

OPUS-RS solution : 018697_14_212_A1.14O OP1407514094725

opus <opus@ngs.noaa.gov>

Fri 8/8/2014 10:11 AM

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

FILE: 018697_14_212_A1.14O OP1407514094725

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: August 08, 2014
 RINEX FILE: 0186212u.14o TIME: 16:11:32 UTC

SOFTWARE: rsgps 1.37 RS91.prl 1.99.2 START: 2014/07/31 20:37:45
 EPHEMERIS: igr18034.eph [rapid] STOP: 2014/07/31 22:13:30
 NAV FILE: brdc2120.14n OBS USED: 5936 / 7686 : 77%
 ANT NAME: CHCX90D-OPUS NONE QUALITY IND. 30.27/ 31.75
 ARP HEIGHT: 2.1000 NORMALIZED RMS: 0.464

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.58053)

X: -1370794.059(m) 0.013(m) -1370794.933(m) 0.013(m)
 Y: -4051704.231(m) 0.027(m) -4051703.006(m) 0.027(m)
 Z: 4716876.174(m) 0.036(m) 4716876.164(m) 0.036(m)

LAT: 47 59 21.68601 0.004(m) 47 59 21.70696 0.004(m)
 E LON: 251 18 28.87542 0.005(m) 251 18 28.81656 0.005(m)
 W LON: 108 41 31.12458 0.005(m) 108 41 31.18344 0.005(m)
 EL HGT: 1065.592(m) 0.046(m) 1064.995(m) 0.046(m)
 ORTHO HGT: 1080.908(m) 0.047(m) [NAVD88 (Computed using GEOID12A)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 12) SPC (2500 MT)

Northing (Y) [meters] 5317695.008 415824.024
 Easting (X) [meters] 672198.593 660282.336
 Convergence [degrees] 1.71532623 0.59107072
 Point Scale 0.99996437 0.99953832
 Combined Factor 0.99979739 0.99937141

US NATIONAL GRID DESIGNATOR: 12TXU7219817695(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DG9749	MTMS MONTANA STATE UNI CORS ARP	N483227.426	W1094111.858	96006.8
DL7731	P053 WHITEWATERMT2007 CORS ARP	N484333.865	W1074331.456	108834.2
DM7133	MTLW LEWISTOWN CORS ARP	N470314.929	W1092633.764	118374.0
DI3425	P052 LRRNCHJRDNMT2006 CORS ARP	N472229.026	W1070107.185	143033.8
DI2257	P049 ARMINGTON_MT2006 CORS ARP	N472059.850	W1105422.382	180866.2
DI3422	P050 WICKUMRNCHMT2006 CORS ARP	N484834.096	W1111454.296	210133.5
DI3064	BIL6 BILLINGS 6 CORS ARP	N455816.251	W1075948.499	230531.5

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)

mtms	-1425435.576	-3984013.200	4757493.860
p053	-1283559.257	-4015770.317	4771131.593
mtlw	-1449333.491	-4105829.844	4646773.528
p052	-1266648.337	-4138194.568	4670709.500
p049	-1545099.833	-4044895.879	4669084.576
p050	-1525480.183	-3923083.426	4777585.186
bil6	-1372181.558	-4223938.034	4563651.078
0186	-1370794.933	-4051703.006	4716876.164

Covariance matrix of the stations:

1	4.7980E-07	1.0640E-06	-1.3750E-06	-4.8350E-08	-1.6120E-07	2.1070E-07	-5.9430E-08	-1.8480E-07	2.3740E-07
	-4.8380E-08	-1.6120E-07	2.0950E-07	-6.4390E-08	-1.9320E-07	2.4800E-07	-6.1540E-08	-1.8750E-07	2.4370E-07
	-5.5140E-08	-1.7640E-07	2.2570E-07	1.6530E-08	-3.6290E-09	1.0060E-08			
2	1.0640E-06	2.7240E-06	-3.3770E-06	-1.5070E-07	-4.1340E-07	5.7280E-07	-1.9210E-07	-4.4680E-07	5.7170E-07
	-1.5800E-07	-4.5810E-07	5.8530E-07	-1.9740E-07	-4.1070E-07	5.4050E-07	-1.8490E-07	-3.7900E-07	5.4050E-07
	-1.8150E-07	-4.7290E-07	5.6560E-07	3.1400E-08	1.0720E-07	-8.8520E-08			
3	-1.3750E-06	-3.3770E-06	4.4260E-06	2.3190E-07	5.7370E-07	-7.3010E-07	2.2890E-07	5.6020E-07	-7.0970E-07
	2.2830E-07	5.6130E-07	-7.1420E-07	2.2930E-07	5.6150E-07	-7.0950E-07	2.3250E-07	5.7240E-07	-7.2340E-07
	2.2490E-07	5.4780E-07	-6.9650E-07	2.2020E-08	3.0350E-08	-3.3010E-08			
4	-4.8350E-08	-1.5070E-07	2.3190E-07	4.4020E-07	9.9530E-07	-1.2560E-06	-6.1820E-08	-1.8800E-07	2.2020E-07
	-6.1830E-09	-1.7180E-07	1.9860E-07	-7.7500E-08	-1.5950E-07	2.0400E-07	-6.5280E-08	-1.2510E-07	2.1580E-07
	-3.8790E-08	-1.9990E-07	1.8470E-07	7.9470E-08	1.2130E-07	-1.3840E-07			
5	-1.6120E-07	-4.1340E-07	5.7370E-07	9.9530E-07	2.7500E-06	-3.4120E-06	-1.7730E-07	-4.5460E-07	5.8130E-07
	-1.3660E-07	-4.4900E-07	5.7410E-07	-1.8580E-07	-4.2520E-07	5.5870E-07	-1.7100E-07	-3.8790E-07	5.5260E-07
	-1.6490E-07	-4.7700E-07	5.7030E-07	3.1540E-08	6.0430E-08	-3.0770E-08			
6	2.1070E-07	5.7280E-07	-7.3010E-07	-1.2560E-06	-3.4120E-06	4.4720E-06	2.1150E-07	5.7200E-07	-7.2320E-07
	1.9880E-07	5.5240E-07	-7.0180E-07	2.1700E-07	5.7870E-07	-7.3170E-07	2.1650E-07	5.8020E-07	-7.3930E-07

2.0370E-07 5.5670E-07 -7.0170E-07 1.6670E-08 7.8320E-08 -9.4330E-08
7 -5.9430E-08 -1.9210E-07 2.2890E-07 -6.1820E-08 -1.7730E-07 2.1150E-07 5.0350E-07 1.1170E-06 -1.3730E-06
-5.9640E-08 -1.6220E-07 2.0630E-07 -6.0180E-08 -2.0500E-07 2.5230E-07 -6.1440E-08 -2.1060E-07 2.4830E-07
-5.7830E-08 -1.6970E-07 2.2570E-07 -9.1920E-09 -6.4200E-08 7.2290E-08
8 -1.8480E-07 -4.4680E-07 5.6020E-07 -1.8800E-07 -4.5460E-07 5.7200E-07 1.1170E-06 2.8360E-06 -3.3820E-06
-1.8940E-07 -4.5630E-07 5.7510E-07 -1.8330E-07 -4.4250E-07 5.5440E-07 -1.8220E-07 -4.4260E-07 5.5250E-07
-1.8840E-07 -4.5090E-07 5.6830E-07 -4.0440E-08 -6.2030E-08 8.8490E-08
9 2.3740E-07 5.7170E-07 -7.0970E-07 2.2020E-07 5.8130E-07 -7.2320E-07 -1.3730E-06 -3.3820E-06 4.2410E-06
2.1440E-07 5.8110E-07 -6.9180E-07 2.3890E-07 5.4160E-07 -6.4960E-07 2.4300E-07 5.5040E-07 -6.8950E-07
2.1780E-07 5.5540E-07 -6.3470E-07 1.3080E-08 1.9090E-08 1.0320E-08
10 -4.8380E-08 -1.5800E-07 2.2830E-07 -6.1830E-09 -1.3660E-07 1.9880E-07 -5.9640E-08 -1.8940E-07 2.1440E-07
4.3350E-07 9.8250E-07 -1.2380E-06 -7.4650E-08 -1.6510E-07 2.0170E-07 -6.4500E-08 -1.3600E-07 2.1550E-07
-3.7500E-08 -1.9720E-07 1.7840E-07 7.4090E-08 1.0420E-07 -1.2730E-07
11 -1.6120E-07 -4.5810E-07 5.6130E-07 -1.7180E-07 -4.4900E-07 5.5240E-07 -1.6220E-07 -4.5630E-07 5.8110E-07
9.8250E-07 2.9060E-06 -3.4590E-06 -1.6010E-07 -4.7540E-07 5.9630E-07 -1.5900E-07 -4.7810E-07 5.7880E-07
-1.6920E-07 -4.4680E-07 5.8940E-07 -4.1370E-08 -1.2000E-07 1.5760E-07
12 2.0950E-07 5.8530E-07 -7.1420E-07 1.9860E-07 5.7410E-07 -7.0180E-07 2.0630E-07 5.7510E-07 -6.9180E-07
-1.2380E-06 -3.4590E-06 4.3340E-06 2.1300E-07 5.8090E-07 -7.0040E-07 2.1650E-07 5.9090E-07 -7.2240E-07
1.9470E-07 5.5390E-07 -6.6040E-07 1.0550E-08 8.1120E-08 -6.4430E-08
13 -6.4390E-08 -1.9740E-07 2.2930E-07 -7.7500E-08 -1.8580E-07 2.1700E-07 -6.0180E-08 -1.8330E-07 2.3890E-07
-7.4650E-08 -1.6010E-07 2.1300E-07 5.4800E-07 1.1130E-06 -1.3900E-06 -6.2540E-08 -2.2360E-07 2.5400E-07
-6.5590E-08 -1.6290E-07 2.3880E-07 -3.0810E-08 -1.0070E-07 1.1880E-07
14 -1.9320E-07 -4.1070E-07 5.6150E-07 -1.5950E-07 -4.2520E-07 5.7870E-07 -2.0500E-07 -4.4250E-07 5.4160E-07
-1.6510E-07 -4.7540E-07 5.8090E-07 1.1130E-06 2.7320E-06 -3.3040E-06 -1.9990E-07 -3.6020E-07 5.1270E-07
-1.8910E-07 -4.7420E-07 5.2860E-07 1.8690E-08 9.9830E-08 -9.6080E-08
15 2.4800E-07 5.4050E-07 -7.0950E-07 2.0400E-07 5.5870E-07 -7.3170E-07 2.5230E-07 5.5440E-07 -6.4960E-07
2.0170E-07 5.9630E-07 -7.0040E-07 -1.3900E-06 -3.3040E-06 4.1930E-06 2.5960E-07 4.8140E-07 -6.5450E-07
2.2320E-07 5.7120E-07 -6.0540E-07 -2.7340E-08 -1.0700E-07 1.5090E-07
16 -6.1540E-08 -1.8490E-07 2.3250E-07 -6.5280E-08 -1.7100E-07 2.1650E-07 -6.1440E-08 -1.8220E-07 2.4300E-07
-6.4500E-08 -1.5900E-07 2.1650E-07 -6.2540E-08 -1.9990E-07 2.5960E-07 5.2120E-07 1.0660E-06 -1.4070E-06
-6.3230E-08 -1.6910E-07 2.4000E-07 -1.3350E-08 -6.1030E-08 8.1730E-08
17 -1.8750E-07 -3.7900E-07 5.7240E-07 -1.2510E-07 -3.8790E-07 5.8020E-07 -2.1060E-07 -4.4260E-07 5.5040E-07
-1.3600E-07 -4.7810E-07 5.9090E-07 -2.2360E-07 -3.6020E-07 4.8140E-07 1.0660E-06 2.6870E-06 -3.3020E-06
-1.8270E-07 -4.9530E-07 5.2610E-07 7.0860E-08 2.1840E-07 -2.1360E-07
18 2.4370E-07 5.4050E-07 -7.2340E-07 2.1580E-07 5.5260E-07 -7.3930E-07 2.4830E-07 5.5250E-07 -6.8950E-07
2.1550E-07 5.7880E-07 -7.2240E-07 2.5400E-07 5.1270E-07 -6.5450E-07 -1.4070E-06 -3.3020E-06 4.3350E-06
2.3050E-07 5.6450E-07 -6.6340E-07 -7.4440E-11 -4.8130E-08 5.0060E-08
19 -5.5140E-08 -1.8150E-07 2.2490E-07 -3.8790E-08 -1.6490E-07 2.0370E-07 -5.7830E-08 -1.8840E-07 2.1780E-07
-3.7500E-08 -1.6920E-07 1.9470E-07 -6.5590E-08 -1.8910E-07 2.2320E-07 -6.3230E-08 -1.8270E-07 2.3050E-07
4.6150E-07 1.0760E-06 -1.2950E-06 2.5990E-08 3.7330E-09 -1.6760E-08
20 -1.7640E-07 -4.7290E-07 5.4780E-07 -1.9990E-07 -4.7700E-07 5.5670E-07 -1.6970E-07 -4.5090E-07 5.5540E-07
-1.9720E-07 -4.4680E-07 5.5390E-07 -1.6290E-07 -4.7420E-07 5.7120E-07 -1.6910E-07 -4.9530E-07 5.6450E-07
1.0760E-06 2.9590E-06 -3.3480E-06 -7.0540E-08 -1.6090E-07 1.8300E-07
21 2.2570E-07 5.6560E-07 -6.9650E-07 1.8470E-07 5.7030E-07 -7.0170E-07 2.2570E-07 5.6830E-07 -6.3470E-07
1.7840E-07 5.8940E-07 -6.6040E-07 2.3880E-07 5.2860E-07 -6.0540E-07 2.4000E-07 5.2610E-07 -6.6340E-07
-1.2950E-06 -3.3480E-06 4.1050E-06 -3.5480E-08 -5.4800E-08 1.2460E-07
22 1.6530E-08 3.1400E-08 2.2020E-08 7.9470E-08 3.1540E-08 1.6670E-08 -9.1920E-09 -4.0440E-08 1.3080E-08
7.4090E-08 -4.1370E-08 1.0550E-08 -3.0810E-08 1.8690E-08 -2.7340E-08 -1.3350E-08 7.0860E-08 -7.4440E-11
2.5990E-08 -7.0540E-08 -3.5480E-08 5.4440E-06 1.3130E-05 -1.6650E-05
23 -3.6290E-09 1.0720E-07 3.0350E-08 1.2130E-07 6.0430E-08 7.8320E-08 -6.4200E-08 -6.2030E-08 1.9090E-08
1.0420E-07 -1.2000E-07 8.1120E-08 -1.0070E-07 9.9830E-08 -1.0700E-07 -6.1030E-08 2.1840E-07 -4.8130E-08

3.7330E-09 -1.6090E-07 -5.4800E-08 1.3130E-05 3.4530E-05 -4.2660E-05
 24 1.0060E-08 -8.8520E-08 -3.3010E-08 -1.3840E-07 -3.0770E-08 -9.4330E-08 7.2290E-08 8.8490E-08 1.0320E-08
 -1.2730E-07 1.5760E-07 -6.4430E-08 1.1880E-07 -9.6080E-08 1.5090E-07 8.1730E-08 -2.1360E-07 5.0060E-08
 -1.6760E-08 1.8300E-07 1.2460E-07 -1.6650E-05 -4.2660E-05 5.4500E-05

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

0.0000054440 0.0000131300 -0.0000166500
 0.0000131300 0.0000345300 -0.0000426600
 -0.0000166500 -0.0000426600 0.0000545000

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

0.0000004594 -0.0000002232 -0.0000026326
 -0.0000002232 0.0000007488 0.0000029962
 -0.0000026326 0.0000029962 0.0000932658

Horizontal network accuracy = 0.00196 meters.

Vertical network accuracy = 0.01894 meters.

		Vectors		
To	From	X	Y	Z
mtms	0186	-54640.643	67689.806	40617.697
p053	0186	87235.676	35932.689	54255.429
mtlw	0186	-78538.559	-54126.837	-70102.636
p052	0186	104146.596	-86491.562	-46166.664
p049	0186	-174304.900	6807.127	-47791.588
p050	0186	-154685.250	128619.580	60709.023
bil6	0186	-1386.626	-172235.028	-153225.086

Covariance matrix of the 7 vectors

1 5.8907E-06 1.4166E-05 -1.8057E-05 5.2997E-06 1.2941E-05 -1.6466E-05 5.3772E-06 1.2989E-05 -1.6436E-05
 5.3050E-06 1.3014E-05 -1.6461E-05 5.3939E-06 1.2922E-05 -1.6385E-05 5.3793E-06 1.2875E-05 -1.6416E-05
 5.3463E-06 1.3028E-05 -1.6399E-05
 2 1.4166E-05 3.7040E-05 -4.5979E-05 1.2827E-05 3.3949E-05 -4.2077E-05 1.2971E-05 3.4038E-05 -4.2019E-05
 1.2836E-05 3.4085E-05 -4.2067E-05 1.3002E-05 3.3912E-05 -4.1924E-05 1.2975E-05 3.3825E-05 -4.1983E-05
 1.2913E-05 3.4111E-05 -4.1951E-05
 3 -1.8057E-05 -4.5979E-05 5.8992E-05 -1.6302E-05 -4.2086E-05 5.3897E-05 -1.6515E-05 -4.2219E-05 5.3813E-05
 -1.6316E-05 -4.2287E-05 5.3883E-05 -1.6562E-05 -4.2033E-05 5.3673E-05 -1.6521E-05 -4.1904E-05 5.3760E-05
 -1.6430E-05 -4.2326E-05 5.3712E-05
 4 5.2997E-06 1.2827E-05 -1.6302E-05 5.7253E-06 1.3972E-05 -1.7784E-05 5.3119E-06 1.2861E-05 -1.6304E-05
 5.2843E-06 1.2878E-05 -1.6324E-05 5.3178E-06 1.2831E-05 -1.6280E-05 5.3126E-06 1.2813E-05 -1.6296E-05
 5.2997E-06 1.2879E-05 -1.6291E-05
 5 1.2941E-05 3.3949E-05 -4.2086E-05 1.3972E-05 3.7159E-05 -4.6120E-05 1.2985E-05 3.4077E-05 -4.2067E-05
 1.2858E-05 3.4141E-05 -4.2136E-05 1.3013E-05 3.3945E-05 -4.1964E-05 1.2988E-05 3.3863E-05 -4.2028E-05
 1.2930E-05 3.4153E-05 -4.2004E-05
 6 -1.6466E-05 -4.2077E-05 5.3897E-05 -1.7784E-05 -4.6120E-05 5.9161E-05 -1.6527E-05 -4.2255E-05 5.3861E-05
 -1.6341E-05 -4.2344E-05 5.3957E-05 -1.6568E-05 -4.2064E-05 5.3712E-05 -1.6532E-05 -4.1945E-05 5.3805E-05
 -1.6446E-05 -4.2365E-05 5.3768E-05
 7 5.3772E-06 1.2971E-05 -1.6515E-05 5.3119E-06 1.2985E-05 -1.6527E-05 5.9659E-06 1.4352E-05 -1.8108E-05
 5.3195E-06 1.3073E-05 -1.6527E-05 5.4238E-06 1.2971E-05 -1.6443E-05 5.4051E-06 1.2913E-05 -1.6474E-05
 5.3694E-06 1.3095E-05 -1.6461E-05

8 1.2989E-05 3.4038E-05 -4.2219E-05 1.2861E-05 3.4077E-05 -4.2255E-05 1.4352E-05 3.7490E-05 -4.6150E-05
1.2877E-05 3.4256E-05 -4.2255E-05 1.3088E-05 3.4050E-05 -4.2087E-05 1.3049E-05 3.3931E-05 -4.2148E-05
1.2978E-05 3.4302E-05 -4.2125E-05

9 -1.6436E-05 -4.2019E-05 5.3813E-05 -1.6304E-05 -4.2067E-05 5.3861E-05 -1.8108E-05 -4.6150E-05 5.8720E-05
-1.6321E-05 -4.2256E-05 5.3862E-05 -1.6543E-05 -4.2041E-05 5.3689E-05 -1.6502E-05 -4.1915E-05 5.3750E-05
-1.6429E-05 -4.2307E-05 5.3730E-05

10 5.3050E-06 1.2836E-05 -1.6316E-05 5.2843E-06 1.2858E-05 -1.6341E-05 5.3195E-06 1.2877E-05 -1.6321E-05
5.7293E-06 1.4050E-05 -1.7771E-05 5.3261E-06 1.2842E-05 -1.6294E-05 5.3188E-06 1.2819E-05 -1.6307E-05
5.3064E-06 1.2899E-05 -1.6309E-05

11 1.3014E-05 3.4085E-05 -4.2287E-05 1.2878E-05 3.4141E-05 -4.2344E-05 1.3073E-05 3.4256E-05 -4.2256E-05
1.4050E-05 3.7676E-05 -4.6358E-05 1.3112E-05 3.4075E-05 -4.2114E-05 1.3073E-05 3.3954E-05 -4.2191E-05
1.2998E-05 3.4364E-05 -4.2173E-05

12 -1.6461E-05 -4.2067E-05 5.3883E-05 -1.6324E-05 -4.2136E-05 5.3957E-05 -1.6527E-05 -4.2255E-05 5.3862E-05
-1.7771E-05 -4.6358E-05 5.8963E-05 -1.6566E-05 -4.2064E-05 5.3713E-05 -1.6526E-05 -4.1937E-05 5.3792E-05
-1.6449E-05 -4.2370E-05 5.3779E-05

13 5.3939E-06 1.3002E-05 -1.6562E-05 5.3178E-06 1.3013E-05 -1.6568E-05 5.4238E-06 1.3088E-05 -1.6543E-05
5.3261E-06 1.3112E-05 -1.6566E-05 6.0536E-06 1.4325E-05 -1.8131E-05 5.4256E-06 1.2936E-05 -1.6515E-05
5.3832E-06 1.3138E-05 -1.6495E-05

14 1.2922E-05 3.3912E-05 -4.2033E-05 1.2831E-05 3.3945E-05 -4.2064E-05 1.2971E-05 3.4050E-05 -4.2041E-05
1.2842E-05 3.4075E-05 -4.2064E-05 1.4325E-05 3.7062E-05 -4.5761E-05 1.2972E-05 3.3852E-05 -4.2003E-05
1.2918E-05 3.4117E-05 -4.1981E-05

15 -1.6385E-05 -4.1924E-05 5.3673E-05 -1.6280E-05 -4.1964E-05 5.3712E-05 -1.6443E-05 -4.2087E-05 5.3689E-05
-1.6294E-05 -4.2114E-05 5.3713E-05 -1.8131E-05 -4.5761E-05 5.8391E-05 -1.6445E-05 -4.1858E-05 5.3645E-05
-1.6383E-05 -4.2165E-05 5.3619E-05

16 5.3793E-06 1.2975E-05 -1.6521E-05 5.3126E-06 1.2988E-05 -1.6532E-05 5.4051E-06 1.3049E-05 -1.6502E-05
5.3188E-06 1.3073E-05 -1.6526E-05 5.4256E-06 1.2972E-05 -1.6445E-05 5.9919E-06 1.4186E-05 -1.8139E-05
5.3681E-06 1.3092E-05 -1.6456E-05

17 1.2875E-05 3.3825E-05 -4.1904E-05 1.2813E-05 3.3863E-05 -4.1945E-05 1.2913E-05 3.3931E-05 -4.1915E-05
1.2819E-05 3.3954E-05 -4.1937E-05 1.2936E-05 3.3852E-05 -4.1858E-05 1.4186E-05 3.6780E-05 -4.5700E-05
1.2873E-05 3.3977E-05 -4.1866E-05

18 -1.6416E-05 -4.1983E-05 5.3760E-05 -1.6296E-05 -4.2028E-05 5.3805E-05 -1.6474E-05 -4.2148E-05 5.3750E-05
-1.6307E-05 -4.2191E-05 5.3792E-05 -1.6515E-05 -4.2003E-05 5.3645E-05 -1.8139E-05 -4.5700E-05 5.8735E-05
-1.6403E-05 -4.2230E-05 5.3662E-05

19 5.3463E-06 1.2913E-05 -1.6430E-05 5.2997E-06 1.2930E-05 -1.6446E-05 5.3694E-06 1.2978E-05 -1.6429E-05
5.3064E-06 1.2998E-05 -1.6449E-05 5.3832E-06 1.2918E-05 -1.6383E-05 5.3681E-06 1.2873E-05 -1.6403E-05
5.8535E-06 1.4273E-05 -1.7893E-05

20 1.3028E-05 3.4111E-05 -4.2326E-05 1.2879E-05 3.4153E-05 -4.2365E-05 1.3095E-05 3.4302E-05 -4.2307E-05
1.2899E-05 3.4364E-05 -4.2370E-05 1.3138E-05 3.4117E-05 -4.2165E-05 1.3092E-05 3.3977E-05 -4.2230E-05
1.4273E-05 3.7811E-05 -4.6136E-05

21 -1.6399E-05 -4.1951E-05 5.3712E-05 -1.6291E-05 -4.2004E-05 5.3768E-05 -1.6461E-05 -4.2125E-05 5.3730E-05
-1.6309E-05 -4.2173E-05 5.3779E-05 -1.6495E-05 -4.1981E-05 5.3619E-05 -1.6456E-05 -4.1866E-05 5.3662E-05
-1.7893E-05 -4.6136E-05 5.8356E-05

Correlation matrix of the 7 vectors

1 1.0000E+00 9.5904E-01 -9.6865E-01 9.1257E-01 8.7467E-01 -8.8204E-01 9.0706E-01 8.7406E-01 -8.8371E-01
9.1316E-01 8.7355E-01 -8.8325E-01 9.0325E-01 8.7452E-01 -8.8345E-01 9.0543E-01 8.7471E-01 -8.8256E-01 9.1046E-
01 8.7293E-01 -8.8448E-01

2 9.5904E-01 1.0000E+00 -9.8362E-01 8.8081E-01 9.1508E-01 -8.9887E-01 8.7256E-01 9.1343E-01 -9.0098E-01
8.8117E-01 9.1242E-01 -9.0017E-01 8.6829E-01 9.1529E-01 -9.0148E-01 8.7093E-01 9.1644E-01 -9.0010E-01 8.7700E-
01 9.1149E-01 -9.0234E-01

3 -9.6865E-01 -9.8362E-01 1.0000E+00 -8.8703E-01 -8.9889E-01 9.1233E-01 -8.8035E-01 -8.9774E-01 9.1432E-01

-8.8752E-01 -8.9696E-01 9.1362E-01 -8.7639E-01 -8.9893E-01 9.1450E-01 -8.7875E-01 -8.9961E-01 9.1329E-01
-8.8418E-01 -8.9619E-01 9.1544E-01
4 9.1257E-01 8.8081E-01 -8.8703E-01 1.0000E+00 9.5795E-01 -9.6632E-01 9.0890E-01 8.7786E-01 -8.8923E-01
9.2265E-01 8.7685E-01 -8.8844E-01 9.0330E-01 8.8081E-01 -8.9041E-01 9.0704E-01 8.8295E-01 -8.8864E-01
9.1548E-01 8.7536E-01 -8.9129E-01
5 8.7467E-01 9.1508E-01 -8.9889E-01 9.5795E-01 1.0000E+00 -9.8364E-01 8.7214E-01 9.1300E-01 -9.0056E-01
8.8121E-01 9.1244E-01 -9.0019E-01 8.6766E-01 9.1468E-01 -9.0088E-01 8.7045E-01 9.1599E-01 -8.9963E-01 8.7670E-
01 9.1116E-01 -9.0202E-01
6 -8.8204E-01 -8.9887E-01 9.1233E-01 -9.6632E-01 -9.8364E-01 1.0000E+00 -8.7974E-01 -8.9723E-01 9.1382E-01
-8.8756E-01 -8.9689E-01 9.1357E-01 -8.7550E-01 -8.9830E-01 9.1386E-01 -8.7806E-01 -8.9919E-01 9.1276E-01
-8.8377E-01 -8.9573E-01 9.1509E-01
7 9.0706E-01 8.7256E-01 -8.8035E-01 9.0890E-01 8.7214E-01 -8.7974E-01 1.0000E+00 9.5963E-01 -9.6749E-01
9.0987E-01 8.7200E-01 -8.8116E-01 9.0253E-01 8.7227E-01 -8.8097E-01 9.0403E-01 8.7171E-01 -8.8006E-01 9.0861E-
01 8.7189E-01 -8.8223E-01
8 8.7406E-01 9.1343E-01 -8.9774E-01 8.7786E-01 9.1300E-01 -8.9723E-01 9.5963E-01 1.0000E+00 -9.8359E-01
8.7862E-01 9.1147E-01 -8.9872E-01 8.6877E-01 9.1346E-01 -8.9953E-01 8.7065E-01 9.1376E-01 -8.9819E-01 8.7610E-
01 9.1107E-01 -9.0062E-01
9 -8.8371E-01 -9.0098E-01 9.1432E-01 -8.8923E-01 -9.0056E-01 9.1382E-01 -9.6749E-01 -9.8359E-01 1.0000E+00
-8.8984E-01 -8.9837E-01 9.1538E-01 -8.7743E-01 -9.0119E-01 9.1689E-01 -8.7974E-01 -9.0192E-01 9.1524E-01
-8.8613E-01 -8.9786E-01 9.1788E-01
10 9.1316E-01 8.8117E-01 -8.8752E-01 9.2265E-01 8.8121E-01 -8.8756E-01 9.0987E-01 8.7862E-01 -8.8984E-01
1.0000E+00 9.5627E-01 -9.6689E-01 9.0437E-01 8.8128E-01 -8.9083E-01 9.0777E-01 8.8307E-01 -8.8895E-01
9.1631E-01 8.7640E-01 -8.9193E-01
11 8.7355E-01 9.1242E-01 -8.9696E-01 8.7685E-01 9.1244E-01 -8.9689E-01 8.7200E-01 9.1147E-01 -8.9837E-01
9.5627E-01 1.0000E+00 -9.8356E-01 8.6822E-01 9.1187E-01 -8.9789E-01 8.7011E-01 9.1211E-01 -8.9688E-01 8.7529E-
01 9.1047E-01 -8.9942E-01
12 -8.8325E-01 -9.0017E-01 9.1362E-01 -8.8844E-01 -9.0019E-01 9.1357E-01 -8.8116E-01 -8.9872E-01 9.1538E-01
-9.6689E-01 -9.8356E-01 1.0000E+00 -8.7686E-01 -8.9982E-01 9.1541E-01 -8.7921E-01 -9.0053E-01 9.1407E-01
-8.8541E-01 -8.9735E-01 9.1682E-01
13 9.0325E-01 8.6829E-01 -8.7639E-01 9.0330E-01 8.6766E-01 -8.7550E-01 9.0253E-01 8.6877E-01 -8.7743E-01
9.0437E-01 8.6822E-01 -8.7686E-01 1.0000E+00 9.5636E-01 -9.6439E-01 9.0086E-01 8.6695E-01 -8.7582E-01
9.0433E-01 8.6841E-01 -8.7759E-01
14 8.7452E-01 9.1529E-01 -8.9893E-01 8.8081E-01 9.1468E-01 -8.9830E-01 8.7227E-01 9.1346E-01 -9.0119E-01
8.8128E-01 9.1187E-01 -8.9982E-01 9.5636E-01 1.0000E+00 -9.8368E-01 8.7051E-01 9.1686E-01 -9.0026E-01 8.7707E-
01 9.1137E-01 -9.0269E-01
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-8.9083E-01 -8.9789E-01 9.1541E-01 -9.6439E-01 -9.8368E-01 1.0000E+00 -8.7917E-01 -9.0323E-01 9.1602E-01
-8.8614E-01 -8.9736E-01 9.1855E-01
16 9.0543E-01 8.7093E-01 -8.7875E-01 9.0704E-01 8.7045E-01 -8.7806E-01 9.0403E-01 8.7065E-01 -8.7974E-01
9.0777E-01 8.7011E-01 -8.7921E-01 9.0086E-01 8.7051E-01 -8.7917E-01 1.0000E+00 9.5560E-01 -9.6688E-01 9.0643E-
01 8.6982E-01 -8.8005E-01
17 8.7471E-01 9.1644E-01 -8.9961E-01 8.8295E-01 9.1599E-01 -8.9919E-01 8.7171E-01 9.1376E-01 -9.0192E-01
8.8307E-01 9.1211E-01 -9.0053E-01 8.6695E-01 9.1686E-01 -9.0323E-01 9.5560E-01 1.0000E+00 -9.8325E-01
8.7731E-01 9.1111E-01 -9.0366E-01
18 -8.8256E-01 -9.0010E-01 9.1329E-01 -8.8864E-01 -8.9963E-01 9.1276E-01 -8.8006E-01 -8.9819E-01 9.1524E-01
-8.8895E-01 -8.9688E-01 9.1407E-01 -8.7582E-01 -9.0026E-01 9.1602E-01 -9.6688E-01 -9.8325E-01 1.0000E+00
-8.8462E-01 -8.9613E-01 9.1659E-01
19 9.1046E-01 8.7700E-01 -8.8418E-01 9.1548E-01 8.7670E-01 -8.8377E-01 9.0861E-01 8.7610E-01 -8.8613E-01
9.1631E-01 8.7529E-01 -8.8541E-01 9.0433E-01 8.7707E-01 -8.8614E-01 9.0643E-01 8.7731E-01 -8.8462E-01
1.0000E+00 9.5938E-01 -9.6811E-01
20 8.7293E-01 9.1149E-01 -8.9619E-01 8.7536E-01 9.1116E-01 -8.9573E-01 8.7189E-01 9.1107E-01 -8.9786E-01

8.7640E-01 9.1047E-01 -8.9735E-01 8.6841E-01 9.1137E-01 -8.9736E-01 8.6982E-01 9.1111E-01 -8.9613E-01 9.5938E-01 1.0000E+00 -9.8218E-01
21 -8.8448E-01 -9.0234E-01 9.1544E-01 -8.9129E-01 -9.0202E-01 9.1509E-01 -8.8223E-01 -9.0062E-01 9.1788E-01 -8.9193E-01 -8.9942E-01 9.1682E-01 -8.7759E-01 -9.0269E-01 9.1855E-01 -8.8005E-01 -9.0366E-01 9.1659E-01 -9.6811E-01 -9.8218E-01 1.0000E+00

G-FILE for the vectors

Axx2014 7312014 731

B201407312000201407312200 7 rsgps 1.37IGS

lant_info.003 NGS

C00080001 -546406434 24 676898060 60 406176967 76
C00080002 872356758 23 359326889 60 542554292 76
C00080003 -785385589 24 -541268374 61 -701026359 76
C00080004 1041465959 23 -864915617 61 -461666636 76
C00080005 -1743049004 24 68071272 60 -477915876 76
C00080006 -1546852499 24 1286195797 60 607090227 76
C00080007 -13866257 24 -1722350276 61 -1532250858 76
D 1 2 9590388 1 3 -9686479 1 4 9125667 1 5 8746742 1 6 -8820383
D 1 7 9070608 1 8 8740609 1 9 -8837104 1 10 9131642 1 11 8735479
D 1 12 -8832525 1 13 9032533 1 14 8745197 1 15 -8834467 1 16 9054343
D 1 17 8747105 1 18 -8825553 1 19 9104646 1 20 8729255 1 21 -8844784
D 2 3 -9836217 2 4 8808070 2 5 9150833 2 6 -8988663 2 7 8725551
D 2 8 9134256 2 9 -9009835 2 10 8811676 2 11 9124181 2 12 -9001652
D 2 13 8682925 2 14 9152870 2 15 -9014790 2 16 8709293 2 17 9164372
D 2 18 -9000999 2 19 8769963 2 20 9114877 2 21 -9023353 3 4 -8870317
D 3 5 -8988908 3 6 9123330 3 7 -8803499 3 8 -8977378 3 9 9143156
D 3 10 -8875170 3 11 -8969624 3 12 9136246 3 13 -8763871 3 14 -8989281
D 3 15 9144972 3 16 -8787472 3 17 -8996123 3 18 9132947 3 19 -8841824
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D 4 8 8778570 4 9 -8892318 4 10 9226453 4 11 8768544 4 12 -8884392
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D 4 18 -8886444 4 19 9154807 4 20 8753627 4 21 -8912905 5 6 -9836389
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D 7 8 9596349 7 9 -9674924 7 10 9098687 7 11 8720025 7 12 -8811609
D 7 13 9025275 7 14 8722746 7 15 -8809691 7 16 9040328 7 17 8717138
D 7 18 -8800581 7 19 9086100 7 20 8718895 7 21 -8822256 8 9 -9835927
D 8 10 8786171 8 11 9114708 8 12 -8987227 8 13 8687650 8 14 9134584
D 8 15 -8995330 8 16 8706545 8 17 9137595 8 18 -8981924 8 19 8760954
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D 9 18 9152443 9 19 -8861261 9 20 -8978561 9 21 9178750 10 11 9562736
D 10 12 -9668902 10 13 9043733 10 14 8812822 10 15 -8908270 10 16 9077715
D 10 17 8830667 10 18 -8889510 10 19 9163081 10 20 8763978 10 21 -8919263
D 11 12 -9835589 11 13 8682163 11 14 9118725 11 15 -8978907 11 16 8701094

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 D 14 18 -9002575 14 19 8770742 14 20 9113702 14 21 -9026915 15 16 -8791689
 D 15 17 -9032287 15 18 9160175 15 19 -8861418 15 20 -8973635 15 21 9185521
 D 16 17 9555993 16 18 -9668848 16 19 9064256 16 20 8698239 16 21 -8800484
 D 17 18 -9832493 17 19 8773124 17 20 9111137 17 21 -9036645 18 19 -8846221
 D 18 20 -8961256 18 21 9165925 19 20 9593849 19 21 -9681146 20 21 -9821817

ITRF position of 0186 as determined by individual baselines

	X	Y	Z
mtms	-1370794.945	-4051703.031	4716876.203
p053	-1370794.944	-4051703.041	4716876.213
mtlw	-1370794.928	-4051703.007	4716876.166
p052	-1370794.946	-4051703.027	4716876.189
p049	-1370794.948	-4051703.029	4716876.198
p050	-1370794.943	-4051703.030	4716876.190
bil6	-1370794.946	-4051703.038	4716876.199

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
mtms	-0.012	-0.025	0.039	-0.003	0.006	0.047
p053	-0.011	-0.035	0.049	0.001	0.006	0.061
mtlw	0.005	-0.001	0.002	0.005	0.002	0.001
p052	-0.013	-0.021	0.025	-0.006	-0.001	0.035
p049	-0.016	-0.022	0.034	-0.008	0.004	0.043
p050	-0.010	-0.024	0.026	-0.002	-0.002	0.037
bil6	-0.013	-0.031	0.035	-0.002	-0.002	0.049

STATE PLANE COORDINATES - International Foot

SPC (2500 MT)

Northing (Y) [feet] 1364252.047
 Easting (X) [feet] 2166280.630
 Convergence [degrees] 0.59107072
 Point Scale 0.99953832
 Combined Factor 0.99937141

** 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: 1079.906 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.424
scatter (mean square distance from rover) is 26501.352
average edop for rover is 0.770
average ndop for rover is 1.010
average hdop for rover is 1.270
average vdop for rover is 2.340
average gdop for rover is 3.140

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.