OPUS-RS solution : 033845_14_240_A1.14O OP1409696662743

opus <opus@ngs.noaa.gov>

Tue 9/2/2014 4:28 PM

To:John Freetly <John.Freetly@neciusa.com>;

FILE: 033845_14_240_A1.14O OP1409696662743

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: john.freetly@neciusa.com DATE: September 02, 2014
RINEX FILE: 0338240u.14o TIME: 22:28:25 UTC

SOFTWARE: rsgps 1.37 RS52.prl 1.99.2 START: 2014/08/28 20:53:00
EPHEMERIS: igr18074.eph [rapid] STOP: 2014/08/28 21:59:30
NAV FILE: brdc2400.14n OBS USED: 4655 / 5348 : 87%
ANT NAME: CHCX90D-OPUS NONE QUALITY IND. 31.00/ 69.43
ARP HEIGHT: 1.8000 NORMALIZED RMS: 0.308

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.65724)

X:	-1329325.314(m)	0.004(m)	-1329326.175(m)	0.004(m)
Y:	-4260748.328(m)	0.011(m)	-4260747.078(m)	0.011(m)
Z:	4542365.879(m)	0.015(m)	4542365.842(m)	0.015(m)
LAT:	45 41 43.24755	0.006(m)	45 41 43.26843	0.006(m)
E LON:	252 40 20.72410	0.003(m)	252 40 20.66891	0.003(m)
W LON:	107 19 39.27590	0.003(m)	107 19 39.33109	0.003(m)
EL HGT:	985.581(m)	0.018(m)	984.900(m)	0.018(m)
ORTHO HGT:	1000.232(m)	0.020(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (Zone 13)	STATE PLANE COORDINATES SPC (2500 MT)
Northing (Y) [meters]	5062834.164	162975.443
Easting (X) [meters]	318784.918	769124.010
Convergence [degrees]	-1.66614917	1.58913682
Point Scale	1.00000374	0.99965385
Combined Factor	0.99984925	0.99949941

US NATIONAL GRID DESIGNATOR: 13TCL1878462834(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI3062	BIL5 BILLINGS 5 CORS ARP	N455816.237	W1075947.298	60347.6
DG9745	MTEI ENGINC CORS ARP	N454447.035	W1083600.736	99252.0
DM7161	WYSH SHERIDAN CORS ARP	N444801.769	W1070035.715	102546.8
DL7758	P722 YNPBASSRCHMT2005 CORS ARP	N452725.985	W1093415.586	177115.8
DI3425	P052 LRRNCHJRDNMT2006 CORS ARP	N472229.026	W1070107.185	188201.3
DJ8992	P033 TENSLEEPTRWY2005 CORS ARP	N435710.415	W1072315.121	193722.8
DM7133	MTLW LEWISTOWN CORS ARP	N470314.929	W1092633.764	222040.7

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)

bil5	-1372156.890	-4223945.779	4563650.214
mtei	-1422329.057	-4226311.563	4546317.415
wysh	-1326396.430	-4335757.890	4472504.203
p722	-1501537.050	-4223566.600	4524171.127
p052	-1266648.339	-4138194.564	4670709.493
p033	-1374663.817	-4389900.539	4405280.422
mtlw	-1449333.481	-4105829.828	4646773.506
0338	-1329326.175	-4260747.078	4542365.842

Covariance matrix of the stations:

1 2.5670E-07 5.7910E-07 -6.4630E-07 -2.0240E-08 -9.7740E-08 1.0960E-07 -1.8510E-08 -1.0190E-07 1.0890E-07 -2.2880E-08 -9.9830E-08 1.1110E-07 -1.2570E-08 -8.3430E-08 9.9830E-08 -2.0640E-08 -1.0600E-07 1.0940E-07 -1.8970E-08 -9.0190E-08 1.0750E-07 2.3770E-08 8.9020E-09 -8.6580E-09

2 5.7910E-07 1.9400E-06 -2.0380E-06 -9.6700E-08 -2.9570E-07 3.3710E-07 -1.0140E-07 -3.2470E-07 3.6000E-07 -9.7600E-08 -2.9140E-07 3.3150E-07 -8.8180E-08 -2.8110E-07 3.2890E-07 -1.0460E-07 -3.3150E-07 3.6130E-07 -9.0680E-08 -2.7260E-07 3.1940E-07 2.1390E-09 3.6360E-08 -1.2670E-08

3 -6.4630E-07 -2.0380E-06 2.3490E-06 1.0660E-07 3.3820E-07 -3.6590E-07 1.0780E-07 3.3600E-07 -3.6670E-07 1.0440E-07 3.3680E-07 -3.6570E-07 1.1330E-07 3.4940E-07 -3.7230E-07 1.0570E-07 3.3260E-07 -3.6650E-07 1.0850E-07 3.4540E-07 -3.6950E-07 9.6750E-09 8.6400E-09 6.1170E-09

4 -2.0240E-08 -9.6700E-08 1.0660E-07 2.6760E-07 5.8930E-07 -6.5430E-07 -1.9980E-08 -9.1560E-08 1.0620E-07 -2.1590E-08 -1.0660E-07 1.1910E-07 -2.0750E-08 -9.3540E-08 9.7000E-08 -2.0790E-08 -9.6010E-08 1.1410E-07 -2.1320E-08 -1.0510E-07 1.1140E-07 1.0330E-08 -1.9920E-08 2.3440E-08

5 -9.7740E-08 -2.9570E-07 3.3820E-07 5.8930E-07 1.9250E-06 -2.0100E-06 -1.0390E-07 -3.3740E-07 3.5980E-07 -1.0330E-07 -2.8140E-07 3.1670E-07 -8.3250E-08 -2.7120E-07 3.3300E-07 -1.0820E-07 -3.4220E-07 3.5000E-07 -9.2610E-08 -2.5460E-07 3.1260E-07 1.4370E-09 2.8120E-08 -7.7910E-09

6 1.0960E-07 3.3710E-07 -3.6590E-07 -6.5430E-07 -2.0100E-06 2.3030E-06 1.1030E-07 3.6130E-07 -3.6860E-07 1.1330E-07 3.1850E-07 -3.3990E-07 1.0060E-07 3.2870E-07 -3.8020E-07 1.1060E-07 3.5500E-07 -3.4780E-07

1.0950E-07 3.1000E-07 -3.5750E-07 1.0380E-09 -2.3310E-09 2.2470E-08
7 -1.8510E-08 -1.0140E-07 1.0780E-07 -1.9980E-08 -1.0390E-07 1.1030E-07 2.5730E-07 6.1260E-07 -6.5080E-07
-2.2060E-08 -1.0670E-07 1.1310E-07 -1.4730E-08 -9.2560E-08 1.0040E-07 -1.9920E-08 -1.0760E-07 1.0960E-07
-1.9470E-08 -1.0010E-07 1.0940E-07 1.8410E-08 -1.0120E-08 6.5150E-09
8 -1.0190E-07 -3.2470E-07 3.3600E-07 -9.1560E-08 -3.3740E-07 3.6130E-07 6.1260E-07 2.2310E-06 -2.1810E-06
-7.8790E-08 -3.6610E-07 4.0590E-07 -1.4420E-07 -3.7880E-07 3.1140E-07 -9.7030E-08 -2.7020E-07 4.0820E-07
-1.0060E-07 -4.1110E-07 3.5880E-07 -7.9090E-08 -1.6820E-07 2.0320E-07
9 1.0890E-07 3.6000E-07 -3.6670E-07 1.0620E-07 3.5980E-07 -3.6860E-07 -6.5080E-07 -2.1810E-06 2.3690E-06
1.0240E-07 3.6060E-07 -3.7220E-07 1.2000E-07 3.8000E-07 -3.7530E-07 1.0390E-07 3.4090E-07 -3.6770E-07
1.1040E-07 3.7830E-07 -3.7620E-07 2.6650E-08 7.7880E-08 -5.1560E-08
10 -2.2880E-08 -9.7600E-08 1.0440E-07 -2.1590E-08 -1.0330E-07 1.1330E-07 -2.2060E-08 -7.8790E-08 1.0240E-07
2.8610E-07 5.8990E-07 -6.4730E-07 -3.0850E-08 -1.0510E-07 9.3310E-08 -2.1270E-08 -8.3480E-08 1.1900E-07
-2.4460E-08 -1.2210E-07 1.1540E-07 -2.2200E-09 -4.2950E-08 4.9260E-08
11 -9.9830E-08 -2.9140E-07 3.3680E-07 -1.0660E-07 -2.8140E-07 3.1850E-07 -1.0670E-07 -3.6610E-07 3.6060E-07
5.8990E-07 1.9020E-06 -1.9800E-06 -6.7940E-08 -2.4420E-07 3.4120E-07 -1.1400E-07 -3.6710E-07 3.2560E-07
-9.3800E-08 -2.0970E-07 2.9650E-07 2.3920E-08 8.6110E-08 -7.7720E-08
12 1.1110E-07 3.3150E-07 -3.6570E-07 1.1910E-07 3.1670E-07 -3.3990E-07 1.1310E-07 4.0590E-07 -3.7220E-07
-6.4730E-07 -1.9800E-06 2.2630E-06 7.5520E-08 2.8790E-07 -3.9310E-07 1.1820E-07 3.9460E-07 -3.1420E-07
1.0950E-07 2.4330E-07 -3.3500E-07 -3.4430E-08 -8.8650E-08 1.2570E-07
13 -1.2570E-08 -8.8180E-08 1.1330E-07 -2.0750E-08 -8.3250E-08 1.0060E-07 -1.4730E-08 -1.4420E-07 1.2000E-07
-3.0850E-08 -6.7940E-08 7.5520E-08 2.5550E-07 5.5440E-07 -5.8840E-07 -2.2390E-08 -1.4650E-07 8.8000E-08
-1.1430E-08 -2.3830E-08 9.0430E-08 6.1680E-08 8.4950E-08 -9.2250E-08
14 -8.3430E-08 -2.8110E-07 3.4940E-07 -9.3540E-08 -2.7120E-07 3.2870E-07 -9.2560E-08 -3.7880E-07 3.8000E-
07 -1.0510E-07 -2.4420E-07 2.8790E-07 5.5440E-07 1.8790E-06 -1.9830E-06 -1.0410E-07 -3.8540E-07 3.3880E-07
-7.5750E-08 -1.7500E-07 2.9760E-07 5.3470E-08 1.2560E-07 -1.0200E-07
15 9.9830E-08 3.2890E-07 -3.7230E-07 9.7000E-08 3.3300E-07 -3.8020E-07 1.0040E-07 3.1140E-07 -3.7530E-07
9.3310E-08 3.4120E-07 -3.9310E-07 -5.8840E-07 -1.9830E-06 2.4370E-06 9.8020E-08 3.1400E-07 -3.9240E-07
1.0020E-07 3.5490E-07 -3.8140E-07 2.4920E-08 6.3650E-08 -7.8340E-08
16 -2.0640E-08 -1.0460E-07 1.0570E-07 -2.0790E-08 -1.0820E-07 1.1060E-07 -1.9920E-08 -9.7030E-08 1.0390E-07
-2.1270E-08 -1.1400E-07 1.1820E-07 -2.2390E-08 -1.0410E-07 9.8020E-08 2.6970E-07 6.4310E-07 -6.4860E-07
-2.2070E-08 -1.1510E-07 1.1200E-07 9.2750E-09 -2.8930E-08 2.4160E-08
17 -1.0600E-07 -3.3150E-07 3.3260E-07 -9.6010E-08 -3.4220E-07 3.5500E-07 -1.0760E-07 -2.7020E-07 3.4090E-07
-8.3480E-08 -3.6710E-07 3.9460E-07 -1.4650E-07 -3.8540E-07 3.1400E-07 6.4310E-07 2.2520E-06 -2.0900E-06
-1.0500E-07 -4.1220E-07 3.5440E-07 -7.9310E-08 -1.6690E-07 1.8920E-07
18 1.0940E-07 3.6130E-07 -3.6650E-07 1.1410E-07 3.5000E-07 -3.4780E-07 1.0960E-07 4.0820E-07 -3.6770E-07
1.1900E-07 3.2560E-07 -3.1420E-07 8.8000E-08 3.3880E-07 -3.9240E-07 -6.4860E-07 -2.0900E-06 2.2810E-06
1.0930E-07 3.0500E-07 -3.4940E-07 -1.8250E-08 -2.0300E-08 7.5370E-08
19 -1.8970E-08 -9.0680E-08 1.0850E-07 -2.1320E-08 -9.2610E-08 1.0950E-07 -1.9470E-08 -1.0060E-07 1.1040E-07
-2.4460E-08 -9.3800E-08 1.0950E-07 -1.1430E-08 -7.5750E-08 1.0020E-07 -2.2070E-08 -1.0500E-07 1.0930E-07
2.6080E-07 5.5810E-07 -6.4720E-07 2.1670E-08 7.9540E-09 -2.5650E-09
20 -9.0190E-08 -2.7260E-07 3.4540E-07 -1.0510E-07 -2.5460E-07 3.1000E-07 -1.0010E-07 -4.1110E-07 3.7830E-07
-1.2210E-07 -2.0970E-07 2.4330E-07 -2.3830E-08 -1.7500E-07 3.5490E-07 -1.1510E-07 -4.1220E-07 3.0500E-07
5.5810E-07 1.8780E-06 -1.9380E-06 7.7760E-08 2.0210E-07 -1.9280E-07
21 1.0750E-07 3.1940E-07 -3.6950E-07 1.1140E-07 3.1260E-07 -3.5750E-07 1.0940E-07 3.5880E-07 -3.7620E-07
1.1540E-07 2.9650E-07 -3.3500E-07 9.0430E-08 2.9760E-07 -3.8140E-07 1.1200E-07 3.5440E-07 -3.4940E-07
-6.4720E-07 -1.9380E-06 2.3120E-06 -1.0010E-08 -3.9050E-08 4.3340E-08
22 2.3770E-08 2.1390E-09 9.6750E-09 1.0330E-08 1.4370E-09 1.0380E-09 1.8410E-08 -7.9090E-08 2.6650E-08
-2.2200E-09 2.3920E-08 -3.4430E-08 6.1680E-08 5.3470E-08 2.4920E-08 9.2750E-09 -7.9310E-08 -1.8250E-08
2.1670E-08 7.7760E-08 -1.0010E-08 2.9480E-06 7.5120E-06 -8.2930E-06
23 8.9020E-09 3.6360E-08 8.6400E-09 -1.9920E-08 2.8120E-08 -2.3310E-09 -1.0120E-08 -1.6820E-07 7.7880E-08
-4.2950E-08 8.6110E-08 -8.8650E-08 8.4950E-08 1.2560E-07 6.3650E-08 -2.8930E-08 -1.6690E-07 -2.0300E-08

7.9540E-09 2.0210E-07 -3.9050E-08 7.5120E-06 2.5190E-05 -2.6580E-05
24 -8.6580E-09 -1.2670E-08 6.1170E-09 2.3440E-08 -7.7910E-09 2.2470E-08 6.5150E-09 2.0320E-07 -5.1560E-08
4.9260E-08 -7.7720E-08 1.2570E-07 -9.2250E-08 -1.0200E-07 -7.8340E-08 2.4160E-08 1.8920E-07 7.5370E-08
-2.5650E-09 -1.9280E-07 4.3340E-08 -8.2930E-06 -2.6580E-05 2.9870E-05

Covariance Matrix for the xyz OPUS Rover Position (meters^2).
0.0000029480 0.0000075120 -0.0000082930
0.0000075120 0.0000251900 -0.0000265800
-0.0000082930 -0.0000265800 0.0000298700

Covariance Matrix for the enu OPUS Position (meters^2).
0.0000006494 -0.0000001032 0.0000001011
-0.0000001032 0.0000008190 0.0000007017
0.0000001011 0.0000007017 0.0000565396

Horizontal network accuracy = 0.00210 meters.
Vertical network accuracy = 0.01474 meters.

Vectors

To	From	X	Y	Z
bil5	0338	-42830.716	36801.299	21284.372
mtei	0338	-93002.883	34435.515	3951.573
wysh	0338	2929.745	-75010.811	-69861.639
p722	0338	-172210.876	37180.479	-18194.715
p052	0338	62677.836	122552.514	128343.651
p033	0338	-45337.643	-129153.461	-137085.420
mtlw	0338	-120007.306	154917.250	104407.664

Covariance matrix of the 7 vectors
1 3.1572E-06 8.0801E-06 -8.9403E-06 2.8937E-06 7.4039E-06 -8.1758E-06 2.8873E-06 7.4803E-06 -8.2021E-06
2.9036E-06 7.3793E-06 -8.1388E-06 2.8500E-06 7.3662E-06 -8.2094E-06 2.8943E-06 7.4764E-06 -8.1567E-06
2.8836E-06 7.3351E-06 -8.1668E-06
2 8.0801E-06 2.7057E-05 -2.8614E-05 7.4331E-06 2.4830E-05 -2.6228E-05 7.4186E-06 2.4997E-05 -2.6285E-05
7.4552E-06 2.4776E-05 -2.6147E-05 7.3367E-06 2.4747E-05 -2.6302E-05 7.4342E-06 2.4989E-05 -2.6186E-05
7.4112E-06 2.4679E-05 -2.6209E-05
3 -8.9403E-06 -2.8614E-05 3.2207E-05 -8.2195E-06 -2.6243E-05 2.9476E-05 -8.2014E-06 -2.6456E-05 2.9549E-
05 -8.2475E-06 -2.6174E-05 2.9372E-05 -8.0971E-06 -2.6137E-05 2.9570E-05 -8.2211E-06 -2.6445E-05 2.9422E-05
-8.1916E-06 -2.6050E-05 2.9451E-05
4 2.8937E-06 7.4331E-06 -8.2195E-06 3.1949E-06 8.1198E-06 -8.9718E-06 2.8993E-06 7.5195E-06 -8.2369E-06
2.9183E-06 7.4014E-06 -8.1629E-06 2.8552E-06 7.3849E-06 -8.2444E-06 2.9076E-06 7.5152E-06 -8.1841E-06
2.8947E-06 7.3491E-06 -8.1950E-06
5 7.4039E-06 2.4830E-05 -2.6243E-05 8.1198E-06 2.7059E-05 -2.8580E-05 7.4168E-06 2.4993E-05 -2.6290E-05
7.4502E-06 2.4794E-05 -2.6167E-05 7.3424E-06 2.4765E-05 -2.6303E-05 7.4313E-06 2.4987E-05 -2.6202E-05
7.4100E-06 2.4705E-05 -2.6221E-05
6 -8.1758E-06 -2.6228E-05 2.9476E-05 -8.9718E-06 -2.8580E-05 3.2128E-05 -8.1903E-06 -2.6420E-05 2.9530E-05
-8.2300E-06 -2.6181E-05 2.9382E-05 -8.1012E-06 -2.6147E-05 2.9546E-05 -8.2076E-06 -2.6412E-05 2.9424E-05
-8.1820E-06 -2.6075E-05 2.9447E-05
7 2.8873E-06 7.4186E-06 -8.2014E-06 2.8993E-06 7.4168E-06 -8.1903E-06 3.1685E-06 8.2138E-06 -8.9770E-06
2.9097E-06 7.3915E-06 -8.1520E-06 2.8532E-06 7.3761E-06 -8.2240E-06 2.9004E-06 7.4938E-06 -8.1717E-06
2.8884E-06 7.3443E-06 -8.1801E-06

8 7.4803E-06 2.4997E-05 -2.6456E-05 7.5195E-06 2.4993E-05 -2.6420E-05 8.2138E-06 2.7757E-05 -2.9042E-05 7.5553E-06 2.4906E-05 -2.6289E-05 7.3619E-06 2.4854E-05 -2.6535E-05 7.5230E-06 2.5255E-05 -2.6355E-05 7.4825E-06 2.4745E-05 -2.6385E-05

9 -8.2021E-06 -2.6285E-05 2.9549E-05 -8.2369E-06 -2.6290E-05 2.9530E-05 -8.9770E-06 -2.9042E-05 3.2342E-05 -8.2665E-06 -2.6220E-05 2.9424E-05 -8.1074E-06 -2.6176E-05 2.9625E-05 -8.2399E-06 -2.6506E-05 2.9478E-05 -8.2067E-06 -2.6087E-05 2.9502E-05

10 2.9036E-06 7.4552E-06 -8.2475E-06 2.9183E-06 7.4502E-06 -8.2300E-06 2.9097E-06 7.5553E-06 -8.2665E-06 3.2385E-06 8.1209E-06 -8.9551E-06 2.8577E-06 7.3964E-06 -8.2739E-06 2.9197E-06 7.5508E-06 -8.2050E-06 2.9041E-06 7.3551E-06 -8.2169E-06

11 7.3793E-06 2.4776E-05 -2.6174E-05 7.4014E-06 2.4794E-05 -2.6181E-05 7.3915E-06 2.4906E-05 -2.6220E-05 8.1209E-06 2.6920E-05 -2.8394E-05 7.3352E-06 2.4734E-05 -2.6225E-05 7.4030E-06 2.4904E-05 -2.6156E-05 7.3863E-06 2.4692E-05 -2.6167E-05

12 -8.1388E-06 -2.6147E-05 2.9372E-05 -8.1629E-06 -2.6167E-05 2.9382E-05 -8.1520E-06 -2.6289E-05 2.9424E-05 -8.9551E-06 -2.8394E-05 3.1882E-05 -8.0908E-06 -2.6101E-05 2.9430E-05 -8.1645E-06 -2.6286E-05 2.9355E-05 -8.1465E-06 -2.6055E-05 2.9366E-05

13 2.8500E-06 7.3367E-06 -8.0971E-06 2.8552E-06 7.3424E-06 -8.1012E-06 2.8532E-06 7.3619E-06 -8.1074E-06 2.8577E-06 7.3352E-06 -8.0908E-06 3.0801E-06 7.9280E-06 -8.8141E-06 2.8547E-06 7.3599E-06 -8.0945E-06 2.8532E-06 7.3255E-06 -8.1003E-06

14 7.3662E-06 2.4747E-05 -2.6137E-05 7.3849E-06 2.4765E-05 -2.6147E-05 7.3761E-06 2.4854E-05 -2.6176E-05 7.3964E-06 2.4734E-05 -2.6101E-05 7.9280E-06 2.6818E-05 -2.8525E-05 7.3834E-06 2.4846E-05 -2.6119E-05 7.3748E-06 2.4687E-05 -2.6141E-05

15 -8.2094E-06 -2.6302E-05 2.9570E-05 -8.2444E-06 -2.6303E-05 2.9546E-05 -8.2240E-06 -2.6535E-05 2.9625E-05 -8.2739E-06 -2.6225E-05 2.9430E-05 -8.8141E-06 -2.8525E-05 3.2464E-05 -8.2441E-06 -2.6519E-05 2.9481E-05 -8.2152E-06 -2.6096E-05 2.9524E-05

16 2.8943E-06 7.4342E-06 -8.2211E-06 2.9076E-06 7.4313E-06 -8.2076E-06 2.9004E-06 7.5230E-06 -8.2399E-06 2.9197E-06 7.4030E-06 -8.1645E-06 2.8547E-06 7.3834E-06 -8.2441E-06 3.1992E-06 8.2633E-06 -8.9475E-06 2.8950E-06 7.3481E-06 -8.1952E-06

17 7.4764E-06 2.4989E-05 -2.6445E-05 7.5152E-06 2.4987E-05 -2.6412E-05 7.4938E-06 2.5255E-05 -2.6506E-05 7.5508E-06 2.4904E-05 -2.6286E-05 7.3599E-06 2.4846E-05 -2.6519E-05 8.2633E-06 2.7776E-05 -2.8839E-05 7.4784E-06 2.4743E-05 -2.6376E-05

18 -8.1567E-06 -2.6186E-05 2.9422E-05 -8.1841E-06 -2.6202E-05 2.9424E-05 -8.1717E-06 -2.6355E-05 2.9478E-05 -8.2050E-06 -2.6156E-05 2.9355E-05 -8.0945E-06 -2.6119E-05 2.9481E-05 -8.9475E-06 -2.8839E-05 3.2000E-05 -8.1629E-06 -2.6062E-05 2.9402E-05

19 2.8836E-06 7.4112E-06 -8.1916E-06 2.8947E-06 7.4100E-06 -8.1820E-06 2.8884E-06 7.4825E-06 -8.2067E-06 2.9041E-06 7.3863E-06 -8.1465E-06 2.8532E-06 7.3748E-06 -8.2152E-06 2.8950E-06 7.4784E-06 -8.1629E-06 3.1655E-06 7.9844E-06 -8.9276E-06

20 7.3351E-06 2.4679E-05 -2.6050E-05 7.3491E-06 2.4705E-05 -2.6075E-05 7.3443E-06 2.4745E-05 -2.6087E-05 7.3551E-06 2.4692E-05 -2.6055E-05 7.3255E-06 2.4687E-05 -2.6096E-05 7.3481E-06 2.4743E-05 -2.6062E-05 7.9844E-06 2.6664E-05 -2.8286E-05

21 -8.1668E-06 -2.6209E-05 2.9451E-05 -8.1950E-06 -2.6221E-05 2.9447E-05 -8.1801E-06 -2.6385E-05 2.9502E-05 -8.2169E-06 -2.6167E-05 2.9366E-05 -8.1003E-06 -2.6141E-05 2.9524E-05 -8.1952E-06 -2.6376E-05 2.9402E-05 -8.9276E-06 -2.8286E-05 3.2095E-05

Correlation matrix of the 7 vectors

1 1.0000E+00 8.7423E-01 -8.8661E-01 9.1110E-01 8.0105E-01 -8.1178E-01 9.1289E-01 7.9906E-01 -8.1169E-01 9.0805E-01 8.0045E-01 -8.1123E-01 9.1392E-01 8.0054E-01 -8.1090E-01 9.1071E-01 7.9838E-01 -8.1150E-01 9.1215E-01 7.9947E-01 -8.1131E-01

2 8.7423E-01 1.0000E+00 -9.6931E-01 7.9946E-01 9.1765E-01 -8.8957E-01 8.0122E-01 9.1213E-01 -8.8856E-01 7.9642E-01 9.1803E-01 -8.9025E-01 8.0367E-01 9.1869E-01 -8.8746E-01 7.9905E-01 9.1154E-01 -8.8991E-01 8.0081E-01 9.1881E-01 -8.8938E-01

3 -8.8661E-01 -9.6931E-01 1.0000E+00 -8.1029E-01 -8.8896E-01 9.1632E-01 -8.1187E-01 -8.8483E-01 9.1555E-01

-8.0756E-01 -8.8892E-01 9.1664E-01 -8.1297E-01 -8.8935E-01 9.1449E-01 -8.0992E-01 -8.8418E-01 9.1648E-01 -8.1129E-01 -8.8896E-01 9.1602E-01

4 9.1110E-01 7.9946E-01 -8.1029E-01 1.0000E+00 8.7329E-01 -8.8553E-01 9.1124E-01 7.9848E-01 -8.1030E-01 9.0724E-01 7.9808E-01 -8.0880E-01 9.1018E-01 7.9782E-01 -8.0952E-01 9.0947E-01 7.9777E-01 -8.0940E-01 9.1023E-01 7.9623E-01 -8.0928E-01

5 8.0105E-01 9.1765E-01 -8.8896E-01 8.7329E-01 1.0000E+00 -9.6931E-01 8.0101E-01 9.1195E-01 -8.8870E-01 7.9587E-01 9.1868E-01 -8.9090E-01 8.0426E-01 9.1934E-01 -8.8746E-01 7.9872E-01 9.1142E-01 -8.9044E-01 8.0066E-01 9.1976E-01 -8.8975E-01

6 -8.1178E-01 -8.8957E-01 9.1632E-01 -8.8553E-01 -9.6931E-01 1.0000E+00 -8.1176E-01 -8.8470E-01 9.1610E-01 -8.0683E-01 -8.9026E-01 9.1805E-01 -8.1437E-01 -8.9077E-01 9.1486E-01 -8.0957E-01 -8.8415E-01 9.1767E-01 -8.1133E-01 -8.9088E-01 9.1701E-01

7 9.1289E-01 8.0122E-01 -8.1187E-01 9.1124E-01 8.0101E-01 -8.1176E-01 1.0000E+00 8.7585E-01 -8.8679E-01 9.0835E-01 8.0033E-01 -8.1109E-01 9.1331E-01 8.0018E-01 -8.1089E-01 9.1099E-01 7.9881E-01 -8.1154E-01 9.1205E-01 7.9903E-01 -8.1117E-01

8 7.9906E-01 9.1213E-01 -8.8483E-01 7.9848E-01 9.1195E-01 -8.8470E-01 8.7585E-01 1.0000E+00 -9.6929E-01 7.9687E-01 9.1113E-01 -8.8371E-01 7.9619E-01 9.1094E-01 -8.8397E-01 7.9833E-01 9.0954E-01 -8.8428E-01 7.9825E-01 9.0957E-01 -8.8400E-01

9 -8.1169E-01 -8.8856E-01 9.1555E-01 -8.1030E-01 -8.8870E-01 9.1610E-01 -8.8679E-01 -9.6929E-01 1.0000E+00 -8.0772E-01 -8.8860E-01 9.1631E-01 -8.1229E-01 -8.8880E-01 9.1426E-01 -8.1007E-01 -8.8436E-01 9.1631E-01 -8.1108E-01 -8.8833E-01 9.1569E-01

10 9.0805E-01 7.9642E-01 -8.0756E-01 9.0724E-01 7.9587E-01 -8.0683E-01 9.0835E-01 7.9687E-01 -8.0772E-01 1.0000E+00 8.6975E-01 -8.8131E-01 9.0481E-01 7.9366E-01 -8.0693E-01 9.0707E-01 7.9613E-01 -8.0599E-01 9.0702E-01 7.9150E-01 -8.0595E-01

11 8.0045E-01 9.1803E-01 -8.8892E-01 7.9808E-01 9.1868E-01 -8.9026E-01 8.0033E-01 9.1113E-01 -8.8860E-01 8.6975E-01 1.0000E+00 -9.6920E-01 8.0555E-01 9.2055E-01 -8.8711E-01 7.9773E-01 9.1074E-01 -8.9118E-01 8.0016E-01 9.2164E-01 -8.9021E-01

12 -8.1123E-01 -8.9025E-01 9.1664E-01 -8.0880E-01 -8.9090E-01 9.1805E-01 -8.1109E-01 -8.8371E-01 9.1631E-01 -8.8131E-01 -9.6920E-01 1.0000E+00 -8.1646E-01 -8.9265E-01 9.1478E-01 -8.0843E-01 -8.8332E-01 9.1903E-01 -8.1093E-01 -8.9364E-01 9.1802E-01

13 9.1392E-01 8.0367E-01 -8.1297E-01 9.1018E-01 8.0426E-01 -8.1437E-01 9.1331E-01 7.9619E-01 -8.1229E-01 9.0481E-01 8.0555E-01 -8.1646E-01 1.0000E+00 8.7230E-01 -8.8144E-01 9.0939E-01 7.9570E-01 -8.1532E-01 9.1376E-01 8.0833E-01 -8.1470E-01

14 8.0054E-01 9.1869E-01 -8.8935E-01 7.9782E-01 9.1934E-01 -8.9077E-01 8.0018E-01 9.1094E-01 -8.8880E-01 7.9366E-01 9.2055E-01 -8.9265E-01 8.7230E-01 1.0000E+00 -9.6674E-01 7.9712E-01 9.1035E-01 -8.9159E-01 8.0043E-01 9.2321E-01 -8.9104E-01

15 -8.1090E-01 -8.8746E-01 9.1449E-01 -8.0952E-01 -8.8746E-01 9.1486E-01 -8.1089E-01 -8.8397E-01 9.1426E-01 -8.0693E-01 -8.8711E-01 9.1478E-01 -8.8144E-01 -9.6674E-01 1.0000E+00 -8.0896E-01 -8.8313E-01 9.1466E-01 -8.1040E-01 -8.8698E-01 9.1464E-01

16 9.1071E-01 7.9905E-01 -8.0992E-01 9.0947E-01 7.9872E-01 -8.0957E-01 9.1099E-01 7.9833E-01 -8.1007E-01 9.0707E-01 7.9773E-01 -8.0843E-01 9.0939E-01 7.9712E-01 -8.0896E-01 1.0000E+00 8.7661E-01 -8.8432E-01 9.0973E-01 7.9560E-01 -8.0876E-01

17 7.9838E-01 9.1154E-01 -8.8418E-01 7.9777E-01 9.1142E-01 -8.8415E-01 7.9881E-01 9.0954E-01 -8.8436E-01 7.9613E-01 9.1074E-01 -8.8332E-01 7.9570E-01 9.1035E-01 -8.8313E-01 8.7661E-01 1.0000E+00 -9.6732E-01 7.9754E-01 9.0918E-01 -8.8339E-01

18 -8.1150E-01 -8.8991E-01 9.1648E-01 -8.0940E-01 -8.9044E-01 9.1767E-01 -8.1154E-01 -8.8428E-01 9.1631E-01 -8.0599E-01 -8.9118E-01 9.1903E-01 -8.1532E-01 -8.9159E-01 9.1466E-01 -8.8432E-01 -9.6732E-01 1.0000E+00 -8.1105E-01 -8.9221E-01 9.1744E-01

19 9.1215E-01 8.0081E-01 -8.1129E-01 9.1023E-01 8.0066E-01 -8.1133E-01 9.1205E-01 7.9825E-01 -8.1108E-01 9.0702E-01 8.0016E-01 -8.1093E-01 9.1376E-01 8.0043E-01 -8.1040E-01 9.0973E-01 7.9754E-01 -8.1105E-01 1.0000E+00 8.6908E-01 -8.8572E-01

20 7.9947E-01 9.1881E-01 -8.8896E-01 7.9623E-01 9.1976E-01 -8.9088E-01 7.9903E-01 9.0957E-01 -8.8833E-01

7.9150E-01 9.2164E-01 -8.9364E-01 8.0833E-01 9.2321E-01 -8.8698E-01 7.9560E-01 9.0918E-01 -8.9221E-01 8.6908E-01 1.0000E+00 -9.6692E-01
21 -8.1131E-01 -8.8938E-01 9.1602E-01 -8.0928E-01 -8.8975E-01 9.1701E-01 -8.1117E-01 -8.8400E-01 9.1569E-01 -8.0595E-01 -8.9021E-01 9.1802E-01 -8.1470E-01 -8.9104E-01 9.1464E-01 -8.0876E-01 -8.8339E-01 9.1744E-01 -8.8572E-01 -9.6692E-01 1.0000E+00

G-FILE for the vectors

Axx2014 8282014 828
B20140828200020140828210 0 7 rsgps 1.37IGS
lant_info.003 NGS
C00080001 -428307155 17 368012987 52 212843723 56
C00080002 -930028826 17 344355153 52 39515734 56
C00080003 29297446 17 -750108114 52 -698616385 56
C00080004-1722108758 17 371804785 51 -181947146 56
C00080005 626778355 17 1225525140 51 1283436512 56
C00080006 -453376426 17-1291534605 52-1370854200 56
C00080007-1200073061 17 1549172497 51 1044076643 56
D 1 2 8742269 1 3 -8866068 1 4 9111037 1 5 8010498 1 6 -8117805
D 1 7 9128924 1 8 7990622 1 9 -8116935 1 10 9080491 1 11 8004495
D 1 12 -8112275 1 13 9139202 1 14 8005408 1 15 -8108974 1 16 9107101
D 1 17 7983832 1 18 -8115009 1 19 9121511 1 20 7994651 1 21 -8113055
D 2 3 -9693095 2 4 7994576 2 5 9176510 2 6 -8895680 2 7 8012227
D 2 8 9121344 2 9 -8885566 2 10 7964219 2 11 9180274 2 12 -8902515
D 2 13 8036654 2 14 9186876 2 15 -8874607 2 16 7990507 2 17 9115368
D 2 18 -8899095 2 19 8008102 2 20 9188051 2 21 -8893762 3 4 -8102914
D 3 5 -8889557 3 6 9163166 3 7 -8118736 3 8 -8848274 3 9 9155481
D 3 10 -8075621 3 11 -8889202 3 12 9166362 3 13 -8129653 3 14 -8893538
D 3 15 9144874 3 16 -8099177 3 17 -8841799 3 18 9164780 3 19 -8112921
D 3 20 -8889564 3 21 9160227 4 5 8732912 4 6 -8855333 4 7 9112411
D 4 8 7984823 4 9 -8103034 4 10 9072436 4 11 7980806 4 12 -8088045
D 4 13 9101773 4 14 7978151 4 15 -8095183 4 16 9094665 4 17 7977688
D 4 18 -8093983 4 19 9102292 4 20 7962316 4 21 -8092791 5 6 -9693133
D 5 7 8010066 5 8 9119467 5 9 -8887040 5 10 7958662 5 11 9186781
D 5 12 -8908972 5 13 8042603 5 14 9193358 5 15 -8874627 5 16 7987173
D 5 17 9114221 5 18 -8904350 5 19 8006556 5 20 9197569 5 21 -8897482
D 6 7 -8117636 6 8 -8846960 6 9 9161026 6 10 -8068315 6 11 -8902575
D 6 12 9180535 6 13 -8143689 6 14 -8907739 6 15 9148559 6 16 -8095739
D 6 17 -8841452 6 18 9176731 6 19 -8113297 6 20 -8908792 6 21 9170085
D 7 8 8758500 7 9 -8867879 7 10 9083548 7 11 8003341 7 12 -8110877
D 7 13 9133105 7 14 8001826 7 15 -8108874 7 16 9109915 7 17 7988128
D 7 18 -8115369 7 19 9120548 7 20 7990271 7 21 -8111712 8 9 -9692907
D 8 10 7968651 8 11 9111264 8 12 -8837081 8 13 7961917 8 14 9109443
D 8 15 -8839713 8 16 7983324 8 17 9095424 8 18 -8842843 8 19 7982538
D 8 20 9095719 8 21 -8840007 9 10 -8077246 9 11 -8885981 9 12 9163099
D 9 13 -8122919 9 14 -8888029 9 15 9142592 9 16 -8100669 9 17 -8843610
D 9 18 9163138 9 19 -8110826 9 20 -8883318 9 21 9156861 10 11 8697518
D 10 12 -8813069 10 13 9048055 10 14 7936572 10 15 -8069287 10 16 9070737
D 10 17 7961298 10 18 -8059864 10 19 9070203 10 20 7915025 10 21 -8059532
D 11 12 -9692038 11 13 8055460 11 14 9205526 11 15 -8871078 11 16 7977288

D 11 17 9107405 11 18 -8911793 11 19 8001553 11 20 9216394 11 21 -8902107
D 12 13 -8164623 12 14 -8926536 12 15 9147755 12 16 -8084326 12 17 -8833246
D 12 18 9190333 12 19 -8109290 12 20 -8936432 12 21 9180224 13 14 8722997
D 13 15 -8814392 13 16 9093919 13 17 7957030 13 18 -8153199 13 19 9137588
D 13 20 8083299 13 21 -8146959 14 15 -9667404 14 16 7971226 14 17 9103530
D 14 18 -8915928 14 19 8004271 14 20 9232110 14 21 -8910366 15 16 -8089561
D 15 17 -8831257 15 18 9146611 15 19 -8103982 15 20 -8869787 15 21 9146387
D 16 17 8766071 16 18 -8843173 16 19 9097259 16 20 7956003 16 21 -8087582
D 17 18 -9673166 17 19 7975435 17 20 9091824 17 21 -8833863 18 19 -8110516
D 18 20 -8922124 18 21 9174399 19 20 8690846 19 21 -8857204 20 21 -9669231

ITRF position of 0338 as determined by individual baselines

	X	Y	Z
bil5	-1329326.176	-4260747.094	4542365.869
mtei	-1329326.174	-4260747.086	4542365.845
wysh	-1329326.180	-4260747.080	4542365.858
p722	-1329326.181	-4260747.089	4542365.853
p052	-1329326.177	-4260747.091	4542365.851
p033	-1329326.174	-4260747.079	4542365.835
mtlw	-1329326.175	-4260747.086	4542365.851

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
bil5	-0.002	-0.016	0.027	0.003	0.008	0.031
mtei	0.001	-0.008	0.003	0.003	-0.003	0.007
wysh	-0.005	-0.002	0.017	-0.004	0.009	0.014
p722	-0.007	-0.011	0.011	-0.003	-0.001	0.017
p052	-0.002	-0.012	0.009	0.001	-0.002	0.016
p033	0.001	-0.000	-0.007	0.001	-0.005	-0.005
mtlw	-0.001	-0.008	0.009	0.002	0.001	0.012

STATE PLANE COORDINATES - International Foot
SPC (2500 MT)

Northing (Y) [feet]	534696.335
Easting (X) [feet]	2523372.736
Convergence [degrees]	1.58913682
Point Scale	0.99965385
Combined Factor	0.99949941

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

dop from interpolation is 0.490
scatter (mean square distance from rover) is 25370.161
average edop for rover is 0.770
average ndop for rover is 1.060
average hdop for rover is 1.310
average vdop for rover is 2.290
average gdop for rover is 3.150

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.