

OPUS-RS solution : 018697_14_248_A0.14O OP1410469442593

opus <opus@ngs.noaa.gov>

Thu 9/11/2014 3:08 PM

Inbox

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

FILE: 018697_14_248_A0.14O OP1410469442593

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: cmozol@neciusa.com DATE: September 11, 2014
RINEX FILE: 0186248t.14o TIME: 21:07:19 UTC

SOFTWARE: rsgps 1.37 RS53.prl 1.99.2 START: 2014/09/05 19:53:45
EPHEMERIS: igr18085.eph [rapid] STOP: 2014/09/05 20:53:30
NAV FILE: brdc2480.14n OBS USED: 3115 / 3370 : 92%
ANT NAME: CHCX90D-OPUS NONE QUALITY IND. 16.89/ 54.38
ARP HEIGHT: 1.8000 NORMALIZED RMS: 0.257

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.67904)

X: -1364224.515(m) 0.006(m) -1364225.373(m) 0.006(m)
Y: -4300615.665(m) 0.018(m) -4300614.410(m) 0.018(m)
Z: 4495098.135(m) 0.015(m) 4495098.092(m) 0.015(m)

LAT: 45 5 9.92741 0.008(m) 45 5 9.94791 0.008(m)
E LON: 252 24 0.48516 0.004(m) 252 24 0.43042 0.004(m)
W LON: 107 35 59.51484 0.004(m) 107 35 59.56958 0.004(m)
EL HGT: 1397.349(m) 0.023(m) 1396.657(m) 0.023(m)
ORTHO HGT: 1409.638(m) 0.024(m) [NAVD88 (Computed using GEOID12A)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 13) SPC (2500 MT)

Northing (Y) [meters] 4995802.558 94746.006
Easting (X) [meters] 295398.056 749572.845
Convergence [degrees] -1.84177897 1.38995657
Point Scale 1.00011476 0.99994942
Combined Factor 0.99989570 0.99973040

US NATIONAL GRID DESIGNATOR: 13TBK9539895802(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DM7161	WYSH SHERIDAN CORS ARP	N444801.769	W1070035.715	56361.1
DI3062	BIL5 BILLINGS 5 CORS ARP	N455816.237	W1075947.298	103152.2
DG9745	MTEI ENGINC CORS ARP	N454447.035	W1083600.736	107333.0
DJ8992	P033 TENSLEEPTRWY2005 CORS ARP	N435710.415	W1072315.121	127075.5
DL7758	P722 YNPBASSRCHMT2005 CORS ARP	N452725.985	W1093415.586	160112.8

NEAREST NGS PUBLISHED CONTROL POINT

QV0346 T9S R34E SEC 6 1/4 COR NORTH N450510.078 W1073522.726 803.2

OPUS-RS Extended Output, Level 2

FINAL COORDINATES (ITRF at epoch of observations)

wysh	-1326396.434	-4335757.896	4472504.212
bil5	-1372156.892	-4223945.790	4563650.220
mtei	-1422329.054	-4226311.546	4546317.399
p033	-1374663.807	-4389900.519	4405280.406
p722	-1501537.057	-4223566.611	4524171.137
0186	-1364225.373	-4300614.410	4495098.092

Covariance matrix of the stations:

1	1.9100E-07	3.3910E-07	-4.3230E-07	3.5000E-08	-4.9410E-09	4.6990E-08	9.0970E-09	-4.4930E-08	9.3270E-08	-1.8570E-09	-1.8670E-07	1.2900E-07	-3.3560E-08	-1.0200E-07	1.6260E-07	7.8640E-08	1.0360E-07	-1.4580E-07
2	3.3910E-07	1.6270E-06	-1.8350E-06	-8.1000E-08	-3.3580E-07	4.3140E-07	-8.2790E-08	-3.4550E-07	4.4570E-07	-8.9720E-08	-3.8230E-07	4.8830E-07	-8.6760E-08	-3.6260E-07	4.7050E-07	3.5550E-09	3.7250E-08	-4.4620E-09
3	-4.3230E-07	-1.8350E-06	2.4330E-06	6.0460E-08	3.3940E-07	-4.6610E-07	9.8650E-08	4.0050E-07	-5.3830E-07	1.1240E-07	6.0530E-07	-5.8150E-07	1.6190E-07	4.8840E-07	-6.4740E-07	-5.9130E-08	-1.4940E-07	2.6230E-07
4	3.5000E-08	-8.1000E-08	6.0460E-08	1.9400E-07	4.0410E-07	-4.5200E-07	8.5280E-09	-4.0300E-08	9.4720E-08	-2.8840E-09	-1.8500E-07	1.3230E-07	-3.4580E-08	-9.7700E-08	1.6430E-07	7.5560E-08	9.8890E-08	-1.3390E-07
5	-4.9410E-09	-3.3580E-07	3.3940E-07	4.0410E-07	1.6860E-06	-1.8730E-06	-7.6800E-08	-1.7240E-07	3.9630E-07	-1.2030E-07	-6.5320E-07	5.5730E-07	-2.0140E-07	-3.2490E-07	5.7930E-07	1.0730E-07	3.3940E-07	-3.9930E-07
6	4.6990E-08	4.3140E-07	-4.6610E-07	-4.5200E-07	-1.8730E-06	2.4790E-06	9.9520E-08	3.4760E-07	-5.3540E-07	1.2100E-07	6.3660E-07	-6.0660E-07	1.8380E-07	4.5830E-07	-6.7080E-07	-6.5560E-08	-1.8130E-07	2.6960E-07
7	9.0970E-09	-8.2790E-08	9.8650E-08	8.5280E-09	-7.6800E-08	9.9520E-08	1.8180E-07	3.6510E-07	-4.4980E-07	3.5270E-09	-1.0200E-07	1.1710E-07	-2.8230E-09	-1.0370E-07	1.3460E-07	3.9830E-08	1.7480E-09	1.0660E-09
8	-4.4930E-08	-3.4550E-07	4.0050E-07	-4.0300E-08	-1.7240E-07	3.4760E-07	3.6510E-07	1.6040E-06	-1.8410E-06	-1.1630E-07	-5.4750E-07	5.4560E-07	-1.6260E-07	-3.3930E-07	5.4670E-07	5.4340E-08	2.0180E-07	-2.0910E-07
9	9.3270E-08	4.4570E-07	-5.3830E-07	9.4720E-08	3.9630E-07	-5.3540E-07	-4.4980E-07	-1.8410E-06	2.5100E-06	1.1840E-07	5.2260E-07	-5.9780E-07	1.4250E-07	4.7760E-07	-6.3830E-07	-5.0260E-09	-2.5430E-08	5.4630E-08
10	-1.8570E-09	-8.9720E-08	1.1240E-07	-2.8840E-09	-1.2030E-07	1.2100E-07	3.5270E-09	-1.1630E-07	1.1840E-07	1.8800E-07	4.4130E-07	-4.7080E-07	1.2890E-08	-1.1460E-07	1.1900E-07	2.4450E-08	-4.9110E-08	5.9180E-08
11	-1.8670E-07	-3.8230E-07	6.0530E-07	-1.8500E-07	-6.5320E-07	6.3660E-07	-1.0200E-07	-5.4750E-07	5.2260E-07	4.4130E-07	2.1940E-06	-2.1290E-06	3.0530E-08	-4.1020E-07	3.6660E-07	-1.4500E-07	-3.9240E-07	5.6140E-07
12	1.2900E-07	4.8830E-07	-5.8150E-07	1.3230E-07	5.5730E-07	-6.0660E-07	1.1710E-07	5.4560E-07	-5.9780E-07	-4.7080E-07	-2.1290E-06	2.5780E-06	9.4290E-08	5.3620E-07	-5.9290E-07	4.5090E-08	1.5780E-07	-1.3120E-07
13	-3.3560E-08	-8.6760E-08	1.6190E-07	-3.4580E-08	-2.0140E-07	1.8380E-07	-2.8230E-09	-1.6260E-07	1.4250E-									

07 1.2890E-08 3.0530E-08 9.4290E-08 2.5840E-07 4.1950E-07 -5.8180E-07 -1.8620E-08 -1.5560E-07 2.1980E-07
 14 -1.0200E-07 -3.6260E-07 4.8840E-07 -9.7700E-08 -3.2490E-07 4.5830E-07 -1.0370E-07 -3.3930E-07 4.7760E-07
 -1.1460E-07 -4.1020E-07 5.3620E-07 4.1950E-07 1.6360E-06 -1.9620E-06 -1.9960E-08 1.4290E-08 5.1030E-08
 15 1.6260E-07 4.7050E-07 -6.4740E-07 1.6430E-07 5.7930E-07 -6.7080E-07 1.3460E-07 5.4670E-07 -6.3830E-07
 1.1900E-07 3.6660E-07 -5.9290E-07 -5.8180E-07 -1.9620E-06 2.7500E-06 8.4300E-08 1.9810E-07 -2.5500E-07
 16 7.8640E-08 3.5550E-09 -5.9130E-08 7.5560E-08 1.0730E-07 -6.5560E-08 3.9830E-08 5.4340E-08 -5.0260E-09
 2.4450E-08 -1.4500E-07 4.5090E-08 -1.8620E-08 -1.9960E-08 8.4300E-08 1.6710E-06 4.3220E-06 -5.1620E-06
 17 1.0360E-07 3.7250E-08 -1.4940E-07 9.8890E-08 3.3940E-07 -1.8130E-07 1.7480E-09 2.0180E-07 -2.5430E-08
 -4.9110E-08 -3.9240E-07 1.5780E-07 -1.5560E-07 1.4290E-08 1.9810E-07 4.3220E-06 1.9080E-05 -2.2520E-05
 18 -1.4580E-07 -4.4620E-09 2.6230E-07 -1.3390E-07 -3.9930E-07 2.6960E-07 1.0660E-09 -2.0910E-07 5.4630E-08
 08 5.9180E-08 5.6140E-07 -1.3120E-07 2.1980E-07 5.1030E-08 -2.5500E-07 -5.1620E-06 -2.2520E-05 2.9360E-05

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

0.0000016710 0.0000043220 -0.0000051620
 0.0000043220 0.0000190800 -0.0000225200
 -0.0000051620 -0.0000225200 0.0000293600

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

0.0000007713 0.0000002895 0.0000023858
 0.0000002895 0.0000016607 0.0000047756
 0.0000023858 0.0000047756 0.0000476790

Horizontal network accuracy = 0.00277 meters.

Vertical network accuracy = 0.01354 meters.

		Vectors		
To	From	X	Y	Z
wysh	0186	37828.939	-35143.486	-22593.880
bil5	0186	-7931.520	76668.619	68552.128
mtei	0186	-58103.681	74302.864	51219.307
p033	0186	-10438.434	-89286.109	-89817.686
p722	0186	-137311.684	77047.799	29073.045

Covariance matrix of the 5 vectors

1 1.7047E-06 4.5539E-06 -5.3894E-06 1.5518E-06 4.1062E-06 -4.9037E-06 1.5616E-06 4.1191E-06 -4.9179E-06
 1.5661E-06 4.1767E-06 -4.9323E-06 1.5774E-06 4.1364E-06 -4.9379E-06
 2 4.5539E-06 2.0632E-05 -2.4201E-05 4.1386E-06 1.8368E-05 -2.1903E-05 4.2339E-06 1.8495E-05 -2.2044E-05
 4.2778E-06 1.9053E-05 -2.2185E-05 4.3873E-06 1.8666E-05 -2.2243E-05
 3 -5.3894E-06 -2.4201E-05 3.1268E-05 -4.9085E-06 -2.1632E-05 2.8362E-05 -5.0053E-06 -2.1761E-05 2.8505E-05
 -5.0497E-06 -2.2327E-05 2.8647E-05 -5.1608E-06 -2.1933E-05 2.8705E-05
 4 1.5518E-06 4.1386E-06 -4.9085E-06 1.7139E-06 4.5199E-06 -5.4145E-06 1.5641E-06 4.1285E-06 -4.9284E-06
 1.5681E-06 4.1831E-06 -4.9409E-06 1.5795E-06 4.1454E-06 -4.9481E-06
 5 4.1062E-06 1.8368E-05 -2.1632E-05 4.5199E-06 2.0087E-05 -2.3812E-05 4.1362E-06 1.8366E-05 -2.1699E-05
 4.1435E-06 1.8480E-05 -2.1721E-05 4.1689E-06 1.8401E-05 -2.1740E-05
 6 -4.9037E-06 -2.1903E-05 2.8362E-05 -5.4145E-06 -2.3812E-05 3.1300E-05 -4.9980E-06 -2.1782E-05 2.8500E-05
 -5.0346E-06 -2.2264E-05 2.8615E-05 -5.1324E-06 -2.1931E-05 2.8675E-05
 7 1.5616E-06 4.2339E-06 -5.0053E-06 1.5641E-06 4.1362E-06 -4.9980E-06 1.7731E-06 4.6310E-06 -5.6078E-06
 1.6102E-06 4.3633E-06 -5.0911E-06 1.6470E-06 4.2365E-06 -5.1128E-06
 8 4.1191E-06 1.8495E-05 -2.1761E-05 4.1285E-06 1.8366E-05 -2.1782E-05 4.6310E-06 2.0280E-05 -2.4126E-05
 4.2005E-06 1.8723E-05 -2.1923E-05 4.2607E-06 1.8525E-05 -2.1962E-05
 9 -4.9179E-06 -2.2044E-05 2.8505E-05 -4.9284E-06 -2.1699E-05 2.8500E-05 -5.6078E-06 -2.4126E-05 3.1761E-05
 -5.0978E-06 -2.2533E-05 2.8839E-05 -5.2343E-06 -2.2068E-05 2.8922E-05

10 1.5661E-06 4.2778E-06 -5.0497E-06 1.5681E-06 4.1435E-06 -5.0346E-06 1.6102E-06 4.2005E-06 -5.0978E-06
1.8101E-06 4.9574E-06 -5.7371E-06 1.6781E-06 4.2765E-06 -5.1865E-06
11 4.1767E-06 1.9053E-05 -2.2327E-05 4.1831E-06 1.8480E-05 -2.2264E-05 4.3633E-06 1.8723E-05 -2.2533E-05
4.9574E-06 2.2059E-05 -2.5368E-05 4.6531E-06 1.9048E-05 -2.2913E-05
12 -4.9323E-06 -2.2185E-05 2.8647E-05 -4.9409E-06 -2.1721E-05 2.8615E-05 -5.0911E-06 -2.1923E-05 2.8839E-05
-5.7371E-06 -2.5368E-05 3.2200E-05 -5.3326E-06 -2.2193E-05 2.9153E-05
13 1.5774E-06 4.3873E-06 -5.1608E-06 1.5795E-06 4.1689E-06 -5.1324E-06 1.6470E-06 4.2607E-06 -5.2343E-06
1.6781E-06 4.6531E-06 -5.3326E-06 1.9666E-06 4.9171E-06 -6.0479E-06
14 4.1364E-06 1.8666E-05 -2.1933E-05 4.1454E-06 1.8401E-05 -2.1931E-05 4.2365E-06 1.8525E-05 -2.2068E-05
4.2765E-06 1.9048E-05 -2.2193E-05 4.9171E-06 2.0687E-05 -2.4731E-05
15 -4.9379E-06 -2.2243E-05 2.8705E-05 -4.9481E-06 -2.1740E-05 2.8675E-05 -5.1128E-06 -2.1962E-05 2.8922E-05
-5.1865E-06 -2.2913E-05 2.9153E-05 -6.0479E-06 -2.4731E-05 3.2620E-05

Correlation matrix of the 5 vectors

1 1.0000E+00 7.6787E-01 -7.3817E-01 9.0786E-01 7.0170E-01 -6.7131E-01 8.9821E-01 7.0055E-01 -6.6836E-01
8.9151E-01 6.8111E-01 -6.6572E-01 8.6151E-01 6.9653E-01 -6.6218E-01
2 7.6787E-01 1.0000E+00 -9.5281E-01 6.9596E-01 9.0223E-01 -8.6189E-01 6.9999E-01 9.0417E-01 -8.6115E-01
7.0000E-01 8.9309E-01 -8.6070E-01 6.8874E-01 9.0348E-01 -8.5739E-01
3 -7.3817E-01 -9.5281E-01 1.0000E+00 -6.7051E-01 -8.6314E-01 9.0659E-01 -6.7221E-01 -8.6415E-01 9.0452E-01
-6.7121E-01 -8.5012E-01 9.0282E-01 -6.5811E-01 -8.6238E-01 8.9881E-01
4 9.0786E-01 6.9596E-01 -6.7051E-01 1.0000E+00 7.7034E-01 -7.3927E-01 8.9725E-01 7.0026E-01 -6.6798E-01
8.9029E-01 6.8033E-01 -6.6510E-01 8.6032E-01 6.9618E-01 -6.6177E-01
5 7.0170E-01 9.0223E-01 -8.6314E-01 7.7034E-01 1.0000E+00 -9.4967E-01 6.9305E-01 9.0997E-01 -8.5908E-01
6.8716E-01 8.7790E-01 -8.5407E-01 6.6328E-01 9.0269E-01 -8.4927E-01
6 -6.7131E-01 -8.6189E-01 9.0659E-01 -7.3927E-01 -9.4967E-01 1.0000E+00 -6.7089E-01 -8.6455E-01 9.0393E-01
-6.6887E-01 -8.4729E-01 9.0135E-01 -6.5417E-01 -8.6187E-01 8.9740E-01
7 8.9821E-01 6.9999E-01 -6.7221E-01 8.9725E-01 6.9305E-01 -6.7089E-01 1.0000E+00 7.7226E-01 -7.4727E-01
8.9881E-01 6.9767E-01 -6.7376E-01 8.8196E-01 6.9949E-01 -6.7227E-01
8 7.0055E-01 9.0417E-01 -8.6415E-01 7.0026E-01 9.0997E-01 -8.6455E-01 7.7226E-01 1.0000E+00 -9.5063E-01
6.9328E-01 8.8521E-01 -8.5789E-01 6.7465E-01 9.0439E-01 -8.5388E-01
9 -6.6836E-01 -8.6115E-01 9.0452E-01 -6.6798E-01 -8.5908E-01 9.0393E-01 -7.4727E-01 -9.5063E-01 1.0000E+00
-6.7233E-01 -8.5131E-01 9.0178E-01 -6.6229E-01 -8.6092E-01 8.9855E-01
10 8.9151E-01 7.0000E-01 -6.7121E-01 8.9029E-01 6.8716E-01 -6.6887E-01 8.9881E-01 6.9328E-01 -6.7233E-01
1.0000E+00 7.8454E-01 -7.5146E-01 8.8939E-01 6.9885E-01 -6.7496E-01
11 6.8111E-01 8.9309E-01 -8.5012E-01 6.8033E-01 8.7790E-01 -8.4729E-01 6.9767E-01 8.8521E-01 -8.5131E-01
7.8454E-01 1.0000E+00 -9.5185E-01 7.0647E-01 8.9167E-01 -8.5418E-01
12 -6.6572E-01 -8.6070E-01 9.0282E-01 -6.6510E-01 -8.5407E-01 9.0135E-01 -6.7376E-01 -8.5789E-01 9.0178E-01
-7.5146E-01 -9.5185E-01 1.0000E+00 -6.7011E-01 -8.5985E-01 8.9953E-01
13 8.6151E-01 6.8874E-01 -6.5811E-01 8.6032E-01 6.6328E-01 -6.5417E-01 8.8196E-01 6.7465E-01 -6.6229E-01
8.8939E-01 7.0647E-01 -6.7011E-01 1.0000E+00 7.7089E-01 -7.5509E-01
14 6.9653E-01 9.0348E-01 -8.6238E-01 6.9618E-01 9.0269E-01 -8.6187E-01 6.9949E-01 9.0439E-01 -8.6092E-01
6.9885E-01 8.9167E-01 -8.5985E-01 7.7089E-01 1.0000E+00 -9.5203E-01
15 -6.6218E-01 -8.5739E-01 8.9881E-01 -6.6177E-01 -8.4927E-01 8.9740E-01 -6.7227E-01 -8.5388E-01 8.9855E-01
-6.7496E-01 -8.5418E-01 8.9953E-01 -7.5509E-01 -9.5203E-01 1.0000E+00

G-FILE for the vectors

Axx2014 9 52014 9 5
B201409051900201409052000 5 rsgps 1.37IGS
Iant_info.003 NGS
C00060001 378289389 13 -351434862 45 -225938800 55
C00060002 -79315195 13 766686192 44 685521277 55

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C00060003 -581036807 13 743028640 45 512193073 56
C00060004 -104384342 13 -892861088 46 -898176860 56
C00060005 -1373116840 14 770477989 45 290730449 57
D 1 2 7678658 1 3 -7381738 1 4 9078602 1 5 7016968 1 6 -6713085
D 1 7 8982128 1 8 7005525 1 9 -6683565 1 10 8915149 1 11 6811077
D 1 12 -6657197 1 13 8615061 1 14 6965280 1 15 -6621765 2 3 -9528115
D 2 4 6959573 2 5 9022265 2 6 -8618936 2 7 6999932 2 8 9041712
D 2 9 -8611468 2 10 6999980 2 11 8930855 2 12 -8607035 2 13 6887434
D 2 14 9034807 2 15 -8573894 3 4 -6705121 3 5 -8631417 3 6 9065948
D 3 7 -6722093 3 8 -8641472 3 9 9045225 3 10 -6712080 3 11 -8501210
D 3 12 9028212 3 13 -6581111 3 14 -8623758 3 15 8988087 4 5 7703354
D 4 6 -7392657 4 7 8972497 4 8 7002621 4 9 -6679844 4 10 8902949
D 4 11 6803276 4 12 -6650960 4 13 8603229 4 14 6961774 4 15 -6617687
D 5 6 -9496699 5 7 6930511 5 8 9099679 5 9 -8590809 5 10 6871592
D 5 11 8779031 5 12 -8540700 5 13 6632837 5 14 9026891 5 15 -8492740
D 6 7 -6708921 6 8 -8645472 6 9 9039291 6 10 -6688744 6 11 -8472892
D 6 12 9013476 6 13 -6541700 6 14 -8618724 6 15 8973969 7 8 7722646
D 7 9 -7472721 7 10 8988137 7 11 6976664 7 12 -6737607 7 13 8819641
D 7 14 6994936 7 15 -6722679 8 9 -9506271 8 10 6932794 8 11 8852145
D 8 12 -8578928 8 13 6746463 8 14 9043939 8 15 -8538814 9 10 -6723296
D 9 11 -8513142 9 12 9017804 9 13 -6622907 9 14 -8609233 9 15 8985496
D 10 11 7845355 10 12 -7514640 10 13 8893931 10 14 6988451 10 15 -6749621
D 11 12 -9518490 11 13 7064668 11 14 8916680 11 15 -8541755 12 13 -6701097
D 12 14 -8598545 12 15 8995288 13 14 7708855 13 15 -7550925 14 15 -9520260
    
```

ITRF position of 0186 as determined by individual baselines

	X	Y	Z
wysh	-1364225.373	-4300614.401	4495098.096
bil5	-1364225.369	-4300614.413	4495098.108
mtei	-1364225.375	-4300614.438	4495098.114
p033	-1364225.384	-4300614.431	4495098.103
p722	-1364225.373	-4300614.407	4495098.090

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
wysh	-0.000	0.008	0.004	-0.003	0.008	-0.003
bil5	0.004	-0.003	0.016	0.004	0.010	0.013
mtei	-0.003	-0.028	0.022	0.006	-0.004	0.036
p033	-0.011	-0.022	0.011	-0.004	-0.009	0.025
p722	-0.000	0.002	-0.002	-0.001	0.000	-0.003

STATE PLANE COORDINATES - International Foot

SPC (2500 MT)

Northing (Y) [feet]	310846.476
Easting (X) [feet]	2459228.494
Convergence [degrees]	1.38995657
Point Scale	0.99994942
Combined Factor	0.99973040

** 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: 1408.786 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.522
scatter (mean square distance from rover) is 13422.199
average edop for rover is 0.800
average ndop for rover is 1.040
average hdop for rover is 1.312
average vdop for rover is 2.020
average gdop for rover is 2.860

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.