 1 6 -7824145
 D 1 7 9108421 1 8 8136606 1 9 -7836463 1 10 8959963 1 11 8098623
 D 1 12 -7802871 1 13 9112609 1 14 8134156 1 15 -7836998 2 3 -9698141
 D 2 4 8104004 2 5 9162378 2 6 -8936534 2 7 8108940 2 8 9252052
 D 2 9 -8980741 2 10 7971001 2 11 9164029 2 12 -8906637 2 13 8112381
 D 2 14 9226770 2 15 -8983148 3 4 -7809877 3 5 -8894864 3 6 9197636
 D 3 7 -7754348 3 8 -8951296 3 9 9231669 3 10 -7706156 3 11 -8893152
 D 3 12 9168886 3 13 -7757216 3 14 -8940413 3 15 9233498 4 5 8883925
 D 4 6 -8537409 4 7 8988755 4 8 8080307 4 9 -7790294 4 10 8997850
 D 4 11 8096665 4 12 -7798827 4 13 8993906 4 14 8105868 4 15 -7790892
 D 5 6 -9700098 5 7 7962999 5 8 9150590 5 9 -8892232 5 10 8032807
 D 5 11 9135230 5 12 -8874442 5 13 7967339 5 14 9162275 5 15 -8894207
 D 6 7 -7735502 6 8 -8938176 6 9 9218851 6 10 -7718671 6 11 -8893136
 D 6 12 9167028 6 13 -7740010 6 14 -8934380 6 15 9222513 7 8 8748697
 D 7 9 -8388288 7 10 8697649 7 11 7977263 7 12 -7692208 7 13 9348864
 D 7 14 8101429 7 15 -7864567 8 9 -9692644 8 10 7904816 8 11 9154301
 D 8 12 -8899285 8 13 8189990 8 14 9249241 8 15 -9021583 9 10 -7635004
 D 9 11 -8893757 9 12 9179601 9 13 -7861261 9 14 -8978747 9 15 9298978
 D 10 11 8868777 10 12 -8536970 10 13 8700702 10 14 7972765 10 15 -7631348
 D 11 12 -9707818 11 13 7980715 11 14 9158340 11 15 -8895265 12 13 -7695580
 D 12 14 -8900332 12 15 9181955 13 14 8686979 13 15 -8388497 14 15 -9686469

ITRF position of 4012 as determined by individual baselines

	X	Y	Z
mtms	-1395289.496	-4033421.669	4725295.879
mtlw	-1395289.504	-4033421.674	4725295.878
p053	-1395289.497	-4033421.676	4725295.888
p049	-1395289.509	-4033421.688	4725295.865
p052	-1395289.500	-4033421.679	4725295.883

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
mtms	0.002	-0.004	0.015	0.003	0.008	0.013
mtlw	-0.006	-0.009	0.015	-0.003	0.002	0.018
p053	0.001	-0.011	0.024	0.004	0.009	0.025
p049	-0.011	-0.023	0.001	-0.003	-0.018	0.018
p052	-0.003	-0.014	0.019	0.002	0.003	0.024

STATE PLANE COORDINATES - International Foot

SPC (2500 MT)

Northing (Y) [feet]	1404803.566
Easting (X) [feet]	2070567.490
Convergence [degrees]	0.30567923
Point Scale	0.99957420
Combined Factor	0.99940750

** 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: 1078.338 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.491
scatter (mean square distance from rover) is 17968.127
average edop for rover is 0.790
average ndop for rover is 1.100
average hdop for rover is 1.354
average vdop for rover is 1.910
average gdop for rover is 2.750

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.