

OPUS-RS solution : 033845_14_240_A0.14O OP1409696540905

opus <opus@ngs.noaa.gov>

Tue 9/2/2014 4:28 PM

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

FILE: 033845_14_240_A0.14O OP1409696540905

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
RINEX FILE: 0338240r.14oDATE: September 02, 2014
TIME: 22:28:17 UTCSOFTWARE: rsgps 1.37 RS90.prl 1.99.2 START: 2014/08/28 17:04:00
EPHEMERIS: igr18074.eph [rapid] STOP: 2014/08/28 18:06:15
NAV FILE: brdc2400.14n OBS USED: 3200 / 4528 : 71%
ANT NAME: CHCX90D-OPUS NONE QUALITY IND. 17.93/ 14.22
ARP HEIGHT: 1.8000 NORMALIZED RMS: 0.305

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.65680)

X: -1320205.350(m) 0.007(m) -1320206.211(m) 0.007(m)
Y: -4263621.974(m) 0.023(m) -4263620.723(m) 0.023(m)
Z: 4542445.839(m) 0.025(m) 4542445.801(m) 0.025(m)LAT: 45 41 44.19325 0.005(m) 45 41 44.21418 0.005(m)
E LON: 252 47 42.61166 0.007(m) 252 47 42.55655 0.007(m)
W LON: 107 12 17.38834 0.007(m) 107 12 17.44345 0.007(m)
EL HGT: 1068.812(m) 0.034(m) 1068.128(m) 0.034(m)
ORTHO HGT: 1083.499(m) 0.035(m) [NAVD88 (Computed using GEOID12A)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 13) SPC (2500 MT)

Northing (Y) [meters] 5062592.710 163277.142
Easting (X) [meters] 328342.126 778676.359
Convergence [degrees] -1.57824664 1.67892643
Point Scale 0.99996228 0.99965375
Combined Factor 0.99979475 0.99948627

US NATIONAL GRID DESIGNATOR: 13TCL2834262592(NAD 83)

BASE STATIONS USED

| PID | DESIGNATION | LATITUDE | LONGITUDE | DISTANCE(m) |
|--------|--------------------------------|--------------|--------------|-------------|
| DI3062 | BIL5 BILLINGS 5 CORS ARP | N455816.237 | W1075947.298 | 68721.2 |
| DM7161 | WYSH SHERIDAN CORS ARP | N4444801.769 | W1070035.715 | 100667.3 |
| DL7728 | P051 BILLINGSAPMT2005 CORS ARP | N454823.741 | W1083246.070 | 105108.2 |
| DL7758 | P722 YNPBASSRCHMT2005 CORS ARP | N452725.985 | W1093415.586 | 186599.0 |
| DI3425 | P052 LRRNCHJRDNMT2006 CORS ARP | N472229.026 | W1070107.185 | 187221.1 |
| DJ8992 | P033 TENSLEEPTRWY2005 CORS ARP | N435710.415 | W1072315.121 | 194233.3 |
| DI2260 | P054 TEREKALAKAMT2006 CORS ARP | N455046.833 | W1042629.062 | 215612.7 |
| DM7133 | MTLW LEWISTOWN CORS ARP | N470314.929 | W1092633.764 | 229032.9 |

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 | -1372156.889 | -4223945.757 | 4563650.199 |
| wysh | -1326396.426 | -4335757.880 | 4472504.195 |
| p051 | -1416839.104 | -4223178.967 | 4551064.098 |
| p722 | -1501537.055 | -4223566.621 | 4524171.149 |
| p052 | -1266648.343 | -4138194.571 | 4670709.500 |
| p033 | -1374663.813 | -4389900.538 | 4405280.426 |
| p054 | -1110122.556 | -4310701.960 | 4554151.788 |
| mtlw | -1449333.473 | -4105829.794 | 4646773.467 |
| 0338 | -1320206.211 | -4263620.723 | 4542445.801 |

Covariance matrix of the stations:

| | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1 | 2.3030E-07 | 4.7860E-07 | -4.4280E-07 | -1.5080E-08 | -7.2740E-08 | 6.7450E-08 | -1.5530E-08 | -7.0900E-08 | 6.7020E-08 |
| | -1.7480E-08 | -7.9100E-08 | 7.6580E-08 | -1.2950E-08 | -5.4210E-08 | 4.6820E-08 | -1.6820E-08 | -8.3480E-08 | 7.7480E-08 |
| | -1.2380E-08 | -5.3540E-08 | 4.6810E-08 | -1.5010E-08 | -6.4780E-08 | 6.0710E-08 | 1.8230E-08 | 5.0250E-09 | -1.8470E-09 |
| 2 | 4.7860E-07 | 2.6480E-06 | -2.7610E-06 | -7.8500E-08 | -4.5610E-07 | 4.4690E-07 | -7.4420E-08 | -3.4140E-07 | 3.9500E-07 |
| | -8.9720E-08 | -3.5860E-07 | 4.1320E-07 | -3.8500E-08 | -2.2620E-07 | 3.0890E-07 | -9.6730E-08 | -5.3190E-07 | 4.8610E-07 |
| | -4.1230E-08 | -3.8590E-07 | 3.8750E-07 | -5.9300E-08 | -2.2340E-07 | 3.2290E-07 | 1.5070E-08 | 1.0090E-07 | -7.9720E-08 |
| 3 | -4.4280E-07 | -2.7610E-06 | 3.2620E-06 | 6.6230E-08 | 4.2140E-07 | -4.5970E-07 | 6.4810E-08 | 3.9010E-07 | -4.5060E-07 |
| | 6.9830E-08 | 3.9890E-07 | -4.6060E-07 | 5.3760E-08 | 3.5130E-07 | -4.2120E-07 | 7.2010E-08 | 4.4690E-07 | -4.7350E-07 |
| | 5.5630E-08 | 3.9480E-07 | -4.3540E-07 | 6.0350E-08 | 3.5730E-07 | -4.3580E-07 | -2.4890E-09 | -2.5770E-08 | 2.6730E-08 |
| 4 | -1.5080E-08 | -7.8500E-08 | 6.6230E-08 | 2.3510E-07 | 5.5460E-07 | -4.7610E-07 | -1.4410E-08 | -8.1230E-08 | 6.9630E-08 |
| | -1.3290E-08 | -8.6800E-08 | 7.6840E-08 | -1.8770E-08 | -8.1900E-08 | 5.8620E-08 | -1.3650E-08 | -7.2650E-08 | 7.8960E-08 |
| | -1.9140E-08 | -6.1180E-08 | 5.6500E-08 | -1.5940E-08 | -9.2210E-08 | 6.9100E-08 | 1.1080E-08 | -2.5740E-08 | 2.6170E-08 |
| 5 | -7.2740E-08 | -4.5610E-07 | 4.2140E-07 | 5.5460E-07 | 3.4080E-06 | -3.1530E-06 | -5.2930E-08 | -4.4170E-07 | 4.0780E-07 |
| | -1.3160E-08 | -4.1200E-07 | 3.8350E-07 | -1.3990E-07 | -6.3090E-07 | 4.8150E-07 | -4.2100E-08 | -2.7250E-07 | 4.9190E-07 |
| | -1.6210E-07 | -4.4870E-07 | 5.3610E-07 | -7.2440E-08 | -6.2070E-07 | 4.3100E-07 | -5.4260E-08 | -2.7010E-07 | 3.0880E-07 |

6 6.7450E-08 4.4690E-07 -4.5970E-07 -4.7610E-07 -3.1530E-06 3.3610E-06 6.8300E-08 4.5060E-07 -4.6430E-07
6.9970E-08 4.5640E-07 -4.7160E-07 6.4900E-08 4.3250E-07 -4.4790E-07 7.2130E-08 4.7710E-07 -4.7830E-07
6.7330E-08 4.4990E-07 -4.5410E-07 6.6430E-08 4.3870E-07 -4.5970E-07 1.3610E-08 8.8800E-08 -4.8170E-08
7 -1.5530E-08 -7.4420E-08 6.4810E-08 -1.4410E-08 -5.2930E-08 6.8300E-08 2.4270E-07 5.0540E-07 -4.7960E-07
-8.9740E-09 -7.8600E-08 7.1470E-08 -2.4600E-08 -9.3320E-08 6.4460E-08 -1.1010E-08 -4.8700E-08 7.7350E-08
-2.6370E-08 -5.4920E-08 6.2670E-08 -1.6600E-08 -1.0280E-07 7.0730E-08 7.1990E-09 -3.5810E-08 4.5180E-08
8 -7.0900E-08 -3.4140E-07 3.9010E-07 -8.1230E-08 -4.4170E-07 4.5060E-07 5.0540E-07 2.6820E-06 -2.8070E-06
-8.5760E-08 -3.6000E-07 4.1130E-07 -5.1630E-08 -2.6170E-07 3.2710E-07 -9.5090E-08 -5.0470E-07 4.8860E-07
-5.6400E-08 -3.9010E-07 4.0460E-07 -6.3900E-08 -2.5750E-07 3.3420E-07 -2.7740E-09 2.9220E-08 -3.0550E-09
9 6.7020E-08 3.9500E-07 -4.5060E-07 6.9630E-08 4.0780E-07 -4.6430E-07 -4.7960E-07 -2.8070E-06 3.3190E-06
6.6310E-08 4.0140E-07 -4.5950E-07 6.7860E-08 3.8890E-07 -4.4090E-07 7.0900E-08 4.1990E-07 -4.7680E-07
7.1850E-08 4.0040E-07 -4.5400E-07 6.5640E-08 3.9340E-07 -4.4830E-07 1.5520E-08 4.7350E-08 -5.3660E-08
10 -1.7480E-08 -8.9720E-08 6.9830E-08 -1.3290E-08 -1.3160E-08 6.9970E-08 -8.9740E-09 -8.5760E-08 6.6310E-08
08 2.8780E-07 5.7620E-07 -5.6820E-07 -4.8300E-08 -1.7220E-07 9.9990E-08 4.8380E-10 2.1250E-08 7.7040E-08
-5.4770E-08 -5.7830E-08 9.4590E-08 -2.0040E-08 -1.7950E-07 9.0920E-08 -7.4330E-09 -9.9290E-08 1.2260E-07
11 -7.9100E-08 -3.5860E-07 3.9890E-07 -8.6800E-08 -4.1200E-07 4.5640E-07 -7.8600E-08 -3.6000E-07 4.0140E-07
07 5.7620E-07 2.7620E-06 -2.9050E-06 -7.8470E-08 -3.3380E-07 3.6280E-07 -9.1710E-08 -4.4850E-07 4.9200E-07
-8.7300E-08 -3.9800E-07 4.3750E-07 -7.3330E-08 -3.2690E-07 3.5580E-07 -2.1390E-08 -2.6850E-08 6.4990E-08
12 7.6580E-08 4.1320E-07 -4.6060E-07 7.6840E-08 3.8350E-07 -4.7160E-07 7.1470E-08 4.1130E-07 -4.5950E-07
-5.6820E-07 -2.9050E-06 3.4300E-06 9.4260E-08 4.5680E-07 -4.7540E-07 7.0010E-08 3.7170E-07 -4.8160E-07
1.0200E-07 4.1060E-07 -4.8620E-07 7.6270E-08 4.5860E-07 -4.6970E-07 3.4340E-08 9.9750E-08 -1.1620E-07
13 -1.2950E-08 -3.8500E-08 5.3760E-08 -1.8770E-08 -1.3990E-07 6.4900E-08 -2.4600E-08 -5.1630E-08 6.7860E-08
-4.8300E-08 -7.8470E-08 9.4260E-08 2.4370E-07 4.8880E-07 -3.7710E-07 -3.8430E-08 -2.0280E-07 7.8290E-08
3.4920E-08 -4.7230E-08 -7.6480E-09 -1.0650E-08 7.0150E-08 2.5580E-08 3.7900E-08 1.0640E-07 -1.2610E-07
14 -5.4210E-08 -2.2620E-07 3.5130E-07 -8.1900E-08 -6.3090E-07 4.3250E-07 -9.3320E-08 -2.6170E-07 3.8890E-07
-1.7220E-07 -3.3380E-07 4.5680E-07 4.8880E-07 2.5880E-06 -2.5420E-06 -1.5280E-07 -8.6070E-07 4.8260E-07
1.0460E-07 -3.4470E-07 2.2010E-07 -3.8720E-08 1.9580E-07 2.1020E-07 8.1890E-08 3.9810E-07 -4.2740E-07
15 4.6820E-08 3.0890E-07 -4.2120E-07 5.8620E-08 4.8150E-07 -4.4790E-07 6.4460E-08 3.2710E-07 -4.4090E-07
07 9.9990E-08 3.6280E-07 -4.7540E-07 -3.7710E-07 -2.5420E-06 3.1000E-06 8.9860E-08 5.8260E-07 -4.6890E-07
-2.3600E-08 3.4940E-07 -3.4790E-07 4.0990E-08 1.3100E-07 -3.7340E-07 -3.9270E-08 -1.6610E-07 1.7110E-07
16 -1.6820E-08 -9.6730E-08 7.2010E-08 -1.3650E-08 -4.2100E-08 7.2130E-08 -1.1010E-08 -9.5090E-08 7.0900E-08
4.8380E-10 -9.1710E-08 7.0010E-08 -3.8430E-08 -1.5280E-07 8.9860E-08 2.6580E-07 7.0840E-07 -5.4690E-07
-4.2550E-08 -6.8740E-08 8.3950E-08 -1.8970E-08 -1.6140E-07 8.7900E-08 -9.8720E-10 -8.2780E-08 9.0600E-08
17 -8.3480E-08 -5.3190E-07 4.4690E-07 -7.2650E-08 -2.7250E-07 4.7710E-07 -4.8700E-08 -5.0470E-07 4.1990E-07
07 2.1250E-08 -4.4850E-07 3.7170E-07 -2.0280E-07 -8.6070E-07 5.8260E-07 7.0840E-07 4.0820E-06 -3.4180E-06
-2.3580E-07 -4.9340E-07 6.2430E-07 -8.7090E-08 -8.4530E-07 4.9560E-07 -9.4560E-08 -4.5570E-07 5.0140E-07
18 7.7480E-08 4.8610E-07 -4.7350E-07 7.8960E-08 4.9190E-07 -4.7830E-07 7.7350E-08 4.8860E-07 -4.7680E-07
07 7.7040E-08 4.9200E-07 -4.8160E-07 7.8290E-08 4.8260E-07 -4.6890E-07 -5.4690E-07 -3.4180E-06 3.4540E-06
8.1310E-08 4.8760E-07 -4.7170E-07 7.6850E-08 4.8780E-07 -4.7770E-07 2.4920E-08 1.3140E-07 -6.8240E-08
19 -1.2380E-08 -4.1230E-08 5.5630E-08 -1.9140E-08 -1.6210E-07 6.7330E-08 -2.6370E-08 -5.6400E-08 7.1850E-08
-5.4770E-08 -8.7300E-08 1.0200E-07 3.4920E-08 1.0460E-07 -2.3600E-08 -4.2550E-08 -2.3580E-07 8.1310E-08
2.5430E-07 3.8990E-07 -3.7790E-07 -9.7150E-09 8.9370E-08 2.2560E-08 4.3620E-08 1.2500E-07 -1.5480E-07
20 -5.3540E-08 -3.8590E-07 3.9480E-07 -6.1180E-08 -4.4870E-07 4.4990E-07 -5.4920E-08 -3.9010E-07 4.0040E-07
07 -5.7830E-08 -3.9800E-07 4.1060E-07 -4.7230E-08 -3.4470E-07 3.4940E-07 -6.8740E-08 -4.9340E-07 4.8760E-07
3.8990E-07 2.9300E-06 -2.8440E-06 -4.8230E-08 -3.4320E-07 3.5240E-07 6.4430E-09 -4.5200E-08 4.6790E-08
21 4.6810E-08 3.8750E-07 -4.3540E-07 5.6500E-08 5.3610E-07 -4.5410E-07 6.2670E-08 4.0460E-07 -4.5400E-07
07 9.4590E-08 4.3750E-07 -4.8620E-07 -7.6480E-09 2.2010E-07 -3.4790E-07 8.3950E-08 6.2430E-07 -4.7170E-07
-3.7790E-07 -2.8440E-06 3.1720E-06 4.2350E-08 2.3340E-07 -3.9850E-07 -3.5830E-08 -7.7020E-08 1.3920E-07
22 -1.5010E-08 -5.9300E-08 6.0350E-08 -1.5940E-08 -7.2440E-08 6.6430E-08 -1.6600E-08 -6.3900E-08 6.5640E-08
08 -2.0040E-08 -7.3330E-08 7.6270E-08 -1.0650E-08 -3.8720E-08 4.0990E-08 -1.8970E-08 -8.7090E-08 7.6850E-08
-9.7150E-09 -4.8230E-08 4.2350E-08 2.3240E-07 4.4260E-07 -4.2840E-07 1.5250E-08 6.7970E-09 -1.5160E-09

23 -6.4780E-08 -2.2340E-07 3.5730E-07 -9.2210E-08 -6.2070E-07 4.3870E-07 -1.0280E-07 -2.5750E-07 3.9340E-07 -1.7950E-07 -3.2690E-07 4.5860E-07 7.0150E-08 1.9580E-07 1.3100E-07 -1.6140E-07 -8.4530E-07 4.8780E-07 8.9370E-08 -3.4320E-07 2.3340E-07 4.4260E-07 2.5460E-06 -2.5010E-06 6.9760E-08 3.9500E-07 -4.1220E-07
 24 6.0710E-08 3.2290E-07 -4.3580E-07 6.9100E-08 4.3100E-07 -4.5970E-07 7.0730E-08 3.3420E-07 -4.4830E-07 9.0920E-08 3.5580E-07 -4.6970E-07 2.5580E-08 2.1020E-07 -3.7340E-07 8.7900E-08 4.9560E-07 -4.7770E-07 2.2560E-08 3.5240E-07 -3.9850E-07 -4.2840E-07 -2.5010E-06 3.1880E-06 -1.0930E-08 -9.8360E-08 7.4260E-08
 25 1.8230E-08 1.5070E-08 -2.4890E-09 1.1080E-08 -5.4260E-08 1.3610E-08 7.1990E-09 -2.7740E-09 1.5520E-08 -7.4330E-09 -2.1390E-08 3.4340E-08 3.7900E-08 8.1890E-08 -3.9270E-08 -9.8720E-10 -9.4560E-08 2.4920E-08 4.3620E-08 6.4430E-09 -3.5830E-08 1.5250E-08 6.9760E-08 -1.0930E-08 2.3130E-06 5.5520E-06 -5.0910E-06
 26 5.0250E-09 1.0090E-07 -2.5770E-08 -2.5740E-08 -2.7010E-07 8.8800E-08 -3.5810E-08 2.9220E-08 4.7350E-08 -9.9290E-08 -2.6850E-08 9.9750E-08 1.0640E-07 3.9810E-07 -1.6610E-07 -8.2780E-08 -4.5570E-07 1.3140E-07 1.2500E-07 -4.5200E-08 -7.7020E-08 6.7970E-09 3.9500E-07 -9.8360E-08 5.5520E-06 3.3040E-05 -3.4090E-05
 27 -1.8470E-09 -7.9720E-08 2.6730E-08 2.6170E-08 3.0880E-07 -4.8170E-08 4.5180E-08 -3.0550E-09 -5.3660E-08 1.2260E-07 6.4990E-08 -1.1620E-07 -1.2610E-07 -4.2740E-07 1.7110E-07 9.0600E-08 5.0140E-07 -6.8240E-08 -1.5480E-07 4.6790E-08 1.3920E-07 -1.5160E-09 -4.1220E-07 7.4260E-08 -5.0910E-06 -3.4090E-05 3.8730E-05

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

```
0.0000023130  0.0000055520  -0.0000050910
0.0000055520  0.0000330400  -0.0000340900
-0.0000050910 -0.0000340900  0.0000387300
```

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

```
0.0000018639  0.0000007331  0.0000065982
0.0000007331  0.0000019983  0.0000020215
0.0000065982  0.0000020215  0.0000702208
```

Horizontal network accuracy = 0.00347 meters.

Vertical network accuracy = 0.01643 meters.

| | | Vectors | | |
|------|------|-------------|-------------|-------------|
| To | From | X | Y | Z |
| bil5 | 0338 | -51950.678 | 39674.966 | 21204.398 |
| wysh | 0338 | -6190.215 | -72137.157 | -69941.606 |
| p051 | 0338 | -96632.894 | 40441.756 | 8618.297 |
| p722 | 0338 | -181330.844 | 40054.102 | -18274.652 |
| p052 | 0338 | 53557.868 | 125426.152 | 128263.699 |
| p033 | 0338 | -54457.602 | -126279.815 | -137165.375 |
| p054 | 0338 | 210083.655 | -47081.237 | 11705.987 |
| mtlw | 0338 | -129127.262 | 157790.929 | 104327.666 |

Covariance matrix of the 8 vectors

```
1 2.5068E-06 6.0105E-06 -5.5295E-06 2.2686E-06 5.5285E-06 -5.0353E-06 2.2720E-06 5.4788E-06 -5.0377E-06
2.2847E-06 5.4893E-06 -5.0469E-06 2.2439E-06 5.4109E-06 -5.0031E-06 2.2789E-06 5.5581E-06 -5.0366E-06
2.2388E-06 5.4870E-06 -5.0065E-06 2.2645E-06 5.4124E-06 -5.0175E-06
2 6.0105E-06 3.5486E-05 -3.6746E-05 5.4842E-06 3.2753E-05 -3.3652E-05 5.4983E-06 3.2568E-05 -3.3663E-05
5.5465E-06 3.2607E-05 -3.3697E-05 5.3920E-06 3.2315E-05 -3.3535E-05 5.5230E-06 3.2863E-05 -3.3656E-05
5.3707E-06 3.2598E-05 -3.3546E-05 5.4708E-06 3.2321E-05 -3.3589E-05
3 -5.5295E-06 -3.6746E-05 4.1939E-05 -5.0485E-06 -3.3952E-05 3.8292E-05 -5.0689E-06 -3.3671E-05 3.8306E-05
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Correlation matrix of the 8 vectors

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 23 5.7952E-01 9.1979E-01 -8.7157E-01 5.7768E-01 9.0018E-01 -8.6987E-01 5.7587E-01 9.1856E-01 -8.7029E-01
 5.6624E-01 9.1572E-01 -8.6753E-01 5.8615E-01 9.3189E-01 -8.7856E-01 5.7022E-01 8.8666E-01 -8.6833E-01 5.8631E-
 01 9.1318E-01 -8.7677E-01 6.3263E-01 1.0000E+00 -9.4641E-01
 24 -4.9034E-01 -8.7244E-01 9.1254E-01 -4.9039E-01 -8.6168E-01 9.1106E-01 -4.9059E-01 -8.7197E-01 9.1179E-01
 -4.8905E-01 -8.7083E-01 9.1023E-01 -4.8414E-01 -8.7444E-01 9.1551E-01 -4.8955E-01 -8.5297E-01 9.0967E-01
 -4.8170E-01 -8.6797E-01 9.1418E-01 -5.3731E-01 -9.4641E-01 1.0000E+00

G-FILE for the vectors

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 C00090002 -61902148 15 -721371571 60 -699416059 64
 C00090003 -966328935 15 404417558 59 86182969 64
 C00090004 -1813308439 16 400541023 59 -182746516 65
 C00090005 535578683 15 1254261518 59 1282636992 64
 C00090006 -544576024 16 -1262798147 61 -1371653752 65
 C00090007 2100836548 15 -470812373 60 117059869 64
 C00090008 -1291272623 15 1577909293 58 1043276664 64
 D 1 2 6372618 1 3 -5392784 1 4 9015400 1 5 5741323 1 6 -4896345

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D 1 12 -4895741 1 13 8997864 1 14 5790502 1 15 -4905829 1 16 8959711
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D 18 24 9096710 19 20 6144179 19 21 -5195061 19 22 8986937 19 23 5863143
 D 19 24 -4816988 20 21 -9525453 20 22 5765522 20 23 9131751 20 24 -8679706
 D 21 22 -4898020 21 23 -8767739 21 24 9141789 22 23 6326348 22 24 -5373058
 D 23 24 -9464063

ITRF position of 0338 as determined by individual baselines

| | X | Y | Z |
|------|--------------|--------------|-------------|
| bil5 | -1320206.208 | -4263620.753 | 4542445.829 |
| wysh | -1320206.217 | -4263620.729 | 4542445.817 |
| p051 | -1320206.213 | -4263620.699 | 4542445.779 |
| p722 | -1320206.216 | -4263620.714 | 4542445.793 |
| p052 | -1320206.211 | -4263620.735 | 4542445.806 |
| p033 | -1320206.213 | -4263620.726 | 4542445.791 |
| p054 | -1320206.201 | -4263620.720 | 4542445.801 |
| mtlw | -1320206.224 | -4263620.766 | 4542445.854 |

Residuals of position determined by individual baselines from the final position

| | X | Y | Z | East | North | Up |
|------|--------|--------|--------|--------|--------|--------|
| bil5 | 0.003 | -0.030 | 0.028 | 0.012 | -0.001 | 0.039 |
| wysh | -0.006 | -0.006 | 0.016 | -0.004 | 0.006 | 0.017 |
| p051 | -0.002 | 0.024 | -0.022 | -0.009 | 0.000 | -0.031 |
| p722 | -0.005 | 0.009 | -0.008 | -0.007 | -0.001 | -0.011 |
| p052 | 0.000 | -0.012 | 0.005 | 0.004 | -0.005 | 0.011 |
| p033 | -0.002 | -0.003 | -0.010 | -0.001 | -0.010 | -0.004 |
| p054 | 0.010 | 0.003 | 0.000 | 0.008 | 0.004 | -0.004 |
| mtlw | -0.013 | -0.043 | 0.053 | 0.001 | 0.005 | 0.069 |

STATE PLANE COORDINATES - International Foot
 SPC (2500 MT)

| | |
|-----------------------|-------------|
| Northing (Y) [feet] | 535686.161 |
| Easting (X) [feet] | 2554712.464 |
| Convergence [degrees] | 1.67892643 |
| Point Scale | 0.99965375 |
| Combined Factor | 0.99948627 |

** 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: 1082.632 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.370
 scatter (mean square distance from rover) is 29048.725

average edop for rover is 1.010
average ndop for rover is 1.040
average hdop for rover is 1.450
average vdop for rover is 2.590
average gdop for rover is 3.440

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.