OPUS-RS solution : 018506_14_240_A2.14O OP1409696425591

opus <opus@ngs.noaa.gov>

Tue 9/2/2014 4:29 PM

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

FILE: 018506_14_240_A2.14O OP1409696425591

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: john.freetly@neciusa.com DATE: September 02, 2014
RINEX FILE: 0185240p.14o TIME: 22:29:23 UTC

SOFTWARE: rsgps 1.37 RS91.prl 1.99.2 START: 2014/08/28 15:10:00
EPHEMERIS: igr18074.eph [rapid] STOP: 2014/08/28 16:09:30
NAV FILE: brdc2400.14n OBS USED: 6986 / 7056 : 99%
ANT NAME: CHCX90D-OPUS NONE QUALITY IND. 34.20/ 55.19
ARP HEIGHT: 1.8000 NORMALIZED RMS: 0.238

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.65658)

X:	-1344971.390(m)	0.006(m)	-1344972.250(m)	0.006(m)
Y:	-4277796.195(m)	0.007(m)	-4277794.943(m)	0.007(m)
Z:	4521882.341(m)	0.010(m)	4521882.301(m)	0.010(m)
LAT:	45 25 54.47103	0.005(m)	45 25 54.49172	0.005(m)
E LON:	252 32 47.25254	0.005(m)	252 32 47.19753	0.005(m)
W LON:	107 27 12.74746	0.005(m)	107 27 12.80247	0.005(m)
EL HGT:	1023.706(m)	0.011(m)	1023.020(m)	0.011(m)
ORTHO HGT:	1038.143(m)	0.015(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 13))	STATE PLANE COORDINATES (SPC (2500 MT))
Northing (Y) [meters]	5033847.794	133438.273
Easting (X) [meters]	308082.208	760084.943
Convergence [degrees]	-1.74847239	1.49699339
Point Scale	1.00005287	0.99976826
Combined Factor	0.99989239	0.99960783

US NATIONAL GRID DESIGNATOR: 13TCL0808233847(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI3062	BIL5 BILLINGS 5 CORS ARP	N455816.237	W1075947.298	73371.0
DM7161	WYSH SHERIDAN CORS ARP	N444801.769	W1070035.715	78377.0
DL7728	P051 BILLINGSAPMT2005 CORS ARP	N454823.741	W1083246.070	94864.8
DJ8992	P033 TENSLEEPTRWY2005 CORS ARP	N435710.415	W1072315.121	164454.4
DL7758	P722 YNPBASSRCHMT2005 CORS ARP	N452725.985	W1093415.586	165706.0
DI3425	P052 LRRNCHJRDNMT2006 CORS ARP	N472229.026	W1070107.185	218569.1
DM7133	MTLW LEWISTOWN CORS ARP	N470314.929	W1092633.764	236772.2

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)

bil5	-1372156.895	-4223945.782	4563650.224
wysh	-1326396.425	-4335757.880	4472504.195
p051	-1416839.101	-4223178.949	4551064.082
p033	-1374663.815	-4389900.539	4405280.424
p722	-1501537.051	-4223566.590	4524171.116
p052	-1266648.344	-4138194.578	4670709.508
mtlw	-1449333.486	-4105829.829	4646773.503
0185	-1344972.250	-4277794.943	4521882.301

Covariance matrix of the stations:

1 1.7820E-07 3.5980E-07 -3.1490E-07 -4.2040E-09 -5.9100E-08 5.0100E-08 -6.8960E-09 -6.1760E-08 5.4390E-08 -5.4680E-09 -6.1830E-08 5.1160E-08 -9.6400E-09 -6.5810E-08 5.7630E-08 -2.0590E-09 -5.2040E-08 4.7430E-08 -7.0680E-09 -5.9150E-08 5.4190E-08 2.3590E-08 8.0790E-09 -6.5780E-09

2 3.5980E-07 1.1340E-06 -1.0040E-06 -6.0730E-08 -1.7310E-07 1.7360E-07 -6.0530E-08 -1.6470E-07 1.6730E-07 -6.2570E-08 -1.7680E-07 1.7500E-07 -6.2450E-08 -1.6540E-07 1.6710E-07 -5.5530E-08 -1.5670E-07 1.6250E-07 -5.8090E-08 -1.5430E-07 1.5890E-07 6.0030E-09 4.3850E-08 -1.7980E-08

3 -3.1490E-07 -1.0040E-06 1.0560E-06 5.1710E-08 1.6320E-07 -1.5060E-07 5.2210E-08 1.6710E-07 -1.5140E-07 5.0680E-08 1.6030E-07 -1.4970E-07 5.1640E-08 1.6670E-07 -1.5120E-07 5.4870E-08 1.7380E-07 -1.5580E-07 5.3970E-08 1.7320E-07 -1.5460E-07 -3.8010E-09 -2.1030E-08 3.7740E-08

4 -4.2040E-09 -6.0730E-08 5.1710E-08 1.7180E-07 3.5560E-07 -3.0170E-07 -6.8000E-09 -6.2620E-08 5.2740E-08 -3.3360E-09 -6.5130E-08 4.2280E-08 -1.1540E-08 -6.5590E-08 5.3850E-08 2.8620E-09 -4.9110E-08 4.9240E-08 -6.2690E-09 -5.2180E-08 5.1590E-08 2.3270E-08 -1.9640E-10 -4.0960E-09

5 -5.9100E-08 -1.7310E-07 1.6320E-07 3.5560E-07 1.2230E-06 -1.0170E-06 -5.6380E-08 -1.7580E-07 1.6720E-07 -6.1180E-08 -1.6700E-07 1.8920E-07 -5.1820E-08 -1.8150E-07 1.7600E-07 -6.9170E-08 -1.8380E-07 1.5270E-07 -5.9110E-08 -1.9940E-07 1.6900E-07 -8.0170E-09 3.5170E-09 1.7950E-08

6 5.0100E-08 1.7360E-07 -1.5060E-07 -3.0170E-07 -1.0170E-06 1.0250E-06 5.2740E-08 1.7250E-07 -1.4840E-07 4.6080E-08 1.7120E-07 -1.2820E-07 5.7160E-08 1.6950E-07 -1.4290E-07 4.3410E-08 1.7000E-07 -1.6180E-07

5.2870E-08 1.5970E-07 -1.4970E-07 -2.8110E-09 7.4810E-09 2.2030E-08
7 -6.8960E-09 -6.0530E-08 5.2210E-08 -6.8000E-09 -5.6380E-08 5.2740E-08 1.8760E-07 3.7190E-07 -3.2510E-07 -7.1560E-09 -5.9100E-08 5.7710E-08 -7.8980E-09 -6.8510E-08 6.0700E-08 -7.4620E-09 -5.7990E-08 4.5050E-08 -8.4510E-09 -6.9580E-08 5.6860E-08 1.6780E-08 -3.6580E-09 5.9810E-09
8 -6.1760E-08 -1.6470E-07 1.6710E-07 -6.2620E-08 -1.7580E-07 1.7250E-07 3.7190E-07 1.1330E-06 -9.9740E-07 -6.4840E-08 -1.7930E-07 1.7210E-07 -6.5960E-08 -1.6470E-07 1.6500E-07 -5.6120E-08 -1.5530E-07 1.6360E-07 -6.0250E-08 -1.5030E-07 1.5710E-07 -4.2150E-09 1.5910E-08 6.2450E-09
9 5.4390E-08 1.6730E-07 -1.5140E-07 5.2740E-08 1.6720E-07 -1.4840E-07 -3.2510E-07 -9.9740E-07 1.0430E-06 5.2520E-08 1.6430E-07 -1.4370E-07 5.6250E-08 1.6470E-07 -1.4750E-07 5.3190E-08 1.6970E-07 -1.5820E-07 5.5750E-08 1.6430E-07 -1.5150E-07 4.6970E-09 5.0770E-09 1.2910E-08
10 -5.4680E-09 -6.2570E-08 5.0680E-08 -3.3360E-09 -6.1180E-08 4.6080E-08 -7.1560E-09 -6.4840E-08 5.2520E-08 1.7820E-07 3.7420E-07 -3.0530E-07 -1.0330E-08 -6.8740E-08 5.5500E-08 -1.6390E-09 -5.5120E-08 4.6860E-08 -7.7080E-09 -6.1840E-08 5.3390E-08 2.0610E-08 -3.1890E-09 -1.6580E-09
11 -6.1830E-08 -1.7680E-07 1.6030E-07 -6.5130E-08 -1.6700E-07 1.7120E-07 -5.9100E-08 -1.7930E-07 1.6430E-07 3.7420E-07 1.2430E-06 -9.8690E-07 -5.4480E-08 -1.8480E-07 1.7280E-07 -7.2230E-08 -1.8870E-07 1.5120E-07 -6.2330E-08 -2.0410E-07 1.6750E-07 -1.0630E-08 5.6680E-11 1.4840E-08
12 5.1160E-08 1.7500E-07 -1.4970E-07 4.2280E-08 1.8920E-07 -1.2820E-07 5.7710E-08 1.7210E-07 -1.4370E-07 -3.0530E-07 -9.8690E-07 1.0030E-06 6.8800E-08 1.6440E-07 -1.2950E-07 3.1180E-08 1.5600E-07 -1.6960E-07 5.4290E-08 1.2950E-07 -1.3930E-07 -8.0020E-09 3.7800E-09 3.8480E-08
13 -9.6400E-09 -6.2450E-08 5.1640E-08 -1.1540E-08 -5.1820E-08 5.7160E-08 -7.8980E-09 -6.5960E-08 5.6250E-08 -1.0330E-08 -5.4480E-08 6.8800E-08 2.1070E-07 3.9000E-07 -3.3570E-07 -1.7030E-08 -6.8330E-08 4.0920E-08 -1.1100E-08 -8.7530E-08 6.1310E-08 1.0860E-08 -8.4320E-09 1.3380E-08
14 -6.5810E-08 -1.6540E-07 1.6670E-07 -6.5590E-08 -1.8150E-07 1.6950E-07 -6.8510E-08 -1.6470E-07 1.6470E-07 -6.8740E-08 -1.8480E-07 1.6440E-07 3.9000E-07 1.1300E-06 -9.8420E-07 -5.5880E-08 -1.5120E-07 1.6620E-07 -6.4090E-08 -1.3970E-07 1.5270E-07 -6.3450E-09 1.6350E-08 1.2130E-09
15 5.7630E-08 1.6710E-07 -1.5120E-07 5.3850E-08 1.7600E-07 -1.4290E-07 6.0700E-08 1.6500E-07 -1.4750E-07 5.5500E-08 1.7280E-07 -1.2950E-07 -3.3570E-07 -9.8420E-07 1.0220E-06 4.8150E-08 1.5990E-07 -1.6330E-07 5.8760E-08 1.4360E-07 -1.4430E-07 4.2440E-09 2.3160E-09 2.2170E-08
16 -2.0590E-09 -5.5530E-08 5.4870E-08 2.8620E-09 -6.9170E-08 4.3410E-08 -7.4620E-09 -5.6120E-08 5.3190E-08 -1.6390E-09 -7.2230E-08 3.1180E-08 -1.7030E-08 -5.5880E-08 4.8150E-08 1.7160E-07 3.3180E-07 -2.7670E-07 -3.4900E-09 -2.2170E-08 4.5610E-08 2.9540E-08 7.7020E-09 -1.1050E-08
17 -5.2040E-08 -1.5670E-07 1.7380E-07 -4.9110E-08 -1.8380E-07 1.7000E-07 -5.7990E-08 -1.5530E-07 1.6970E-07 -5.5120E-08 -1.8870E-07 1.5600E-07 -6.8330E-08 -1.5120E-07 1.5990E-07 3.3180E-07 1.0850E-06 -9.8070E-07 -5.0110E-08 -1.0550E-07 1.5110E-07 1.1800E-08 2.8200E-08 -2.6150E-09
18 4.7430E-08 1.6250E-07 -1.5580E-07 4.9240E-08 1.5270E-07 -1.6180E-07 4.5050E-08 1.6360E-07 -1.5820E-07 4.6860E-08 1.5120E-07 -1.6960E-07 4.0920E-08 1.6620E-07 -1.6330E-07 -2.7670E-07 -9.8070E-07 1.1140E-06 4.8400E-08 1.8490E-07 -1.6310E-07 3.2270E-09 5.4310E-09 -5.1560E-09
19 -7.0680E-09 -5.8090E-08 5.3970E-08 -6.2690E-09 -5.9110E-08 5.2870E-08 -8.4510E-09 -6.0250E-08 5.5750E-08 -7.7080E-09 -6.2330E-08 5.4290E-08 -1.1100E-08 -6.4090E-08 5.8760E-08 -3.4900E-09 -5.0110E-08 4.8400E-08 1.8730E-07 3.5380E-07 -3.2370E-07 1.8050E-08 -9.0130E-10 4.3920E-09
20 -5.9150E-08 -1.5430E-07 1.7320E-07 -5.2180E-08 -1.9940E-07 1.5970E-07 -6.9580E-08 -1.5030E-07 1.6430E-07 -6.1840E-08 -2.0410E-07 1.2950E-07 -8.7530E-08 -1.3970E-07 1.4360E-07 -2.2170E-08 -1.0550E-07 1.8490E-07 3.5380E-07 1.0970E-06 -9.5560E-07 1.1640E-08 3.4970E-08 -1.9980E-08
21 5.4190E-08 1.5890E-07 -1.5460E-07 5.1590E-08 1.6900E-07 -1.4970E-07 5.6860E-08 1.5710E-07 -1.5150E-07 5.3390E-08 1.6750E-07 -1.3930E-07 6.1310E-08 1.5270E-07 -1.4430E-07 4.5610E-08 1.5110E-07 -1.6310E-07 -3.2370E-07 -9.5560E-07 1.0450E-06 2.2390E-09 -3.0410E-09 1.4860E-08
22 2.3590E-08 6.0030E-09 -3.8010E-09 2.3270E-08 -8.0170E-09 -2.8110E-09 1.6780E-08 -4.2150E-09 4.6970E-09 2.0610E-08 -1.0630E-08 -8.0020E-09 1.0860E-08 -6.3450E-09 4.2440E-09 2.9540E-08 1.1800E-08 3.2270E-09 1.8050E-08 1.1640E-08 2.2390E-09 1.7480E-06 4.1060E-06 -3.5250E-06
23 8.0790E-09 4.3850E-08 -2.1030E-08 -1.9640E-10 3.5170E-09 7.4810E-09 -3.6580E-09 1.5910E-08 5.0770E-09 -3.1890E-09 5.6680E-11 3.7800E-09 -8.4320E-09 1.6350E-08 2.3160E-09 7.7020E-09 2.8200E-08 5.4310E-09

-9.0130E-10 3.4970E-08 -3.0410E-09 4.1060E-06 1.3170E-05 -1.1620E-05
24 -6.5780E-09 -1.7980E-08 3.7740E-08 -4.0960E-09 1.7950E-08 2.2030E-08 5.9810E-09 6.2450E-09 1.2910E-08
-1.6580E-09 1.4840E-08 3.8480E-08 1.3380E-08 1.2130E-09 2.2170E-08 -1.1050E-08 -2.6150E-09 -5.1560E-09
4.3920E-09 -1.9980E-08 1.4860E-08 -3.5250E-06 -1.1620E-05 1.1630E-05

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

0.0000017480	0.0000041060	-0.0000035250
0.0000041060	0.0000131700	-0.0000116200
-0.0000035250	-0.0000116200	0.0000116300

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

0.0000004259	0.0000001567	0.0000000172
0.0000001567	0.0000009312	-0.0000015325
0.0000000172	-0.0000015325	0.0000251910

Horizontal network accuracy = 0.00207 meters.
Vertical network accuracy = 0.00984 meters.

Vectors

To	From	X	Y	Z
bil5	0185	-27184.645	53849.160	41767.923
wysh	0185	18575.825	-57962.937	-49378.106
p051	0185	-71866.851	54615.994	29181.781
p033	0185	-29691.565	-112105.596	-116601.877
p722	0185	-156564.801	54228.353	2288.816
p052	0185	78323.906	139600.365	148827.208
mtlw	0185	-104361.236	171965.113	124891.202

Covariance matrix of the 7 vectors

1 1.8790E-06 4.4517E-06 -3.8295E-06 1.6969E-06 4.0468E-06 -3.4655E-06 1.7007E-06 4.0404E-06 -3.4687E-06
1.6983E-06 4.0467E-06 -3.4593E-06 1.7039E-06 4.0385E-06 -3.4650E-06 1.6928E-06 4.0341E-06 -3.4742E-06
1.6993E-06 4.0271E-06 -3.4665E-06

2 4.4517E-06 1.4216E-05 -1.2585E-05 4.0395E-06 1.2950E-05 -1.1436E-05 4.0431E-06 1.2946E-05 -1.1440E-05
4.0406E-06 1.2949E-05 -1.1431E-05 4.0460E-06 1.2944E-05 -1.1437E-05 4.0368E-06 1.2941E-05 -1.1445E-05
4.0428E-06 1.2937E-05 -1.1440E-05

3 -3.8295E-06 -1.2585E-05 1.2611E-05 -3.4654E-06 -1.1454E-05 1.1420E-05 -3.4750E-06 -1.1438E-05 1.1428E-05
-3.4689E-06 -1.1454E-05 1.1404E-05 -3.4829E-06 -1.1433E-05 1.1419E-05 -3.4553E-06 -1.1423E-05 1.1442E-05
-3.4716E-06 -1.1406E-05 1.1423E-05

4 1.6969E-06 4.0395E-06 -3.4654E-06 1.8733E-06 4.4698E-06 -3.8198E-06 1.7012E-06 4.0478E-06 -3.4729E-06
1.7008E-06 4.0517E-06 -3.4706E-06 1.7023E-06 4.0470E-06 -3.4713E-06 1.6981E-06 4.0453E-06 -3.4749E-06
1.7004E-06 4.0424E-06 -3.4716E-06

5 4.0468E-06 1.2950E-05 -1.1454E-05 4.4698E-06 1.4386E-05 -1.2662E-05 4.0613E-06 1.2975E-05 -1.1476E-05
4.0560E-06 1.2999E-05 -1.1453E-05 4.0706E-06 1.2969E-05 -1.1464E-05 4.0371E-06 1.2954E-05 -1.1491E-05
4.0558E-06 1.2932E-05 -1.1466E-05

6 -3.4655E-06 -1.1436E-05 1.1420E-05 -3.8198E-06 -1.2662E-05 1.2611E-05 -3.4754E-06 -1.1461E-05 1.1447E-05
-3.4745E-06 -1.1471E-05 1.1441E-05 -3.4784E-06 -1.1459E-05 1.1443E-05 -3.4677E-06 -1.1455E-05 1.1451E-05
-3.4737E-06 -1.1448E-05 1.1443E-05

7 1.7007E-06 4.0431E-06 -3.4750E-06 1.7012E-06 4.0613E-06 -3.4754E-06 1.9020E-06 4.4858E-06 -3.8608E-06
1.7035E-06 4.0612E-06 -3.4653E-06 1.7125E-06 4.0475E-06 -3.4745E-06 1.6942E-06 4.0399E-06 -3.4892E-06
1.7047E-06 4.0284E-06 -3.4764E-06

8 4.0404E-06 1.2946E-05 -1.1438E-05 4.0478E-06 1.2975E-05 -1.1461E-05 4.4858E-06 1.4271E-05 -1.2629E-05 4.0486E-06 1.2975E-05 -1.1458E-05 4.0527E-06 1.2973E-05 -1.1464E-05 4.0464E-06 1.2971E-05 -1.1468E-05 4.0509E-06 1.2969E-05 -1.1466E-05

9 -3.4687E-06 -1.1440E-05 1.1428E-05 -3.4729E-06 -1.1476E-05 1.1447E-05 -3.8608E-06 -1.2629E-05 1.2647E-05 -3.4755E-06 -1.1476E-05 1.1435E-05 -3.4868E-06 -1.1462E-05 1.1447E-05 -3.4655E-06 -1.1453E-05 1.1464E-05 -3.4783E-06 -1.1441E-05 1.1451E-05

10 1.6983E-06 4.0406E-06 -3.4689E-06 1.7008E-06 4.0560E-06 -3.4745E-06 1.7035E-06 4.0486E-06 -3.4755E-06 1.8850E-06 4.4940E-06 -3.8206E-06 1.7062E-06 4.0468E-06 -3.4721E-06 1.6962E-06 4.0423E-06 -3.4797E-06 1.7016E-06 4.0357E-06 -3.4722E-06

11 4.0467E-06 1.2949E-05 -1.1454E-05 4.0517E-06 1.2999E-05 -1.1471E-05 4.0612E-06 1.2975E-05 -1.1476E-05 4.4940E-06 1.4413E-05 -1.2626E-05 4.0706E-06 1.2969E-05 -1.1464E-05 4.0367E-06 1.2953E-05 -1.1489E-05 4.0552E-06 1.2931E-05 -1.1464E-05

12 -3.4593E-06 -1.1431E-05 1.1404E-05 -3.4706E-06 -1.1453E-05 1.1441E-05 -3.4653E-06 -1.1458E-05 1.1435E-05 -3.8206E-06 -1.2626E-05 1.2556E-05 -3.4616E-06 -1.1461E-05 1.1440E-05 -3.4748E-06 -1.1465E-05 1.1427E-05 -3.4671E-06 -1.1474E-05 1.1437E-05

13 1.7039E-06 4.0460E-06 -3.4829E-06 1.7023E-06 4.0706E-06 -3.4784E-06 1.7125E-06 4.0527E-06 -3.4868E-06 1.7062E-06 4.0706E-06 -3.4616E-06 1.9370E-06 4.5108E-06 -3.8783E-06 1.6906E-06 4.0343E-06 -3.5007E-06 1.7080E-06 4.0153E-06 -3.4793E-06

14 4.0385E-06 1.2944E-05 -1.1433E-05 4.0470E-06 1.2969E-05 -1.1459E-05 4.0475E-06 1.2973E-05 -1.1462E-05 4.0468E-06 1.2969E-05 -1.1461E-05 4.5108E-06 1.4267E-05 -1.2608E-05 4.0488E-06 1.2974E-05 -1.1460E-05 4.0492E-06 1.2979E-05 -1.1465E-05

15 -3.4650E-06 -1.1437E-05 1.1419E-05 -3.4713E-06 -1.1464E-05 1.1443E-05 -3.4745E-06 -1.1464E-05 1.1447E-05 -3.4721E-06 -1.1464E-05 1.1440E-05 -3.8783E-06 -1.2608E-05 1.2608E-05 -3.4700E-06 -1.1460E-05 1.1450E-05 -3.4749E-06 -1.1459E-05 1.1449E-05

16 1.6928E-06 4.0368E-06 -3.4553E-06 1.6981E-06 4.0371E-06 -3.4677E-06 1.6942E-06 4.0464E-06 -3.4655E-06 1.6962E-06 4.0367E-06 -3.4748E-06 1.6906E-06 4.0488E-06 -3.4700E-06 1.8605E-06 4.4183E-06 -3.7939E-06 1.6969E-06 4.0645E-06 -3.4706E-06

17 4.0341E-06 1.2941E-05 -1.1423E-05 4.0453E-06 1.2954E-05 -1.1455E-05 4.0399E-06 1.2971E-05 -1.1453E-05 4.0423E-06 1.2953E-05 -1.1465E-05 4.0343E-06 1.2974E-05 -1.1460E-05 4.4183E-06 1.4199E-05 -1.2604E-05 4.0450E-06 1.3001E-05 -1.1463E-05

18 -3.4742E-06 -1.1445E-05 1.1442E-05 -3.4749E-06 -1.1491E-05 1.1451E-05 -3.4892E-06 -1.1468E-05 1.1464E-05 -3.4797E-06 -1.1489E-05 1.1427E-05 -3.5007E-06 -1.1460E-05 1.1450E-05 -3.7939E-06 -1.2604E-05 1.2754E-05 -3.4842E-06 -1.1421E-05 1.1457E-05

19 1.6993E-06 4.0428E-06 -3.4716E-06 1.7004E-06 4.0558E-06 -3.4737E-06 1.7047E-06 4.0509E-06 -3.4783E-06 1.7016E-06 4.0552E-06 -3.4671E-06 1.7080E-06 4.0492E-06 -3.4749E-06 1.6969E-06 4.0450E-06 -3.4842E-06 1.8992E-06 4.4491E-06 -3.8553E-06

20 4.0271E-06 1.2937E-05 -1.1406E-05 4.0424E-06 1.2932E-05 -1.1448E-05 4.0284E-06 1.2969E-05 -1.1441E-05 4.0357E-06 1.2931E-05 -1.1474E-05 4.0153E-06 1.2979E-05 -1.1459E-05 4.0645E-06 1.3001E-05 -1.1421E-05 4.4491E-06 1.4197E-05 -1.2553E-05

21 -3.4665E-06 -1.1440E-05 1.1423E-05 -3.4716E-06 -1.1466E-05 1.1443E-05 -3.4764E-06 -1.1466E-05 1.1451E-05 -3.4722E-06 -1.1464E-05 1.1437E-05 -3.4793E-06 -1.1465E-05 1.1449E-05 -3.4706E-06 -1.1463E-05 1.1457E-05 -3.8553E-06 -1.2553E-05 1.2645E-05

Correlation matrix of the 7 vectors

1 1.0000E+00 8.6133E-01 -7.8671E-01 9.0448E-01 7.7836E-01 -7.1191E-01 8.9962E-01 7.8024E-01 -7.1155E-01 9.0241E-01 7.7761E-01 -7.1218E-01 8.9314E-01 7.7997E-01 -7.1191E-01 9.0537E-01 7.8101E-01 -7.0968E-01 8.9953E-01 7.7971E-01 -7.1114E-01

2 8.6133E-01 1.0000E+00 -9.3992E-01 7.8276E-01 9.0551E-01 -8.5409E-01 7.7752E-01 9.0886E-01 -8.5316E-01 7.8055E-01 9.0464E-01 -8.5557E-01 7.7102E-01 9.0890E-01 -8.5430E-01 7.8492E-01 9.1088E-01 -8.4995E-01 7.7804E-01 9.1062E-01 -8.5324E-01

3 -7.8671E-01 -9.3992E-01 1.0000E+00 -7.1300E-01 -8.5038E-01 9.0555E-01 -7.0954E-01 -8.5262E-01 9.0491E-01

-7.1149E-01 -8.4957E-01 9.0629E-01 -7.0472E-01 -8.5240E-01 9.0561E-01 -7.1334E-01 -8.5364E-01 9.0218E-01 -7.0938E-01 -8.5243E-01 9.0457E-01

4 9.0448E-01 7.8276E-01 -7.1300E-01 1.0000E+00 8.6104E-01 -7.8590E-01 9.0123E-01 7.8287E-01 -7.1350E-01 9.0510E-01 7.7976E-01 -7.1562E-01 8.9368E-01 7.8281E-01 -7.1429E-01 9.0957E-01 7.8438E-01 -7.1091E-01 9.0151E-01 7.8386E-01 -7.1328E-01

5 7.7836E-01 9.0551E-01 -8.5038E-01 8.6104E-01 1.0000E+00 -9.4010E-01 7.7640E-01 9.0552E-01 -8.5078E-01 7.7889E-01 9.0277E-01 -8.5213E-01 7.7113E-01 9.0522E-01 -8.5125E-01 7.8035E-01 9.0642E-01 -8.4830E-01 7.7593E-01 9.0490E-01 -8.5011E-01

6 -7.1191E-01 -8.5409E-01 9.0555E-01 -7.8590E-01 -9.4010E-01 1.0000E+00 -7.0962E-01 -8.5433E-01 9.0638E-01 -7.1262E-01 -8.5086E-01 9.0923E-01 -7.0379E-01 -8.5430E-01 9.0750E-01 -7.1590E-01 -8.5604E-01 9.0293E-01 -7.0980E-01 -8.5556E-01 9.0619E-01

7 8.9962E-01 7.7752E-01 -7.0954E-01 9.0123E-01 7.7640E-01 -7.0962E-01 1.0000E+00 8.6099E-01 -7.8717E-01 8.9964E-01 7.7565E-01 -7.0909E-01 8.9217E-01 7.7697E-01 -7.0953E-01 9.0062E-01 7.7738E-01 -7.0841E-01 8.9693E-01 7.7522E-01 -7.0884E-01

8 7.8024E-01 9.0886E-01 -8.5262E-01 7.8287E-01 9.0552E-01 -8.5433E-01 8.6099E-01 1.0000E+00 -9.4001E-01 7.8058E-01 9.0468E-01 -8.5595E-01 7.7082E-01 9.0916E-01 -8.5462E-01 7.8527E-01 9.1119E-01 -8.5003E-01 7.7809E-01 9.1111E-01 -8.5354E-01

9 -7.1155E-01 -8.5316E-01 9.0491E-01 -7.1350E-01 -8.5078E-01 9.0638E-01 -7.8717E-01 -9.4001E-01 1.0000E+00 -7.1182E-01 -8.4997E-01 9.0742E-01 -7.0448E-01 -8.5325E-01 9.0655E-01 -7.1441E-01 -8.5465E-01 9.0264E-01 -7.0972E-01 -8.5381E-01 9.0547E-01

10 9.0241E-01 7.8055E-01 -7.1149E-01 9.0510E-01 7.7889E-01 -7.1262E-01 8.9964E-01 7.8058E-01 -7.1182E-01 1.0000E+00 8.6220E-01 -7.8534E-01 8.9292E-01 7.8035E-01 -7.1223E-01 9.0575E-01 7.8136E-01 -7.0968E-01 8.9935E-01 7.8013E-01 -7.1119E-01

11 7.7761E-01 9.0464E-01 -8.4957E-01 7.7976E-01 9.0277E-01 -8.5086E-01 7.7565E-01 9.0468E-01 -8.4997E-01 8.6220E-01 1.0000E+00 -9.3853E-01 7.7040E-01 9.0438E-01 -8.5047E-01 7.7953E-01 9.0547E-01 -8.4739E-01 7.7509E-01 9.0397E-01 -8.4920E-01

12 -7.1218E-01 -8.5557E-01 9.0629E-01 -7.1562E-01 -8.5213E-01 9.0923E-01 -7.0909E-01 -8.5595E-01 9.0742E-01 -7.8534E-01 -9.3853E-01 1.0000E+00 -7.0192E-01 -8.5627E-01 9.0924E-01 -7.1892E-01 -8.5868E-01 9.0298E-01 -7.0999E-01 -8.5941E-01 9.0769E-01

13 8.9314E-01 7.7102E-01 -7.0472E-01 8.9368E-01 7.7113E-01 -7.0379E-01 8.9217E-01 7.7082E-01 -7.0448E-01 8.9292E-01 7.7040E-01 -7.0192E-01 1.0000E+00 8.5806E-01 -7.8481E-01 8.9054E-01 7.6928E-01 -7.0431E-01 8.9051E-01 7.6569E-01 -7.0302E-01

14 7.7997E-01 9.0890E-01 -8.5240E-01 7.8281E-01 9.0522E-01 -8.5430E-01 7.7697E-01 9.0916E-01 -8.5325E-01 7.8035E-01 9.0438E-01 -8.5627E-01 8.5806E-01 1.0000E+00 -9.4005E-01 7.8584E-01 9.1157E-01 -8.4958E-01 7.7787E-01 9.1195E-01 -8.5360E-01

15 -7.1191E-01 -8.5430E-01 9.0561E-01 -7.1429E-01 -8.5125E-01 9.0750E-01 -7.0953E-01 -8.5462E-01 9.0655E-01 -7.1223E-01 -8.5047E-01 9.0924E-01 -7.8481E-01 -9.4005E-01 1.0000E+00 -7.1647E-01 -8.5652E-01 9.0292E-01 -7.1013E-01 -8.5649E-01 9.0672E-01

16 9.0537E-01 7.8492E-01 -7.1334E-01 9.0957E-01 7.8035E-01 -7.1590E-01 9.0062E-01 7.8527E-01 -7.1441E-01 9.0575E-01 7.7953E-01 -7.1892E-01 8.9054E-01 7.8584E-01 -7.1647E-01 1.0000E+00 8.5964E-01 -7.7882E-01 9.0273E-01 7.9084E-01 -7.1552E-01

17 7.8101E-01 9.1088E-01 -8.5364E-01 7.8438E-01 9.0642E-01 -8.5604E-01 7.7738E-01 9.1119E-01 -8.5465E-01 7.8136E-01 9.0547E-01 -8.5868E-01 7.6928E-01 9.1157E-01 -8.5652E-01 8.5964E-01 1.0000E+00 -9.3657E-01 7.7895E-01 9.1573E-01 -8.5550E-01

18 -7.0968E-01 -8.4995E-01 9.0218E-01 -7.1091E-01 -8.4830E-01 9.0293E-01 -7.0841E-01 -8.5003E-01 9.0264E-01 -7.0968E-01 -8.4739E-01 9.0298E-01 -7.0431E-01 -8.4958E-01 9.0292E-01 -7.7882E-01 -9.3657E-01 1.0000E+00 -7.0793E-01 -8.4871E-01 9.0216E-01

19 8.9953E-01 7.7804E-01 -7.0938E-01 9.0151E-01 7.7593E-01 -7.0980E-01 8.9693E-01 7.7809E-01 -7.0972E-01 8.9935E-01 7.7509E-01 -7.0999E-01 8.9051E-01 7.7787E-01 -7.1013E-01 9.0273E-01 7.7895E-01 -7.0793E-01 1.0000E+00 8.5681E-01 -7.8671E-01

20 7.7971E-01 9.1062E-01 -8.5243E-01 7.8386E-01 9.0490E-01 -8.5556E-01 7.7522E-01 9.1111E-01 -8.5381E-01

7.8013E-01 9.0397E-01 -8.5941E-01 7.6569E-01 9.1195E-01 -8.5649E-01 7.9084E-01 9.1573E-01 -8.4871E-01 8.5681E-01 1.0000E+00 -9.3685E-01
21 -7.1114E-01 -8.5324E-01 9.0457E-01 -7.1328E-01 -8.5011E-01 9.0619E-01 -7.0884E-01 -8.5354E-01 9.0547E-01 -7.1119E-01 -8.4920E-01 9.0769E-01 -7.0302E-01 -8.5360E-01 9.0672E-01 -7.1552E-01 -8.5550E-01 9.0216E-01 -7.8671E-01 -9.3685E-01 1.0000E+00

G-FILE for the vectors

Axx2014 8282014 828
B20140828150020140828160 0 7 rsgps 1.37IGS
lant_info.003 NGS
C00080001 -271846450 13 538491604 37 417679232 35
C00080002 185758251 13 -579629372 37 -493781057 35
C00080003 -718668512 13 546159941 37 291817811 35
C00080004 -296915649 13-1121055959 37-1166018771 35
C00080005-1565648012 13 542283526 37 22888156 35
C00080006 783239057 13 1396003646 37 1488272075 35
C00080007-1043612358 13 1719651134 37 1248912018 35
D 1 2 8613281 1 3 -7867056 1 4 9044836 1 5 7783601 1 6 -7119145
D 1 7 8996236 1 8 7802362 1 9 -7115539 1 10 9024092 1 11 7776104
D 1 12 -7121822 1 13 8931376 1 14 7799715 1 15 -7119095 1 16 9053689
D 1 17 7810092 1 18 -7096806 1 19 8995327 1 20 7797059 1 21 -7111441
D 2 3 -9399247 2 4 7827649 2 5 9055059 2 6 -8540894 2 7 7775244
D 2 8 9088598 2 9 -8531554 2 10 7805503 2 11 9046431 2 12 -8555728
D 2 13 7710237 2 14 9089034 2 15 -8543002 2 16 7849156 2 17 9108779
D 2 18 -8499475 2 19 7780446 2 20 9106197 2 21 -8532405 3 4 -7129957
D 3 5 -8503751 3 6 9055486 3 7 -7095364 3 8 -8526249 3 9 9049091
D 3 10 -7114870 3 11 -8495650 3 12 9062904 3 13 -7047203 3 14 -8523955
D 3 15 9056077 3 16 -7133447 3 17 -8536385 3 18 9021782 3 19 -7093824
D 3 20 -8524318 3 21 9045693 4 5 8610350 4 6 -7858996 4 7 9012260
D 4 8 7828690 4 9 -7134959 4 10 9051004 4 11 7797625 4 12 -7156191
D 4 13 8936802 4 14 7828130 4 15 -7142917 4 16 9095671 4 17 7843817
D 4 18 -7109083 4 19 9015078 4 20 7838600 4 21 -7132808 5 6 -9400995
D 5 7 7763994 5 8 9055247 5 9 -8507806 5 10 7788930 5 11 9027742
D 5 12 -8521294 5 13 7711332 5 14 9052192 5 15 -8512546 5 16 7803468
D 5 17 9064165 5 18 -8482966 5 19 7759300 5 20 9049003 5 21 -8501092
D 6 7 -7096186 6 8 -8543334 6 9 9063755 6 10 -7126217 6 11 -8508571
D 6 12 9092324 6 13 -7037920 6 14 -8542981 6 15 9074968 6 16 -7159031
D 6 17 -8560389 6 18 9029288 6 19 -7097977 6 20 -8555573 6 21 9061863
D 7 8 8609888 7 9 -7871693 7 10 8996368 7 11 7756535 7 12 -7090890
D 7 13 8921719 7 14 7769720 7 15 -7095260 7 16 9006214 7 17 7773821
D 7 18 -7084061 7 19 8969280 7 20 7752247 7 21 -7088440 8 9 -9400102
D 8 10 7805804 8 11 9046758 8 12 -8559525 8 13 7708157 8 14 9091612
D 8 15 -8546186 8 16 7852735 8 17 9111859 8 18 -8500257 8 19 7780949
D 8 20 9111110 8 21 -8535357 9 10 -7118187 9 11 -8499702 9 12 9074225
D 9 13 -7044837 9 14 -8532516 9 15 9065536 9 16 -7144083 9 17 -8546545
D 9 18 9026357 9 19 -7097243 9 20 -8538080 9 21 9054659 10 11 8621960
D 10 12 -7853376 10 13 8929229 10 14 7803453 10 15 -7122293 10 16 9057520
D 10 17 7813562 10 18 -7096774 10 19 8993462 10 20 7801305 10 21 -7111906
D 11 12 -9385284 11 13 7704038 11 14 9043846 11 15 -8504659 11 16 7795313

D 11 17 9054689 11 18 -8473852 11 19 7750890 11 20 9039682 11 21 -8491957
D 12 13 -7019161 12 14 -8562682 12 15 9092362 12 16 -7189228 12 17 -8586797
D 12 18 9029844 12 19 -7099939 12 20 -8594104 12 21 9076851 13 14 8580604
D 13 15 -7848095 13 16 8905399 13 17 7692775 13 18 -7043073 13 19 8905071
D 13 20 7656884 13 21 -7030176 14 15 -9400451 14 16 7858402 14 17 9115670
D 14 18 -8495755 14 19 7778722 14 20 9119488 14 21 -8536047 15 16 -7164742
D 15 17 -8565191 15 18 9029169 15 19 -7101281 15 20 -8564859 15 21 9067207
D 16 17 8596369 16 18 -7788208 16 19 9027320 16 20 7908415 16 21 -7155179
D 17 18 -9365704 17 19 7789498 17 20 9157265 17 21 -8555010 18 19 -7079320
D 18 20 -8487100 18 21 9021642 19 20 8568086 19 21 -7867053 20 21 -9368488

ITRF position of 0185 as determined by individual baselines

	X	Y	Z
bil5	-1344972.242	-4277794.949	4521882.306
wysh	-1344972.257	-4277794.943	4521882.312
p051	-1344972.255	-4277794.945	4521882.303
p033	-1344972.253	-4277794.946	4521882.293
p722	-1344972.256	-4277794.958	4521882.317
p052	-1344972.246	-4277794.941	4521882.293
mtlw	-1344972.245	-4277794.945	4521882.309

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
bil5	0.008	-0.006	0.005	0.009	0.001	0.006
wysh	-0.007	-0.000	0.011	-0.007	0.006	0.010
p051	-0.005	-0.002	0.002	-0.004	-0.001	0.004
p033	-0.003	-0.003	-0.008	-0.002	-0.008	-0.003
p722	-0.006	-0.015	0.016	-0.001	0.000	0.023
p052	0.003	0.002	-0.008	0.003	-0.004	-0.008
mtlw	0.004	-0.002	0.008	0.005	0.005	0.006

STATE PLANE COORDINATES - International Foot
SPC (2500 MT)

Northing (Y) [feet]	437789.610
Easting (X) [feet]	2493717.005
Convergence [degrees]	1.49699339
Point Scale	0.99976826
Combined Factor	0.99960783

** 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: 1037.280 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.461
scatter (mean square distance from rover) is 25544.650
average edop for rover is 0.630
average ndop for rover is 0.810
average hdop for rover is 1.026
average vdop for rover is 1.650
average gdop for rover is 2.240

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.