

OPUS-RS solution : 401289226R.14O OP1408550129053

opus <opus@ngs.noaa.gov>

Wed 8/20/2014 9:59 AM

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

FILE: 401289226R.14O OP1408550129053

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: 4012226r.14o TIME: 15:58:33 UTC

SOFTWARE: rsgps 1.37 RS94.prl 1.99.2 START: 2014/08/14 17:28:50
EPHEMERIS: igr18054.eph [rapid] STOP: 2014/08/14 18:28:30
NAV FILE: brdc2260.14n OBS USED: 3740 / 4440 : 84%
ANT NAME: CHCX91R NONE QUALITY IND. 20.86/ 44.67
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.326

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.61849)

X:	-1384517.520(m)	0.005(m)	-1384518.395(m)	0.005(m)
Y:	-4031797.687(m)	0.017(m)	-4031796.464(m)	0.017(m)
Z:	4729677.463(m)	0.019(m)	4729677.455(m)	0.019(m)

LAT:	48 9 45.73773	0.004(m)	48 9 45.75860	0.004(m)
E LON:	251 2 51.18506	0.005(m)	251 2 51.12579	0.005(m)
W LON:	108 57 8.81494	0.005(m)	108 57 8.87421	0.005(m)
EL HGT:	959.251(m)	0.026(m)	958.663(m)	0.026(m)
ORTHO HGT:	974.606(m)	0.027(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 12)	SPC (2500 MT)
Northing (Y) [meters]	5336411.761	434921.871
Easting (X) [meters]	652253.710	640715.735
Convergence [degrees]	1.52580331	0.40053615
Point Scale	0.99988484	0.99959485
Combined Factor	0.99973454	0.99944459

US NATIONAL GRID DESIGNATOR: 12UXU5225336411(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DG9749	MTMS MONTANA STATE UNI	CORS ARP	N483227.426 W1094111.858	68783.8
DL7731	P053 WHITEWATERMT2007	CORS ARP	N484333.865 W1074331.456	110308.8
DM7133	MTLW LEWISTOWN	CORS ARP	N470314.929 W1092633.764	128666.2
DI3425	P052 LRRNCHJRDNMT2006	CORS ARP	N472229.026 W1070107.185	169384.6
DI2257	P049 ARMINGTON_MT2006	CORS ARP	N472059.850 W1105422.382	172132.2

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	-1425435.579	-3984013.201	4757493.869
p053	-1283559.262	-4015770.334	4771131.611
mtlw	-1449333.477	-4105829.823	4646773.503
p052	-1266648.337	-4138194.575	4670709.506
p049	-1545099.841	-4044895.870	4669084.573
4012	-1384518.395	-4031796.464	4729677.455

Covariance matrix of the stations:

1	2.3630E-07	6.0540E-07	-6.5950E-07	-8.3200E-09	-1.3240E-07	1.3850E-07	-8.4240E-09	-1.6430E-07	1.8070E-07
	-8.3100E-09	-1.1950E-07	1.3740E-07	-1.1080E-08	-1.8940E-07	2.0310E-07	3.4850E-08	-1.6230E-08	1.8920E-08
2	6.0540E-07	2.7200E-06	-2.7260E-06	-9.6710E-08	-5.6170E-07	6.7770E-07	-1.9110E-07	-6.7220E-07	6.9300E-07
	-1.0770E-07	-7.7630E-07	7.7700E-07	-2.0920E-07	-5.0910E-07	5.7780E-07	2.6100E-08	2.2960E-07	-1.4690E-07
3	-6.5950E-07	-2.7260E-06	3.0530E-06	1.5670E-07	6.8560E-07	-7.3150E-07	1.7130E-07	6.7600E-07	-7.0190E-07
	1.5830E-07	7.4120E-07	-7.5740E-07	1.7230E-07	6.2370E-07	-6.6270E-07	5.0750E-09	-5.0230E-08	6.5820E-08
4	-8.3200E-09	-9.6710E-08	1.5670E-07	2.2870E-07	5.6060E-07	-5.5710E-07	-2.3590E-08	-1.8440E-07	1.5450E-07
	5.5070E-08	-1.5910E-07	1.1970E-07	-5.2210E-08	-1.1950E-07	1.2560E-07	7.1210E-08	1.1700E-07	-9.8960E-08
5	-1.3240E-07	-5.6170E-07	6.8560E-07	5.6060E-07	2.8790E-06	-2.8670E-06	-1.6560E-07	-7.3530E-07	7.4740E-07
	-7.6060E-08	-7.8910E-07	7.8330E-07	-1.8770E-07	-5.9160E-07	6.5060E-07	4.1920E-08	1.2070E-07	-4.6990E-08
6	1.3850E-07	6.7770E-07	-7.3150E-07	-5.5710E-07	-2.8670E-06	3.1440E-06	1.4910E-07	7.4190E-07	-7.4590E-07
	1.0930E-07	7.6260E-07	-7.5580E-07	1.6100E-07	6.8470E-07	-7.1130E-07	-2.0440E-08	2.1740E-08	-4.9310E-09
7	-8.4240E-09	-1.9110E-07	1.7130E-07	-2.3590E-08	-1.6560E-07	1.4910E-07	2.5680E-07	6.9570E-07	-6.7650E-07
	-2.3100E-08	-1.2480E-07	1.4100E-07	-1.6020E-09	-2.1460E-07	2.1540E-07	2.0780E-08	-7.7790E-08	6.3990E-08
8	-1.6430E-07	-6.7220E-07	6.7600E-07	-1.8440E-07	-7.3530E-07	7.4190E-07	6.9570E-07	3.0490E-06	-2.8930E-06
	-1.9360E-07	-7.8830E-07	8.0460E-07	-1.5290E-07	-6.5410E-07	6.7100E-07	-4.3440E-08	-9.7990E-08	1.0230E-07
9	1.8070E-07	6.9300E-07	-7.0190E-07	1.5450E-07	7.4740E-07	-7.4590E-07	-6.7650E-07	-2.8930E-06	3.0200E-06
	1.5280E-07	8.1570E-07	-7.5750E-07	1.8830E-07	6.3700E-07	-6.1440E-07	2.0300E-08	3.6270E-08	2.7430E-08
10	-8.3100E-09	-1.0770E-07	1.5830E-07	5.5070E-08	-7.6060E-08	1.0930E-07	-2.3100E-08	-1.9360E-07	1.5280E-07
	2.2800E-07	5.0610E-07	-5.4450E-07	-5.2160E-08	-1.2770E-07	1.2340E-07	7.2040E-08	1.0810E-07	-1.0010E-07
11	-1.1950E-07	-7.7630E-07	7.4120E-07	-1.5910E-07	-7.8910E-07	7.6260E-07	-1.2480E-07	-7.8830E-07	8.1570E-07
	5.0610E-07	3.3670E-06	-3.1390E-06	-1.0450E-07	-8.1310E-07	8.1930E-07	-1.4860E-08	-2.2680E-07	2.0980E-07
12	1.3740E-07	7.7700E-07	-7.5740E-07	1.1970E-07	7.8330E-07	-7.5580E-07	1.4100E-07	8.0460E-07	-7.5750E-07
	-5.4450E-07	-3.1390E-06	3.2090E-06	1.4810E-07	7.7260E-07	-7.3870E-07	-1.4030E-08	1.3140E-07	-4.9500E-08
13	-1.1080E-08	-2.0920E-07	1.7230E-07	-5.2210E-08	-1.8770E-07	1.6100E-07	-1.6020E-09	-1.5290E-07	1.8830E-07

```

-5.2160E-08 -1.0450E-07 1.4810E-07 3.1750E-07 6.5300E-07 -6.6880E-07 1.0570E-09 -1.3120E-07 1.1620E-07
 14 -1.8940E-07 -5.0910E-07 6.2370E-07 -1.1950E-07 -5.9160E-07 6.8470E-07 -2.1460E-07 -6.5410E-07 6.3700E-07
-1.2770E-07 -8.1310E-07 7.7260E-07 6.5300E-07 2.7670E-06 -2.7180E-06 -9.4280E-09 1.7560E-07 -1.1900E-07
 15 2.0310E-07 5.7780E-07 -6.6270E-07 1.2560E-07 6.5060E-07 -7.1130E-07 2.1540E-07 6.7100E-07 -6.1440E-07
1.2340E-07 8.1930E-07 -7.3870E-07 -6.6880E-07 -2.7180E-06 2.9280E-06 8.9660E-09 -1.3950E-07 1.6140E-07
 16 3.4850E-08 2.6100E-08 5.0750E-09 7.1210E-08 4.1920E-08 -2.0440E-08 2.0780E-08 -4.3440E-08 2.0300E-08
7.2040E-08 -1.4860E-08 -1.4030E-08 1.0570E-09 -9.4280E-09 8.9660E-09 2.2060E-06 7.2740E-06 -7.5990E-06
 17 -1.6230E-08 2.2960E-07 -5.0230E-08 1.1700E-07 1.2070E-07 2.1740E-08 -7.7790E-08 -9.7990E-08 3.6270E-08
1.0810E-07 -2.2680E-07 1.3140E-07 -1.3120E-07 1.7560E-07 -1.3950E-07 7.2740E-06 3.3640E-05 -3.3990E-05
 18 1.8920E-08 -1.4690E-07 6.5820E-08 -9.8960E-08 -4.6990E-08 -4.9310E-09 6.3990E-08 1.0230E-07 2.7430E-08
-1.0010E-07 2.0980E-07 -4.9500E-08 1.1620E-07 -1.1900E-07 1.6140E-07 -7.5990E-06 -3.3990E-05 3.6570E-05

```

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

```

0.0000022060 0.0000072740 -0.0000075990
0.0000072740 0.0000336400 -0.0000339900
-0.0000075990 -0.0000339900 0.0000365700

```

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

```

0.0000010530 -0.0000003300 0.0000054836
-0.0000003300 0.0000011602 -0.0000027002
0.0000054836 -0.0000027002 0.0000702028

```

Horizontal network accuracy = 0.00261 meters.

Vertical network accuracy = 0.01643 meters.

		Vectors		
To	From	X	Y	Z
mtms	4012	-40917.184	47783.264	27816.414
p053	4012	100959.133	16026.130	41454.156
mtlw	4012	-64815.082	-74033.359	-82903.952
p052	4012	117870.058	-106398.111	-58967.949
p049	4012	-160581.446	-13099.406	-60592.882

Covariance matrix of the 5 vectors

```

1 2.3726E-06 7.8695E-06 -8.2825E-06 2.0916E-06 7.1159E-06 -7.4590E-06 2.1419E-06 7.1694E-06 -7.4575E-06
2.0908E-06 7.1856E-06 -7.4665E-06 2.1590E-06 7.1103E-06 -7.4238E-06
2 7.8695E-06 3.5901E-05 -3.6519E-05 7.0342E-06 3.2728E-05 -3.3187E-05 7.1346E-06 3.2836E-05 -3.3186E-05
7.0321E-06 3.2861E-05 -3.3197E-05 7.1699E-06 3.2726E-05 -3.3126E-05
3 -8.2825E-06 -3.6519E-05 3.9491E-05 -7.3484E-06 -3.3207E-05 3.5778E-05 -7.4968E-06 -3.3366E-05 3.5775E-05
-7.3457E-06 -3.3408E-05 3.5796E-05 -7.5480E-06 -3.3197E-05 3.5680E-05
4 2.0916E-06 7.0342E-06 -7.3484E-06 2.2923E-06 7.6757E-06 -8.0367E-06 2.0904E-06 7.0160E-06 -7.3658E-06
2.1178E-06 7.0128E-06 -7.3663E-06 2.0815E-06 7.0469E-06 -7.3834E-06
5 7.1159E-06 3.2728E-05 -3.3207E-05 7.6757E-06 3.6278E-05 -3.6832E-05 7.1443E-06 3.2882E-05 -3.3232E-05
7.0479E-06 3.2957E-05 -3.3291E-05 7.1756E-06 3.2752E-05 -3.3153E-05
6 -7.4590E-06 -3.3187E-05 3.5778E-05 -8.0367E-06 -3.6832E-05 3.9724E-05 -7.4934E-06 -3.3372E-05 3.5802E-05
-7.3692E-06 -3.3459E-05 3.5869E-05 -7.5338E-06 -3.3208E-05 3.5702E-05
7 2.1419E-06 7.1346E-06 -7.4968E-06 2.0904E-06 7.1443E-06 -7.4934E-06 2.4212E-06 8.0909E-06 -8.3598E-06
2.0901E-06 7.2418E-06 -7.5080E-06 2.1826E-06 7.1466E-06 -7.4566E-06
8 7.1694E-06 3.2836E-05 -3.3366E-05 7.0160E-06 3.2882E-05 -3.3372E-05 8.0909E-06 3.6885E-05 -3.7022E-05
7.0157E-06 3.3176E-05 -3.3419E-05 7.2957E-06 3.2908E-05 -3.3282E-05
9 -7.4575E-06 -3.3186E-05 3.5775E-05 -7.3658E-06 -3.3232E-05 3.5802E-05 -8.3598E-06 -3.7022E-05 3.9535E-05
-7.3664E-06 -3.3420E-05 3.5835E-05 -7.5472E-06 -3.3270E-05 3.5767E-05

```

10 2.0908E-06 7.0321E-06 -7.3457E-06 2.1178E-06 7.0479E-06 -7.3692E-06 2.0901E-06 7.0157E-06 -7.3664E-06
2.2899E-06 7.6869E-06 -8.0294E-06 2.0807E-06 7.0476E-06 -7.3845E-06
11 7.1856E-06 3.2861E-05 -3.3408E-05 7.0128E-06 3.2957E-05 -3.3459E-05 7.2418E-06 3.3176E-05 -3.3420E-05
7.6869E-06 3.7461E-05 -3.7470E-05 7.3156E-06 3.2878E-05 -3.3241E-05
12 -7.4665E-06 -3.3197E-05 3.5796E-05 -7.3663E-06 -3.3291E-05 3.5869E-05 -7.5080E-06 -3.3419E-05 3.5835E-05
-8.0294E-06 -3.7470E-05 3.9878E-05 -7.5531E-06 -3.3230E-05 3.5719E-05
13 2.1590E-06 7.1699E-06 -7.5480E-06 2.0815E-06 7.1756E-06 -7.5338E-06 2.1826E-06 7.2957E-06 -7.5472E-06
2.0807E-06 7.3156E-06 -7.5531E-06 2.5214E-06 8.0676E-06 -8.3930E-06
14 7.1103E-06 3.2726E-05 -3.3197E-05 7.0469E-06 3.2752E-05 -3.3208E-05 7.1466E-06 3.2908E-05 -3.3270E-05
7.0476E-06 3.2878E-05 -3.3230E-05 8.0676E-06 3.6056E-05 -3.6449E-05
15 -7.4238E-06 -3.3126E-05 3.5680E-05 -7.3834E-06 -3.3153E-05 3.5702E-05 -7.4566E-06 -3.3282E-05 3.5767E-05
-7.3845E-06 -3.3241E-05 3.5719E-05 -8.3930E-06 -3.6449E-05 3.9175E-05

Correlation matrix of the 5 vectors

1 1.0000E+00 8.5268E-01 -8.5565E-01 8.9688E-01 7.6701E-01 -7.6832E-01 8.9367E-01 7.6638E-01 -7.7000E-01
8.9700E-01 7.6219E-01 -7.6760E-01 8.8272E-01 7.6875E-01 -7.7003E-01
2 8.5268E-01 1.0000E+00 -9.6987E-01 7.7540E-01 9.0688E-01 -8.7880E-01 7.6524E-01 9.0235E-01 -8.8088E-01
7.7557E-01 8.9607E-01 -8.7738E-01 7.5360E-01 9.0960E-01 -8.8330E-01
3 -8.5565E-01 -9.6987E-01 1.0000E+00 -7.7234E-01 -8.7733E-01 9.0331E-01 -7.6666E-01 -8.7424E-01 9.0539E-01
-7.7245E-01 -8.6859E-01 9.0203E-01 -7.5641E-01 -8.7975E-01 9.0713E-01
4 8.9688E-01 7.7540E-01 -7.7234E-01 1.0000E+00 8.4171E-01 -8.4221E-01 8.8732E-01 7.6302E-01 -7.7374E-01
9.2437E-01 7.5678E-01 -7.7046E-01 8.6582E-01 7.7514E-01 -7.7914E-01
5 7.6701E-01 9.0688E-01 -8.7733E-01 8.4171E-01 1.0000E+00 -9.7024E-01 7.6229E-01 8.9891E-01 -8.7749E-01
7.7327E-01 8.9401E-01 -8.7527E-01 7.5027E-01 9.0559E-01 -8.7942E-01
6 -7.6832E-01 -8.7880E-01 9.0331E-01 -8.4221E-01 -9.7024E-01 1.0000E+00 -7.6408E-01 -8.7183E-01 9.0341E-01
-7.7265E-01 -8.6736E-01 9.0120E-01 -7.5278E-01 -8.7747E-01 9.0503E-01
7 8.9367E-01 7.6524E-01 -7.6666E-01 8.8732E-01 7.6229E-01 -7.6408E-01 1.0000E+00 8.5616E-01 -8.5445E-01
8.8763E-01 7.6040E-01 -7.6408E-01 8.8334E-01 7.6488E-01 -7.6562E-01
8 7.6638E-01 9.0235E-01 -8.7424E-01 7.6302E-01 8.9891E-01 -8.7183E-01 8.5616E-01 1.0000E+00 -9.6948E-01
7.6338E-01 8.9252E-01 -8.7137E-01 7.5653E-01 9.0239E-01 -8.7554E-01
9 -7.7000E-01 -8.8088E-01 9.0539E-01 -7.7374E-01 -8.7749E-01 9.0341E-01 -8.5445E-01 -9.6948E-01 1.0000E+00
-7.7420E-01 -8.6842E-01 9.0249E-01 -7.5592E-01 -8.8121E-01 9.0883E-01
10 8.9700E-01 7.7557E-01 -7.7245E-01 9.2437E-01 7.7327E-01 -7.7265E-01 8.8763E-01 7.6338E-01 -7.7420E-01
1.0000E+00 8.2995E-01 -8.4024E-01 8.6594E-01 7.7561E-01 -7.7966E-01
11 7.6219E-01 8.9607E-01 -8.6859E-01 7.5678E-01 8.9401E-01 -8.6736E-01 7.6040E-01 8.9252E-01 -8.6842E-01
8.2995E-01 1.0000E+00 -9.6946E-01 7.5273E-01 8.9461E-01 -8.6772E-01
12 -7.6760E-01 -8.7738E-01 9.0203E-01 -7.7046E-01 -8.7527E-01 9.0120E-01 -7.6408E-01 -8.7137E-01 9.0249E-01
-8.4024E-01 -9.6946E-01 1.0000E+00 -7.5325E-01 -8.7634E-01 9.0372E-01
13 8.8272E-01 7.5360E-01 -7.5641E-01 8.6582E-01 7.5027E-01 -7.5278E-01 8.8334E-01 7.5653E-01 -7.5592E-01
8.6594E-01 7.5273E-01 -7.5325E-01 1.0000E+00 8.4613E-01 -8.4448E-01
14 7.6875E-01 9.0960E-01 -8.7975E-01 7.7514E-01 9.0559E-01 -8.7747E-01 7.6488E-01 9.0239E-01 -8.8121E-01
7.7561E-01 8.9461E-01 -8.7634E-01 8.4613E-01 1.0000E+00 -9.6984E-01
15 -7.7003E-01 -8.8330E-01 9.0713E-01 -7.7914E-01 -8.7942E-01 9.0503E-01 -7.6562E-01 -8.7554E-01 9.0883E-01
-7.7966E-01 -8.6772E-01 9.0372E-01 -8.4448E-01 -9.6984E-01 1.0000E+00

G-FILE for the vectors

Axx2014 8142014 814
B201408141700201408141800 5 rsgps 1.37IGS
lant_info.003 NGS
C00060001 -409171839 15 477832635 59 278164141 62
C00060002 1009591326 15 160261300 60 414541560 63

C00060003 -648150822 15 -740333588 60 -829039520 62
 C00060004 1178700578 15-1063981106 61 -589679491 63
 C00060005-1605814459 15 -130994055 60 -605928819 62
 D 1 2 8526768 1 3 -8556533 1 4 8968848 1 5 7670062 1 6 -7683187
 D 1 7 8936703 1 8 7663796 1 9 -7699996 1 10 8969951 1 11 7621892
 D 1 12 -7676045 1 13 8827207 1 14 7687507 1 15 -7700298 2 3 -9698715
 D 2 4 7754042 2 5 9068764 2 6 -8788040 2 7 7652406 2 8 9023518
 D 2 9 -8808785 2 10 7755732 2 11 8960660 2 12 -8773777 2 13 7536008
 D 2 14 9095976 2 15 -8833009 3 4 -7723404 3 5 -8773273 3 6 9033053
 D 3 7 -7666619 3 8 -8742371 3 9 9053888 3 10 -7724502 3 11 -8685941
 D 3 12 9020283 3 13 -7564143 3 14 -8797537 3 15 9071292 4 5 8417124
 D 4 6 -8422057 4 7 8873210 4 8 7630156 4 9 -7737431 4 10 9243683
 D 4 11 7567767 4 12 -7704588 4 13 8658201 4 14 7751369 4 15 -7791432
 D 5 6 -9702359 5 7 7622890 5 8 8989055 5 9 -8774936 5 10 7732706
 D 5 11 8940072 5 12 -8752705 5 13 7502708 5 14 9055914 5 15 -8794208
 D 6 7 -7640770 6 8 -8718334 6 9 9034103 6 10 -7726487 6 11 -8673593
 D 6 12 9012024 6 13 -7527770 6 14 -8774652 6 15 9050321 7 8 8561596
 D 7 9 -8544463 7 10 8876338 7 11 7604019 7 12 -7640756 7 13 8833398
 D 7 14 7648813 7 15 -7656208 8 9 -9694790 8 10 7633760 8 11 8925206
 D 8 12 -8713713 8 13 7565278 8 14 9023872 8 15 -8755408 9 10 -7742005
 D 9 11 -8684248 9 12 9024930 9 13 -7559177 9 14 -8812053 9 15 9088296
 D 10 11 8299490 10 12 -8402424 10 13 8659416 10 14 7756133 10 15 -7796565
 D 11 12 -9694646 11 13 7527322 11 14 8946059 11 15 -8677229 12 13 -7532465
 D 12 14 -8763416 12 15 9037157 13 14 8461329 13 15 -8444815 14 15 -9698362

ITRF position of 4012 as determined by individual baselines

	X	Y	Z
mtms	-1384518.397	-4031796.477	4729677.466
p053	-1384518.394	-4031796.478	4729677.478
mtlw	-1384518.402	-4031796.480	4729677.475
p052	-1384518.401	-4031796.475	4729677.459
p049	-1384518.395	-4031796.486	4729677.476

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
mtms	-0.002	-0.013	0.011	0.002	-0.002	0.017
p053	0.001	-0.014	0.023	0.005	0.006	0.026
mtlw	-0.007	-0.016	0.020	-0.001	0.000	0.026
p052	-0.006	-0.010	0.005	-0.003	-0.006	0.011
p049	-0.000	-0.022	0.021	0.007	-0.001	0.029

STATE PLANE COORDINATES - International Foot

SPC (2500 MT)

Northing (Y) [feet]	1426909.026
Easting (X) [feet]	2102085.745
Convergence [degrees]	0.40053615
Point Scale	0.99959485
Combined Factor	0.99944459

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

dop from interpolation is 0.503
scatter (mean square distance from rover) is 18352.957
average edop for rover is 0.590
average ndop for rover is 0.740
average hdop for rover is 0.946
average vdop for rover is 1.650
average gdop for rover is 2.150

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.