# OPUS-RS solution : 018697_14_238_A0.14O OP1409691043964

opus <opus@ngs.noaa.gov>

Tue 9/2/2014 2:54 PM

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

FILE: 018697_14_238_A0.14O OP1409691043964

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: 0186238w.14o TIME: 20:53:59 UTC

SOFTWARE: rsgps 1.37 RS93.prl 1.99.2 START: 2014/08/26 22:47:00
EPHEMERIS: igr18072.eph [rapid] STOP: 2014/08/26 23:05:15
NAV FILE: brdc2380.14n OBS USED: 1110 / 1110 : 100%
ANT NAME: CHCX90D-OPUS NONE QUALITY IND. 39.95/ 5.48
ARP HEIGHT: 1.80000 NORMALIZED RMS: 0.232

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.65193)

X: -1333434.508(m) 0.011(m) -1333435.368(m) 0.011(m)
Y: -4273954.988(m) 0.027(m) -4273953.736(m) 0.027(m)
Z: 4528830.580(m) 0.030(m) 4528830.541(m) 0.030(m)

LAT: 45 31 16.51863 0.006(m) 45 31 16.53945 0.006(m)
E LON: 252 40 21.21653 0.006(m) 252 40 21.16153 0.006(m)
W LON: 107 19 38.78347 0.006(m) 107 19 38.83847 0.006(m)
EL HGT: 989.337(m) 0.041(m) 988.652(m) 0.041(m)
ORTHO HGT: 1003.921(m) 0.042(m) [NAVD88 (Computed using GEOID12A)]

| | UTM COORDINATES (Zone 13) | STATE PLANE COORDINATES SPC (2500 MT ) |
|---|---|---|
| Northing (Y) [meters] | 5043492.761 | 143640.030 |
| Easting (X) [meters] | 318233.842 | 769671.116 |
| Convergence [degrees] | -1.66110551 | 1.58923688 |
| Point Scale | 1.00000622 | 0.99972712 |
| Combined Factor | 0.99985114 | 0.99957208 |

US NATIONAL GRID DESIGNATOR: 13TCL1823343492(NAD 83)

BASE STATIONS USED

| PID | DESIGNATION | LATITUDE | LONGITUDE | DISTANCE(m) |
|---|---|---|---|---|
| DI3062 | BIL5 BILLINGS 5 CORS ARP | N455816.237 | W1075947.298 | 72198.1 |
| DM7161 | WYSH SHERIDAN CORS ARP | N444801.769 | W1070035.715 | 83916.4 |
| DL7728 | P051 BILLINGSAPMT2005 CORS ARP | N454823.741 | W1083246.070 | 100142.9 |
| DL7758 | P722 YNPBASSRCHMT2005 CORS ARP | N452725.985 | W1093415.586 | 175552.7 |
| DI3425 | P052 LRRNCHJRDNMT2006 CORS ARP | N472229.026 | W1070107.185 | 207414.3 |
| DI2260 | P054 TEREKALAKAMT2006 CORS ARP | N455046.833 | W1042629.062 | 227728.4 |

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 | -1372156.896 | -4223945.788 | 4563650.231 |
| wysh | -1326396.424 | -4335757.882 | 4472504.197 |
| p051 | -1416839.103 | -4223178.947 | 4551064.079 |
| p722 | -1501537.058 | -4223566.613 | 4524171.134 |
| p052 | -1266648.340 | -4138194.568 | 4670709.498 |
| p054 | -1110122.540 | -4310701.928 | 4554151.767 |
| 0186 | -1333435.368 | -4273953.736 | 4528830.541 |

Covariance matrix of the stations:

1 1.2820E-06 3.1060E-06 -3.5100E-06 -2.2280E-07 -6.1740E-07 7.1500E-07 -2.2900E-07 -6.5840E-07 7.4370E-07 -2.4060E-07 -7.0020E-07 7.9130E-07 -2.1640E-07 -6.0520E-07 6.6240E-07 -2.0670E-07 -5.2490E-07 5.9800E-07 -8.3780E-08 -3.0320E-07 3.5200E-07

2 3.1060E-06 9.1240E-06 -9.8300E-06 -6.3130E-07 -1.8120E-06 1.9410E-06 -6.4950E-07 -1.8240E-06 1.9850E-06 -6.6840E-07 -1.8360E-06 1.9690E-06 -5.8110E-07 -1.7140E-06 1.9550E-06 -5.7520E-07 -1.7710E-06 1.9800E-06 -8.5610E-08 -1.7290E-07 2.3540E-07

3 -3.5100E-06 -9.8300E-06 1.1220E-05 6.8590E-07 1.9070E-06 -2.0940E-06 7.2400E-07 1.9790E-06 -2.2030E-06 7.2800E-07 1.9520E-06 -2.1420E-06 7.0180E-07 2.0060E-06 -2.3410E-06 6.6990E-07 1.9860E-06 -2.2710E-06 1.0900E-07 2.6070E-07 -2.7300E-07

4 -2.2280E-07 -6.3130E-07 6.8590E-07 1.2410E-06 3.0690E-06 -3.3480E-06 -2.3180E-07 -6.4750E-07 6.9850E-07 -2.4670E-07 -6.7130E-07 7.1360E-07 -1.9640E-07 -5.7820E-07 6.5300E-07 -1.7670E-07 -5.4050E-07 5.9650E-07 -2.6250E-10 -8.1900E-08 6.7280E-08

5 -6.1740E-07 -1.8120E-06 1.9070E-06 3.0690E-06 9.2020E-06 -9.5360E-06 -6.2360E-07 -1.8240E-06 1.9130E-06 -6.3180E-07 -1.8360E-06 1.9120E-06 -6.0100E-07 -1.7900E-06 1.9140E-06 -5.9440E-07 -1.7730E-06 1.8920E-06 -1.6490E-07 -4.3920E-07 4.5870E-07

6 7.1500E-07 1.9410E-06 -2.0940E-06 -3.3480E-06 -9.5360E-06 1.0650E-05 7.3780E-07 1.9130E-06 -2.0170E-06 7.5900E-07 1.8110E-06 -1.8170E-06 6.0350E-07 1.8430E-06 -2.2890E-06 5.3120E-07 2.0280E-06 -2.2710E-06 -2.6790E-07 -7.5480E-07 9.9180E-07

7 -2.2900E-07 -6.4950E-07 7.2400E-07 -2.3180E-07 -6.2360E-07 7.3780E-07 1.3430E-06 3.1750E-06 -3.5420E-06

-2.3820E-07 -7.2260E-07 8.2190E-07 -2.4150E-07 -6.4920E-07 6.6960E-07 -2.3600E-07 -5.3030E-07 5.8940E-07
-1.5390E-07 -4.8640E-07 5.5420E-07
8 -6.5840E-07 -1.8240E-06 1.9790E-06 -6.4750E-07 -1.8240E-06 1.9130E-06 3.1750E-06 9.1710E-06 -9.7940E-06
-6.9300E-07 -1.8320E-06 1.9330E-06 -5.9360E-07 -1.7210E-06 1.9700E-06 -5.8140E-07 -1.8030E-06 1.9990E-06
-6.5060E-08 -8.2290E-08 1.0310E-07
9 7.4370E-07 1.9850E-06 -2.2030E-06 6.9850E-07 1.9130E-06 -2.0170E-06 -3.5420E-06 -9.7940E-06 1.1080E-05
7.6720E-07 1.9150E-06 -2.0430E-06 6.8900E-07 1.9580E-06 -2.3490E-06 6.4250E-07 2.0230E-06 -2.3040E-06
-8.5080E-09 -1.0680E-07 1.8120E-07
10 -2.4060E-07 -6.6840E-07 7.2800E-07 -2.4670E-07 -6.3180E-07 7.5900E-07 -2.3820E-07 -6.9300E-07 7.6720E-
07 1.4480E-06 3.2450E-06 -3.5120E-06 -2.7800E-07 -7.0940E-07 6.8010E-07 -2.7710E-07 -5.4280E-07 5.7870E-07
-2.3980E-07 -7.0020E-07 7.8410E-07
11 -7.0020E-07 -1.8360E-06 1.9520E-06 -6.7130E-07 -1.8360E-06 1.8110E-06 -7.2260E-07 -1.8320E-06 1.9150E-06
3.2450E-06 9.2150E-06 -9.7120E-06 -5.9020E-07 -1.6790E-06 1.9890E-06 -5.5850E-07 -1.8650E-06 2.0460E-06
8.3540E-08 4.0400E-07 -5.0270E-07
12 7.9130E-07 1.9690E-06 -2.1420E-06 7.1360E-07 1.9120E-06 -1.8170E-06 8.2190E-07 1.9330E-06 -2.0430E-06
-3.5120E-06 -9.7120E-06 1.0900E-05 6.3300E-07 1.8030E-06 -2.3520E-06 5.4990E-07 2.0950E-06 -2.3790E-06
-3.5430E-07 -1.1520E-06 1.4370E-06
13 -2.1640E-07 -5.8110E-07 7.0180E-07 -1.9640E-07 -6.0100E-07 6.0350E-07 -2.4150E-07 -5.9360E-07 6.8900E-07
-2.7800E-07 -5.9020E-07 6.3300E-07 1.1650E-06 2.8860E-06 -3.2990E-06 -6.7130E-08 -5.1950E-07 6.7180E-07
2.6590E-07 6.4780E-07 -7.0620E-07
14 -6.0520E-07 -1.7140E-06 2.0060E-06 -5.7820E-07 -1.7900E-06 1.8430E-06 -6.4920E-07 -1.7210E-06 1.9580E-06
-7.0940E-07 -1.6790E-06 1.8030E-06 2.8860E-06 8.8020E-06 -9.7250E-06 -3.4520E-07 -1.7310E-06 2.1150E-06
4.3650E-07 1.2010E-06 -1.2330E-06
15 6.6240E-07 1.9550E-06 -2.3410E-06 6.5300E-07 1.9140E-06 -2.2890E-06 6.6960E-07 1.9700E-06 -2.3490E-06
6.8010E-07 1.9890E-06 -2.3520E-06 -3.2990E-06 -9.7250E-06 1.1810E-05 6.3670E-07 1.8980E-06 -2.3160E-06
1.6510E-07 5.2950E-07 -7.3170E-07
16 -2.0670E-07 -5.7520E-07 6.6990E-07 -1.7670E-07 -5.9440E-07 5.3120E-07 -2.3600E-07 -5.8140E-07 6.4250E-07
-2.7710E-07 -5.5850E-07 5.4990E-07 -6.7130E-08 -3.4520E-07 6.3670E-07 1.1300E-06 2.6550E-06 -3.0320E-06
3.7930E-07 9.2590E-07 -1.0540E-06
17 -5.2490E-07 -1.7710E-06 1.9860E-06 -5.4050E-07 -1.7730E-06 2.0280E-06 -5.3030E-07 -1.8030E-06 2.0230E-06
-5.4280E-07 -1.8650E-06 2.0950E-06 -5.1950E-07 -1.7310E-06 1.8980E-06 2.6550E-06 9.1090E-06 -1.0030E-05
-2.0420E-07 -7.4320E-07 9.3790E-07
18 5.9800E-07 1.9800E-06 -2.2710E-06 5.9650E-07 1.8920E-06 -2.2710E-06 5.8940E-07 1.9990E-06 -2.3040E-06
5.7870E-07 2.0460E-06 -2.3790E-06 6.7180E-07 2.1150E-06 -2.3160E-06 -3.0320E-06 -1.0030E-05 1.1710E-05
3.5650E-07 1.2230E-06 -1.4380E-06
19 -8.3780E-08 -8.5610E-08 1.0900E-07 -2.6250E-10 -1.6490E-07 -2.6790E-07 -1.5390E-07 -6.5060E-08 -8.5080E-09
-2.3980E-07 8.3540E-08 -3.5430E-07 2.6590E-07 4.3650E-07 1.6510E-07 3.7930E-07 -2.0420E-07 3.5650E-07
1.5600E-05 3.9630E-05 -4.4360E-05
20 -3.0320E-07 -1.7290E-07 2.6070E-07 -8.1900E-08 -4.3920E-07 -7.5480E-07 -4.8640E-07 -8.2290E-08 -1.0680E-
07 -7.0020E-07 4.0400E-07 -1.1520E-06 6.4780E-07 1.2010E-06 5.2950E-07 9.2590E-07 -7.4320E-07 1.2230E-06
3.9630E-05 1.1720E-04 -1.2600E-04
21 3.5200E-07 2.3540E-07 -2.7300E-07 6.7280E-08 4.5870E-07 9.9180E-07 5.5420E-07 1.0310E-07 1.8120E-07
7.8410E-07 -5.0270E-07 1.4370E-06 -7.0620E-07 -1.2330E-06 -7.3170E-07 -1.0540E-06 9.3790E-07 -1.4380E-06
-4.4360E-05 -1.2600E-04 1.4190E-04

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

| | | |
|---|---|---|
| 0.0000156000 | 0.0000396300 | -0.0000443600 |
| 0.0000396300 | 0.0001172000 | -0.0001260000 |
| -0.0000443600 | -0.0001260000 | 0.0001419000 |

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

| | | |
|---|---|---|
| 0.0000020774 | -0.0000007483 | -0.0000060380 |
| -0.0000007483 | 0.0000027622 | 0.0000040558 |
| -0.0000060380 | 0.0000040558 | 0.0002698604 |

Horizontal network accuracy = 0.00387 meters.
Vertical network accuracy = 0.03221 meters.

| | | Vectors | | |
|---|---|---|---|---|
| To | From | X | Y | Z |
| bil5 | 0186 | -38721.529 | 50007.948 | 34819.691 |
| wysh | 0186 | 7038.944 | -61804.146 | -56326.344 |
| p051 | 0186 | -83403.736 | 50774.789 | 22233.538 |
| p722 | 0186 | -168101.690 | 50387.123 | -4659.407 |
| p052 | 0186 | 66787.027 | 135759.168 | 141878.957 |
| p054 | 0186 | 223312.827 | -36748.191 | 25321.226 |

Covariance matrix of the 6 vectors

1 1.7050E-05 4.3125E-05 -4.8331E-05 1.5461E-05 3.9481E-05 -4.3729E-05 1.5609E-05 3.9340E-05 -4.3960E-05 1.5683E-05 3.9149E-05 -4.3566E-05 1.5201E-05 3.8891E-05 -4.4215E-05 1.5098E-05 3.9613E-05 -4.4471E-05

2 4.3125E-05 1.2667E-04 -1.3633E-04 3.9166E-05 1.1600E-04 -1.2354E-04 3.9553E-05 1.1563E-04 -1.2414E-04 3.9747E-05 1.1513E-04 -1.2311E-04 3.8487E-05 1.1446E-04 -1.2481E-04 3.8215E-05 1.1635E-04 -1.2548E-04

3 -4.8331E-05 -1.3633E-04 1.5367E-04 -4.3850E-05 -1.2481E-04 1.3909E-04 -4.4299E-05 -1.2438E-04 1.3979E-04 -4.4525E-05 -1.2381E-04 1.3859E-04 -4.3061E-05 -1.2302E-04 1.4056E-04 -4.2745E-05 -1.2521E-04 1.4134E-04

4 1.5461E-05 3.9166E-05 -4.3850E-05 1.6842E-05 4.2946E-05 -4.7507E-05 1.5522E-05 3.9129E-05 -4.3720E-05 1.5593E-05 3.8957E-05 -4.3359E-05 1.5138E-05 3.8697E-05 -4.3939E-05 1.5044E-05 3.9376E-05 -4.4187E-05

5 3.9481E-05 1.1600E-04 -1.2481E-04 4.2946E-05 1.2728E-04 -1.3524E-04 3.9658E-05 1.1590E-04 -1.2444E-04 3.9863E-05 1.1540E-04 -1.2339E-04 3.8546E-05 1.1465E-04 -1.2507E-04 3.8275E-05 1.1661E-04 -1.2579E-04

6 -4.3729E-05 -1.2354E-04 1.3909E-04 -4.7507E-05 -1.3524E-04 1.5057E-04 -4.3909E-05 -1.2344E-04 1.3871E-04 -4.4117E-05 -1.2293E-04 1.3765E-04 -4.2782E-05 -1.2217E-04 1.3935E-04 -4.2507E-05 -1.2416E-04 1.4008E-04

7 1.5609E-05 3.9553E-05 -4.4299E-05 1.5522E-05 3.9658E-05 -4.3909E-05 1.7251E-05 4.3356E-05 -4.8448E-05 1.5755E-05 3.9310E-05 -4.3738E-05 1.5247E-05 3.9031E-05 -4.4410E-05 1.5139E-05 3.9790E-05 -4.4681E-05

8 3.9340E-05 1.1563E-04 -1.2438E-04 3.9129E-05 1.1590E-04 -1.2344E-04 4.3356E-05 1.2654E-04 -1.3579E-04 3.9702E-05 1.1505E-04 -1.2302E-04 3.8454E-05 1.1436E-04 -1.2466E-04 3.8188E-05 1.1622E-04 -1.2533E-04

9 -4.3960E-05 -1.2414E-04 1.3979E-04 -4.3720E-05 -1.2444E-04 1.3871E-04 -4.8448E-05 -1.3579E-04 1.5262E-04 -4.4368E-05 -1.2348E-04 1.3824E-04 -4.2956E-05 -1.2270E-04 1.4010E-04 -4.2655E-05 -1.2481E-04 1.4085E-04

10 1.5683E-05 3.9747E-05 -4.4525E-05 1.5593E-05 3.9863E-05 -4.4117E-05 1.5755E-05 3.9702E-05 -4.4368E-05 1.7528E-05 4.3492E-05 -4.8302E-05 1.5296E-05 3.9184E-05 -4.4629E-05 1.5183E-05 3.9992E-05 -4.4922E-05

11 3.9149E-05 1.1513E-04 -1.2381E-04 3.8957E-05 1.1540E-04 -1.2293E-04 3.9310E-05 1.1505E-04 -1.2348E-04 4.3492E-05 1.2561E-04 -1.3406E-04 3.8308E-05 1.1392E-04 -1.2404E-04 3.8062E-05 1.1567E-04 -1.2467E-04

12 -4.3566E-05 -1.2311E-04 1.3859E-04 -4.3359E-05 -1.2339E-04 1.3765E-04 -4.3738E-05 -1.2302E-04 1.3824E-04 -4.8302E-05 -1.3406E-04 1.4993E-04 -4.2667E-05 -1.2181E-04 1.3884E-04 -4.2402E-05 -1.2369E-04 1.3952E-04

13 1.5201E-05 3.8487E-05 -4.3061E-05 1.5138E-05 3.8546E-05 -4.2782E-05 1.5247E-05 3.8454E-05 -4.2956E-05 1.5296E-05 3.8308E-05 -4.2667E-05 1.6233E-05 4.1432E-05 -4.7118E-05 1.4888E-05 3.8667E-05 -4.3339E-05

14 3.8891E-05 1.1446E-04 -1.2302E-04 3.8697E-05 1.1465E-04 -1.2217E-04 3.9031E-05 1.1436E-04 -1.2270E-04 3.9184E-05 1.1392E-04 -1.2181E-04 4.1432E-05 1.2360E-04 -1.3502E-04 3.7922E-05 1.1501E-04 -1.2387E-04

15 -4.4215E-05 -1.2481E-04 1.4056E-04 -4.3939E-05 -1.2507E-04 1.3935E-04 -4.4410E-05 -1.2466E-04 1.4010E-04 -4.4629E-05 -1.2404E-04 1.3884E-04 -4.7118E-05 -1.3502E-04 1.5517E-04 -4.2834E-05 -1.2557E-04 1.4175E-04

16 1.5098E-05 3.8215E-05 -4.2745E-05 1.5044E-05 3.8275E-05 -4.2507E-05 1.5139E-05 3.8188E-05 -4.2655E-05 1.5183E-05 3.8062E-05 -4.2402E-05 1.4888E-05 3.7922E-05 -4.2834E-05 1.5971E-05 4.1563E-05 -4.6695E-05

17 3.9613E-05 1.1635E-04 -1.2521E-04 3.9376E-05 1.1661E-04 -1.2416E-04 3.9790E-05 1.1622E-04 -1.2481E-04

3.9992E-05 1.1567E-04 -1.2369E-04 3.8667E-05 1.1501E-04 -1.2557E-04 4.1563E-05 1.2780E-04 -1.3819E-04
18 -4.4471E-05 -1.2548E-04 1.4134E-04 -4.4187E-05 -1.2579E-04 1.4008E-04 -4.4681E-05 -1.2533E-04 1.4085E-04
-4.4922E-05 -1.2467E-04 1.3952E-04 -4.3339E-05 -1.2387E-04 1.4175E-04 -4.6695E-05 -1.3819E-04 1.5649E-04

Correlation matrix of the 6 vectors
1 1.0000E+00 9.2797E-01 -9.4424E-01 9.1242E-01 8.4752E-01 -8.6308E-01 9.1013E-01 8.4697E-01 -8.6178E-01
9.0722E-01 8.4598E-01 -8.6170E-01 9.1375E-01 8.4721E-01 -8.5961E-01 9.1492E-01 8.4863E-01 -8.6095E-01
2 9.2797E-01 1.0000E+00 -9.7713E-01 8.4798E-01 9.1357E-01 -8.9455E-01 8.4612E-01 9.1334E-01 -8.9286E-01
8.4355E-01 9.1276E-01 -8.9338E-01 8.4874E-01 9.1474E-01 -8.9023E-01 8.4961E-01 9.1444E-01 -8.9124E-01
3 -9.4424E-01 -9.7713E-01 1.0000E+00 -8.6197E-01 -8.9246E-01 9.1440E-01 -8.6040E-01 -8.9201E-01 9.1281E-01
-8.5794E-01 -8.9114E-01 9.1310E-01 -8.6217E-01 -8.9265E-01 9.1028E-01 -8.6283E-01 -8.9351E-01 9.1146E-01
4 9.1242E-01 8.4798E-01 -8.6197E-01 1.0000E+00 9.2758E-01 -9.4342E-01 9.1067E-01 8.4763E-01 -8.6236E-01
9.0759E-01 8.4701E-01 -8.6289E-01 9.1553E-01 8.4816E-01 -8.5952E-01 9.1729E-01 8.4875E-01 -8.6073E-01
5 8.4752E-01 9.1357E-01 -8.9246E-01 9.2758E-01 1.0000E+00 -9.7692E-01 8.4633E-01 9.1324E-01 -8.9284E-01
8.4398E-01 9.1267E-01 -8.9326E-01 8.4800E-01 9.1407E-01 -8.8998E-01 8.4890E-01 9.1431E-01 -8.9131E-01
6 -8.6308E-01 -8.9455E-01 9.1440E-01 -9.4342E-01 -9.7692E-01 1.0000E+00 -8.6155E-01 -8.9427E-01 9.1504E-01
-8.5878E-01 -8.9391E-01 9.1619E-01 -8.6536E-01 -8.9555E-01 9.1167E-01 -8.6681E-01 -8.9504E-01 9.1256E-01
7 9.1013E-01 8.4612E-01 -8.6040E-01 9.1067E-01 8.4633E-01 -8.6155E-01 1.0000E+00 9.2799E-01 -9.4420E-01
9.0608E-01 8.4449E-01 -8.6003E-01 9.1109E-01 8.4526E-01 -8.5835E-01 9.1203E-01 8.4745E-01 -8.5997E-01
8 8.4697E-01 9.1334E-01 -8.9201E-01 8.4763E-01 9.1324E-01 -8.9427E-01 9.2799E-01 1.0000E+00 -9.7715E-01
8.4304E-01 9.1256E-01 -8.9315E-01 8.4846E-01 9.1445E-01 -8.8965E-01 8.4947E-01 9.1396E-01 -8.9064E-01
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-8.5785E-01 -8.9181E-01 9.1388E-01 -8.6302E-01 -8.9339E-01 9.1040E-01 -8.6396E-01 -8.9368E-01 9.1143E-01
10 9.0722E-01 8.4355E-01 -8.5794E-01 9.0759E-01 8.4398E-01 -8.5878E-01 9.0608E-01 8.4304E-01 -8.5785E-01
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11 8.4598E-01 9.1276E-01 -8.9114E-01 8.4701E-01 9.1267E-01 -8.9391E-01 8.4449E-01 9.1256E-01 -8.9181E-01
9.2691E-01 1.0000E+00 -9.7689E-01 8.4837E-01 9.1426E-01 -8.8846E-01 8.4979E-01 9.1300E-01 -8.8927E-01
12 -8.6170E-01 -8.9338E-01 9.1310E-01 -8.6289E-01 -8.9326E-01 9.1619E-01 -8.6003E-01 -8.9315E-01 9.1388E-01
-9.4224E-01 -9.7689E-01 1.0000E+00 -8.6486E-01 -8.9483E-01 9.1028E-01 -8.6651E-01 -8.9360E-01 9.1089E-01
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9.0680E-01 8.4837E-01 -8.6486E-01 1.0000E+00 9.2496E-01 -9.3880E-01 9.2460E-01 8.4895E-01 -8.5987E-01
14 8.4721E-01 9.1474E-01 -8.9265E-01 8.4816E-01 9.1407E-01 -8.9555E-01 8.4526E-01 9.1445E-01 -8.9339E-01
8.4186E-01 9.1426E-01 -8.9483E-01 9.2496E-01 1.0000E+00 -9.7496E-01 8.5352E-01 9.1511E-01 -8.9071E-01
15 -8.5961E-01 -8.9023E-01 9.1028E-01 -8.5952E-01 -8.8998E-01 9.1167E-01 -8.5835E-01 -8.8965E-01 9.1040E-01
-8.5575E-01 -8.8846E-01 9.1028E-01 -9.3880E-01 -9.7496E-01 1.0000E+00 -8.6042E-01 -8.9170E-01 9.0968E-01
16 9.1492E-01 8.4961E-01 -8.6283E-01 9.1729E-01 8.4890E-01 -8.6681E-01 9.1203E-01 8.4947E-01 -8.6396E-01
9.0748E-01 8.4979E-01 -8.6651E-01 9.2460E-01 8.5352E-01 -8.6042E-01 1.0000E+00 9.1999E-01 -9.3402E-01
17 8.4863E-01 9.1444E-01 -8.9351E-01 8.4875E-01 9.1431E-01 -8.9504E-01 8.4745E-01 9.1396E-01 -8.9368E-01
8.4499E-01 9.1300E-01 -8.9360E-01 8.4895E-01 9.1511E-01 -8.9170E-01 9.1999E-01 1.0000E+00 -9.7720E-01
18 -8.6095E-01 -8.9124E-01 9.1146E-01 -8.6073E-01 -8.9131E-01 9.1256E-01 -8.5997E-01 -8.9064E-01 9.1143E-01
-8.5775E-01 -8.8927E-01 9.1089E-01 -8.5987E-01 -8.9071E-01 9.0968E-01 -9.3402E-01 -9.7720E-01 1.0000E+00

G-FILE for the vectors

Axx2014 8262014 826
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C00070002 70389441 41 -618041457 112 -563263439 122
C00070003 -834037355 41 507747888 112 222335384 123

C00070004-1681016897 41 503871228 112 -46594067 122
C00070005 667870273 40 1357591676 111 1418789573 124
C00070006-2061839022 39 -367481914 113 253212260 125
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D 1 12 -8617010 1 13 9137496 1 14 8472057 1 15 -8596099 1 16 9149239
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D 9 17 -8936816 9 18 9114344 10 11 9269105 10 12 -9422445 10 13 9068004
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D 12 16 -8665114 12 17 -8935969 12 18 9108911 13 14 9249567 13 15 -9388046
D 13 16 9245984 13 17 8489452 13 18 -8598725 14 15 -9749560 14 16 8535227
D 14 17 9151099 14 18 -8907107 15 16 -8604240 15 17 -8916975 15 18 9096786
D 16 17 9199853 16 18 -9340206 17 18 -9772014

ITRF position of 0186 as determined by individual baselines

| | X | Y | Z |
|---|---|---|---|
| bil5 | -1333435.366 | -4273953.754 | 4528830.561 |
| wysh | -1333435.385 | -4273953.754 | 4528830.575 |
| p051 | -1333435.375 | -4273953.754 | 4528830.564 |
| p722 | -1333435.374 | -4273953.751 | 4528830.567 |
| p052 | -1333435.374 | -4273953.762 | 4528830.562 |
| p054 | -1333435.380 | -4273953.778 | 4528830.575 |

Residuals of position determined by individual baselines from the final position

| | X | Y | Z | East | North | Up |
|---|---|---|---|---|---|---|
| bil5 | 0.002 | -0.018 | 0.020 | 0.007 | 0.002 | 0.025 |
| wysh | -0.017 | -0.018 | 0.035 | -0.011 | 0.008 | 0.040 |
| p051 | -0.007 | -0.018 | 0.023 | -0.002 | 0.003 | 0.030 |
| p722 | -0.006 | -0.015 | 0.026 | -0.001 | 0.007 | 0.030 |
| p052 | -0.006 | -0.026 | 0.021 | 0.002 | -0.004 | 0.034 |

| | | | | | | |
|---|---|---|---|---|---|---|
| p054 | -0.013 | -0.042 | 0.034 | 0.001 | -0.007 | 0.055 |

STATE PLANE COORDINATES - International Foot
SPC (2500 MT )
Northing (Y) [feet] 471259.941
Easting (X) [feet] 2525167.703
Convergence [degrees] 1.58923688
Point Scale 0.99972712
Combined Factor 0.99957208

** 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: 1003.060 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.455
scatter (mean square distance from rover) is 24657.265
average edop for rover is 1.000
average ndop for rover is 0.940
average hdop for rover is 1.372
average vdop for rover is 2.580
average gdop for rover is 3.450

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.