



**Subject** OPUS-RS solution : BM\_160A0.170 OP1497111317198  
**From** opus <opus@ngs.noaa.gov>  
**To:** southcosurvey@yahoo.com <southcosurvey@yahoo.com>  
**Date** Sat, 10 Jun, 2017 at 10:19 am

FILE: BM\_160A0.170 OP1497111317198

2005 NOTE: The IGS precise and IGS rapid orbits were not available  
 2005 at processing time. The IGS ultra-rapid orbit was/will be used to  
 2005 process the data.  
 2005

NGS OPUS-RS SOLUTION REPORT  
 =====

All computed coordinate accuracies are listed as 1-sigma RMS values.  
 For additional information: <https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: [southcosurvey@yahoo.com](mailto:southcosurvey@yahoo.com) DATE: June 10, 2017  
 RINEX FILE: bm\_160r.17o TIME: 16:17:17 UTC

SOFTWARE: rsgps 1.38 RS57.prl 1.99.3 START: 2017/06/09 17:32:00  
 EPHEMERIS: igu19525.eph [ultra-rapid] STOP: 2017/06/09 18:01:30  
 NAV FILE: brdc1600.17n OBS USED: 3222 / 3222 : 100%  
 ANT NAME: CHCX91+S NONE QUALITY IND. 31.55/ 6.01  
 ARP HEIGHT: 1.3929 NORMALIZED RMS: 0.421

REF FRAME: NAD\_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2017.43765)

X: -1404862.645(m) 0.029(m) -1404863.507(m) 0.029(m)  
 Y: -4851631.648(m) 0.072(m) -4851630.312(m) 0.072(m)  
 Z: 3885430.678(m) 0.076(m) 3885430.552(m) 0.076(m)

LAT: 37 45 19.23235 0.031(m) 37 45 19.24985 0.031(m)  
 E LON: 253 51 3.00470 0.040(m) 253 51 2.95574 0.040(m)  
 W LON: 106 8 56.99530 0.040(m) 106 8 57.04426 0.040(m)  
 EL HGT: 2321.158(m) 0.097(m) 2320.256(m) 0.097(m)  
 ORTHO HGT: 2337.629(m) 0.100(m) [NAVD88 (Computed using GEOID12B)]

UTM COORDINATES STATE PLANE COORDINATES  
 UTM (Zone 13) SPC (0503 CO S)

Northing (Y) [meters] 4179291.933 425824.651  
 Easting (X) [meters] 398770.366 857198.663  
 Convergence [degrees] -0.70368334 -0.39818378  
 Point Scale 0.99972622 0.99994634  
 Combined Factor 0.99936222 0.99958226

US NATIONAL GRID DESIGNATOR: 13SCB9877079291(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
007406	0007	45.000000	100.000000	117700.0

DG7426 P037 FREEMONTAPCO2004 CORS ARP N382518.293 W1050616.819 117796.0  
DQ3903 RG23 RG23SANDNPCO2006 CORS ARP N374437.922 W1052954.609 57379.9  
D02634 CTI4 COMPASSTOOLS4CRNR CORS ARP N370910.489 W1074521.876 157161.9  
DQ3900 RG21 RG21FREEMNCO2006 CORS ARP N374604.231 W1070633.057 84638.2  
AI7401 AMC2 ALTERNATE MASTER CORS ARP N384811.226 W1043128.496 183714.8  
DK7753 P123 TRESPIEDRANM2006 CORS ARP N363806.598 W1055439.006 126151.2  
DQ3897 RG09 RG09LNRDRTHNM2006 CORS ARP N361816.595 W1070321.136 180136.9  
DL3478 R301 CRAWFORD CORS ARP N383923.739 W1073527.367 161150.4  
DM5962 CTMC CDOT GOLDEN CORS ARP N394317.493 W1051134.335 233626.0

NEAREST NGS PUBLISHED CONTROL POINT

AJ7779 U285 MP63.35 N374519.228 W1060856.993 0.1

OPUS-RS Extended Output, Level 2

FINAL COORDINATES (ITRF at epoch of observations)

p037 -1304152.071 -4831831.398 3943232.957  
rg23 -1349949.979 -4868252.029 3884607.366  
cti4 -1552692.462 -4848834.558 3832151.691  
rg21 -1485806.972 -4826934.138 3886799.457  
amc2 -1248596.375 -4819428.196 3976505.935  
p123 -1405300.533 -4929803.030 3786420.585  
rg09 -1509878.137 -4921415.365 3756778.730  
r301 -1507714.704 -4755525.178 3963883.562  
ctmc -1287788.634 -4742177.043 4055414.518  
bm\_\_ -1404863.507 -4851630.312 3885430.552

Covariance matrix of the stations:

1 5.0890E-07 1.4860E-06 -9.9130E-07 -4.1610E-08 -2.0520E-07 1.3390E-07 -7.0810E-08  
-1.6520E-07 8.7630E-08 -6.3970E-08 -1.8480E-07 1.1790E-07 -1.8620E-08 -2.0020E-07 1.6480E-07  
-4.9560E-08 -1.9360E-07 9.5080E-08 -6.3250E-08 -1.7150E-07 7.1150E-08 -6.6360E-08 -1.7440E-07  
1.3550E-07 -2.3750E-08 -1.9030E-07 1.8520E-07 5.0420E-08 1.1520E-07 -7.9240E-08  
2 1.4860E-06 6.0430E-06 -4.1850E-06 -1.9500E-07 -7.0920E-07 5.0640E-07 -1.6360E-07  
-7.9680E-07 5.9530E-07 -1.6880E-07 -7.5500E-07 5.4180E-07 -2.2110E-07 -6.8530E-07 4.3720E-07  
-1.8860E-07 -7.4610E-07 5.7720E-07 -1.7390E-07 -7.9150E-07 6.2120E-07 -1.6390E-07 -7.6080E-07  
5.0980E-07 -2.1140E-07 -6.8730E-07 3.9690E-07 -2.8060E-08 -1.5360E-07 1.3840E-07  
3 -9.9130E-07 -4.1850E-06 3.1600E-06 1.3520E-07 4.6610E-07 -3.4890E-07 8.7750E-08  
5.8830E-07 -4.7270E-07 9.9320E-08 5.4120E-07 -4.0520E-07 1.8030E-07 4.6400E-07 -2.7370E-07  
1.1810E-07 4.8910E-07 -4.3070E-07 9.5830E-08 5.5460E-07 -4.9370E-07 1.0030E-07 5.7840E-07  
-3.8000E-07 1.7500E-07 5.0370E-07 -2.4450E-07 5.3010E-08 2.3460E-07 -1.6750E-07  
4 -4.1610E-08 -1.9500E-07 1.3520E-07 5.2840E-07 1.5490E-06 -1.0160E-06 -6.6110E-08  
-1.9340E-07 1.1500E-07 -6.1330E-08 -1.9890E-07 1.2700E-07 -3.4220E-08 -1.8830E-07 1.3670E-07  
-5.2530E-08 -1.9840E-07 1.1280E-07 -6.1330E-08 -1.9400E-07 1.0530E-07 -6.3060E-08 -1.9490E-07  
1.3640E-07 -3.7280E-08 -1.8550E-07 1.4760E-07 2.1340E-08 2.2180E-08 -1.7570E-08  
5 -2.0520E-07 -7.0920E-07 4.6610E-07 1.5490E-06 5.9460E-06 -3.9440E-06 -1.7840E-07  
-7.5290E-07 5.3110E-07 -1.8240E-07 -7.3280E-07 5.0300E-07 -2.1530E-07 -7.1090E-07 4.5570E-07  
-1.9530E-07 -7.3710E-07 5.2880E-07 -1.8510E-07 -7.5470E-07 5.4890E-07 -1.7890E-07 -7.3230E-07  
4.8220E-07 -2.0870E-07 -7.0470E-07 4.2800E-07 -5.3120E-08 -2.1610E-07 1.6080E-07  
6 1.3390E-07 5.0640E-07 -3.4890E-07 -1.0160E-06 -3.9440E-06 2.8550E-06 1.1710E-07 4.7140E-07  
-3.3190E-07 1.2260E-07 4.8260E-07 -3.3630E-07 1.3920E-07 5.2240E-07 -3.5870E-07 1.2040E-07  
-4.6760E-07 2.2180E-07 1.1460E-07 4.5880E-07 2.2700E-07 1.2600E-07 4.2760E-07 2.4220E-07

U/ 4.6760E-07 -3.3100E-07 1.1460E-07 4.5930E-07 -3.2780E-07 1.2680E-07 4.9760E-07 -3.4320E-07 1.4210E-07 5.3590E-07 -3.6620E-07 2.3710E-08 1.0840E-07 -6.2070E-08  
7 -7.0810E-08 -1.6360E-07 8.7750E-08 -6.6110E-08 -1.7840E-07 1.1710E-07 6.3660E-07 1.5650E-06 -9.6830E-07 -5.6390E-08 -2.2440E-07 1.5070E-07 -7.8540E-08 -1.5230E-07 6.7260E-08 -6.3540E-08 -2.0440E-07 1.6200E-07 -5.8700E-08 -2.4330E-07 1.9560E-07 -5.5780E-08 -2.3490E-07 1.3700E-07 -7.5440E-08 -1.6450E-07 5.0900E-08 -3.0030E-08 -1.2630E-07 8.7070E-08  
8 -1.6520E-07 -7.9680E-07 5.8830E-07 -1.9340E-07 -7.5290E-07 4.7140E-07 1.5650E-06 5.4060E-06 -3.5660E-06 -2.4550E-07 -5.4140E-07 3.2000E-07 -1.2560E-07 -8.3830E-07 6.7370E-07 -2.1110E-07 -6.5600E-07 2.8110E-07 -2.3800E-07 -4.7680E-07 1.2870E-07 -2.4820E-07 -4.7840E-07 3.7360E-07 -1.3720E-07 -7.5480E-07 7.2870E-07 7.9200E-08 3.9300E-07 -2.9840E-07  
9 8.7630E-08 5.9530E-07 -4.7270E-07 1.1500E-07 5.3110E-07 -3.3190E-07 -9.6830E-07 -3.5660E-06 2.6280E-06 1.7750E-07 3.1740E-07 -1.7710E-07 4.4810E-08 6.4560E-07 -5.7100E-07 1.2880E-07 4.0100E-07 -1.0580E-07 1.6010E-07 2.1180E-07 5.7710E-08 1.8800E-07 2.7470E-07 -2.5620E-07 6.5810E-08 5.8930E-07 -6.5970E-07 -1.0770E-07 -4.5520E-07 3.6030E-07  
10 -6.3970E-08 -1.6880E-07 9.9320E-08 -6.1330E-08 -1.8240E-07 1.2260E-07 -5.6390E-08 -2.4550E-07 1.7750E-07 6.0310E-07 1.5900E-06 -1.0340E-06 -6.8850E-08 -1.5770E-07 8.2320E-08 -6.0360E-08 -2.0430E-07 1.5710E-07 -5.8230E-08 -2.3620E-07 1.8380E-07 -5.5870E-08 -2.2880E-07 1.4090E-07 -6.6820E-08 -1.6720E-07 7.0830E-08 -1.9500E-08 -1.0040E-07 7.2130E-08  
11 -1.8480E-07 -7.5500E-07 5.4120E-07 -1.9890E-07 -7.3280E-07 4.8260E-07 -2.2440E-07 -5.4140E-07 3.1740E-07 1.5900E-06 5.4860E-06 -3.6440E-06 -1.6600E-07 -7.8130E-07 5.8780E-07 -2.0750E-07 -6.8390E-07 3.8710E-07 -2.1820E-07 -5.8310E-07 3.0430E-07 -2.2060E-07 -5.7090E-07 4.1730E-07 -1.6940E-07 -7.2640E-07 6.0620E-07 2.2430E-08 1.5020E-07 -1.0740E-07  
12 1.1790E-07 5.4180E-07 -4.0520E-07 1.2700E-07 5.0300E-07 -3.3630E-07 1.5070E-07 3.2000E-07 -1.7710E-07 -1.0340E-06 -3.6440E-06 2.6610E-06 1.0180E-07 5.7530E-07 -4.5650E-07 1.2860E-07 4.3070E-07 -2.2800E-07 1.3840E-07 3.3650E-07 -1.4980E-07 1.5710E-07 3.8310E-07 -2.9810E-07 1.1230E-07 5.5400E-07 -4.9850E-07 -3.1980E-08 -1.5620E-07 1.3210E-07  
13 -1.8620E-08 -2.2110E-07 1.8030E-07 -3.4220E-08 -2.1530E-07 1.3920E-07 -7.8540E-08 -1.2560E-07 4.4810E-08 -6.8850E-08 -1.6600E-07 1.0180E-07 5.0220E-07 1.4040E-06 -9.2030E-07 -4.6190E-08 -1.8790E-07 6.6280E-08 -6.6840E-08 -1.3970E-07 1.8330E-08 -7.2360E-08 -1.4680E-07 1.3150E-07 -5.6620E-09 -2.0070E-07 2.3810E-07 6.5580E-08 1.6670E-07 -1.1640E-07  
14 -2.0020E-07 -6.8530E-07 4.6400E-07 -1.8830E-07 -7.1090E-07 5.2240E-07 -1.5230E-07 -8.3830E-07 6.4560E-07 -1.5770E-07 -7.8130E-07 5.7530E-07 1.4040E-06 6.1900E-06 -4.4160E-06 -1.8090E-07 -7.6070E-07 6.1440E-07 -1.6430E-07 -8.2670E-07 6.7540E-07 -1.5210E-07 -7.9210E-07 5.3700E-07 -2.0910E-07 -6.8340E-07 3.8260E-07 -7.0970E-08 -3.5550E-07 2.9340E-07  
15 1.6480E-07 4.3720E-07 -2.7370E-07 1.3670E-07 4.5570E-07 -3.5870E-07 6.7260E-08 6.7370E-07 -5.7100E-07 8.2320E-08 5.8780E-07 -4.5650E-07 -9.2030E-07 -4.4160E-06 3.4590E-06 1.1390E-07 5.0930E-07 -5.0020E-07 8.1800E-08 6.2490E-07 -6.0730E-07 8.1330E-08 6.4000E-07 -4.1110E-07 1.9300E-07 4.8740E-07 -1.7000E-07 1.1390E-07 4.9360E-07 -3.6710E-07  
16 -4.9560E-08 -1.8860E-07 1.1810E-07 -5.2530E-08 -1.9530E-07 1.2040E-07 -6.3540E-08 -2.1110E-07 1.2880E-07 -6.0360E-08 -2.0750E-07 1.2860E-07 -4.6190E-08 -1.8090E-07 1.1390E-07 5.5330E-07 1.5830E-06 -9.8450E-07 -6.0600E-08 -2.0760E-07 1.2360E-07 -6.1780E-08 -2.0830E-07 1.3260E-07 -4.7920E-08 -1.8320E-07 1.1850E-07 7.8360E-09 -1.7570E-08 4.4620E-09  
17 -1.9360E-07 -7.4610E-07 4.8910E-07 -1.9840E-07 -7.3710E-07 4.6760E-07 -2.0440E-07 -6.5600E-07 4.0100E-07 -2.0430E-07 -6.8390E-07 4.3070E-07 -1.8790E-07 -7.6070E-07 5.0930E-07 1.5830E-06 5.7710E-06 -3.6440E-06 -2.0260E-07 -6.7370E-07 3.9840E-07 -2.0400E-07 -6.6750E-07 4.3640E-07 -1.8830E-07 -7.3510E-07 5.1170E-07 -1.2630E-08 -3.3090E-08 3.4270E-11  
18 9.5080E-08 5.7720E-07 -4.3070E-07 1.1280E-07 5.2880E-07 -3.3100E-07 1.6200E-07 2.8110E-07 -1.0580E-07 1.5710E-07 3.8710E-07 -2.2800E-07 6.6280E-08 6.1440E-07 -5.0020E-07 -9.8450E-07 -3.6440E-06 2.6230E-06 1.4200E-07 3.0380E-07 -5.9820E-08 1.6660E-07 3.6550E-07 -2.8790E-07 8.3000E-08 5.8520E-07 -5.6840E-07 -7.2880E-08 -2.6940E-07 2.3250E-07  
19 -6.3250E-08 -1.7390E-07 9.5830E-08 -6.1330E-08 -1.8510E-07 1.1460E-07 -5.8700E-08 -2.3800E-07 1.6010E-07 -5.8230E-08 -2.1820E-07 1.3840E-07 -6.6840E-08 -1.6430E-07 8.1800E-08 -6.0600E-08 -2.0260E-07 1.4200E-07 6.0420E-07 1.5810E-06 -9.3850E-07 -5.8570E-08 -2.2560E-07 1.3180E-07 -6.5730E-08 -1.7340E-07 7.3830E-08 -1.5880E-08 -8.4830E-08 5.1560E-08  
20 -1.7150E-07 -7.9150E-07 5.5460E-07 -1.9400E-07 -7.5470E-07 4.5930E-07 -2.4330E-07 4.7600E-07 3.1100E-07 3.3600E-07 5.0010E-07 3.0650E-07 1.0070E-07 3.0670E-07 6.0400E-07

-4.7680E-07 2.1180E-07 -2.3620E-07 -5.8310E-07 3.3650E-07 -1.3970E-07 -8.2670E-07 6.2490E-07  
-2.0760E-07 -6.7370E-07 3.0380E-07 1.5810E-06 5.5120E-06 -3.5420E-06 -2.3910E-07 -5.3400E-07  
3.8100E-07 -1.4960E-07 -7.6050E-07 6.7040E-07 5.7920E-08 2.8670E-07 -2.3910E-07  
21 7.1150E-08 6.2120E-07 -4.9370E-07 1.0530E-07 5.4890E-07 -3.2780E-07 1.9560E-07 1.2870E-  
07 5.7710E-08 1.8380E-07 3.0430E-07 -1.4980E-07 1.8330E-08 6.7540E-07 -6.0730E-07 1.2360E-  
07 3.9840E-07 -5.9820E-08 -9.3850E-07 -3.5420E-06 2.6540E-06 1.9640E-07 2.5370E-07 -2.4570E-  
07 4.4000E-08 6.1110E-07 -7.1590E-07 -1.3940E-07 -5.5150E-07 4.4240E-07  
22 -6.6360E-08 -1.6390E-07 1.0030E-07 -6.3060E-08 -1.7890E-07 1.2680E-07 -5.5780E-08  
-2.4820E-07 1.8800E-07 -5.5870E-08 -2.2060E-07 1.5710E-07 -7.2360E-08 -1.5210E-07 8.1330E-08  
-6.1780E-08 -2.0400E-07 1.6660E-07 -5.8570E-08 -2.3910E-07 1.9640E-07 6.1490E-07 1.5680E-06  
-1.0830E-06 -6.9510E-08 -1.6140E-07 6.6710E-08 -2.3970E-08 -1.1090E-07 8.5910E-08  
23 -1.7440E-07 -7.6080E-07 5.7840E-07 -1.9490E-07 -7.3230E-07 4.9760E-07 -2.3490E-07  
-4.7840E-07 2.7470E-07 -2.2880E-07 -5.7090E-07 3.8310E-07 -1.4680E-07 -7.9210E-07 6.4000E-07  
-2.0830E-07 -6.6750E-07 3.6550E-07 -2.2560E-07 -5.3400E-07 2.5370E-07 1.5680E-06 5.3670E-06  
-3.6630E-06 -1.5230E-07 -7.2010E-07 6.6950E-07 4.7850E-08 2.5970E-07 -1.6680E-07  
24 1.3550E-07 5.0980E-07 -3.8000E-07 1.3640E-07 4.8220E-07 -3.4320E-07 1.3700E-07 3.7360E-  
07 -2.5620E-07 1.4090E-07 4.1730E-07 -2.9810E-07 1.3150E-07 5.3700E-07 -4.1110E-07 1.3260E-  
07 4.3640E-07 -2.8790E-07 1.3180E-07 3.8100E-07 -2.4570E-07 -1.0830E-06 -3.6630E-06 2.7630E-  
06 1.3640E-07 5.2690E-07 -4.2910E-07 5.2960E-09 -3.2660E-08 2.6480E-08  
25 -2.3750E-08 -2.1140E-07 1.7500E-07 -3.7280E-08 -2.0870E-07 1.4210E-07 -7.5440E-08  
-1.3720E-07 6.5810E-08 -6.6820E-08 -1.6940E-07 1.1230E-07 -5.6620E-09 -2.0910E-07 1.9300E-07  
-4.7920E-08 -1.8830E-07 8.3000E-08 -6.5730E-08 -1.4960E-07 4.4000E-08 -6.9510E-08 -1.5230E-07  
1.3640E-07 5.0330E-07 1.4270E-06 -9.5160E-07 5.5320E-08 1.3610E-07 -8.7930E-08  
26 -1.9030E-07 -6.8730E-07 5.0370E-07 -1.8550E-07 -7.0470E-07 5.3590E-07 -1.6450E-07  
-7.5480E-07 5.8930E-07 -1.6720E-07 -7.2640E-07 5.5400E-07 -2.0070E-07 -6.8340E-07 4.8740E-07  
-1.8320E-07 -7.3510E-07 5.8520E-07 -1.7340E-07 -7.6050E-07 6.1110E-07 -1.6140E-07 -7.2010E-07  
5.2690E-07 1.4270E-06 5.8840E-06 -4.3930E-06 -4.2390E-08 -2.1950E-07 2.1840E-07  
27 1.8520E-07 3.9690E-07 -2.4450E-07 1.4760E-07 4.2800E-07 -3.6620E-07 5.0900E-08 7.2870E-  
07 -6.5970E-07 7.0830E-08 6.0620E-07 -4.9850E-07 2.3810E-07 3.8260E-07 -1.7000E-07 1.1850E-  
07 5.1170E-07 -5.6840E-07 7.3830E-08 6.7040E-07 -7.1590E-07 6.6710E-08 6.6950E-07 -4.2910E-  
07 -9.5160E-07 -4.3930E-06 3.7630E-06 1.5600E-07 6.2870E-07 -4.8600E-07  
28 5.0420E-08 -2.8060E-08 5.3010E-08 2.1340E-08 -5.3120E-08 2.3710E-08 -3.0030E-08  
7.9200E-08 -1.0770E-07 -1.9500E-08 2.2430E-08 -3.1980E-08 6.5580E-08 -7.0970E-08 1.1390E-07  
7.8360E-09 -1.2630E-08 -7.2880E-08 -1.5880E-08 5.7920E-08 -1.3940E-07 -2.3970E-08 4.7850E-08  
5.2960E-09 5.5320E-08 -4.2390E-08 1.5600E-07 5.8040E-06 1.6960E-05 -1.1080E-05  
29 1.1520E-07 -1.5360E-07 2.3460E-07 2.2180E-08 -2.1610E-07 1.0840E-07 -1.2630E-07  
3.9300E-07 -4.5520E-07 -1.0040E-07 1.5020E-07 -1.5620E-07 1.6670E-07 -3.5550E-07 4.9360E-07  
-1.7570E-08 -3.3090E-08 -2.6940E-07 -8.4830E-08 2.8670E-07 -5.5150E-07 -1.1090E-07 2.5970E-07  
-3.2660E-08 1.3610E-07 -2.1950E-07 6.2870E-07 1.6960E-05 6.0970E-05 -4.0370E-05  
30 -7.9240E-08 1.3840E-07 -1.6750E-07 -1.7570E-08 1.6080E-07 -6.2070E-08 8.7070E-08  
-2.9840E-07 3.6030E-07 7.2130E-08 -1.0740E-07 1.3210E-07 -1.1640E-07 2.9340E-07 -3.6710E-07  
4.4620E-09 3.4270E-11 2.3250E-07 5.1560E-08 -2.3910E-07 4.4240E-07 8.5910E-08 -1.6680E-07  
2.6480E-08 -8.7930E-08 2.1840E-07 -4.8600E-07 -1.1080E-05 -4.0370E-05 2.8940E-05

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

0.0000058040	0.0000169600	-0.0000110800
0.0000169600	0.0000609700	-0.0000403700
-0.0000110800	-0.0000403700	0.0000289400

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

0.0000010095	0.0000002188	0.0000006761
0.0000002188	0.0000021712	-0.0000070603
0.0000006761	-0.0000070603	0.0000925333

Horizontal network accuracy = 0.00315 meters.

Vertical network accuracy = 0.01000 meters.

vertical network accuracy = 0.01886 meters.

### Vectors

To	From	X	Y	Z
p037	bm__	100711.436	19798.914	57802.405
rg23	bm__	54913.528	-16621.717	-823.186
cti4	bm__	-147828.955	2795.755	-53278.861
rg21	bm__	-80943.466	24696.174	1368.905
amc2	bm__	156267.132	32202.116	91075.383
p123	bm__	-437.026	-78172.718	-99009.967
rg09	bm__	-105014.630	-69785.052	-128651.822
r301	bm__	-102851.198	96105.134	78453.010
ctmc	bm__	117074.872	109453.269	169983.966

### Covariance matrix of the 9 vectors

1 6.2121E-06 1.8359E-05 -1.2045E-05 5.6906E-06 1.6693E-05 -1.0891E-05 5.7128E-06 1.6600E-05 -1.0805E-05 5.7091E-06 1.6638E-05 -1.0851E-05 5.6694E-06 1.6716E-05 -1.0950E-05 5.6962E-06 1.6664E-05 -1.0833E-05 5.7062E-06 1.6615E-05 -1.0790E-05 5.7112E-06 1.6623E-05 -1.0871E-05 5.6745E-06 1.6697E-05 -1.0972E-05

2 1.8359E-05 6.7320E-05 -4.4928E-05 1.6771E-05 6.0631E-05 -4.0110E-05 1.6951E-05 5.9934E-05 -3.9458E-05 1.6920E-05 6.0218E-05 -3.9810E-05 1.6600E-05 6.0794E-05 -4.0565E-05 1.6817E-05 6.0411E-05 -3.9662E-05 1.6899E-05 6.0045E-05 -3.9336E-05 1.6935E-05 6.0103E-05 -3.9966E-05 1.6641E-05 6.0656E-05 -4.0740E-05

3 -1.2045E-05 -4.4928E-05 3.2435E-05 -1.0980E-05 -4.0299E-05 2.8821E-05 -1.1132E-05 -3.9718E-05 2.8275E-05 -1.1106E-05 -3.9956E-05 2.8570E-05 -1.0836E-05 -4.0434E-05 2.9201E-05 -1.1019E-05 -4.0116E-05 2.8444E-05 -1.1089E-05 -3.9811E-05 2.8171E-05 -1.1119E-05 -3.9859E-05 2.8701E-05 -1.0870E-05 -4.0319E-05 2.9349E-05

4 5.6906E-06 1.6771E-05 -1.0980E-05 6.2897E-06 1.8540E-05 -1.2102E-05 5.7466E-06 1.6665E-05 -1.0840E-05 5.7408E-06 1.6716E-05 -1.0903E-05 5.6829E-06 1.6820E-05 -1.1040E-05 5.7223E-06 1.6752E-05 -1.0877E-05 5.7372E-06 1.6686E-05 -1.0818E-05 5.7436E-06 1.6695E-05 -1.0931E-05 5.6901E-06 1.6795E-05 -1.1071E-05

5 1.6693E-05 6.0631E-05 -4.0299E-05 1.8540E-05 6.7348E-05 -4.4583E-05 1.6961E-05 6.0040E-05 -3.9545E-05 1.6931E-05 6.0303E-05 -3.9872E-05 1.6631E-05 6.0831E-05 -4.0569E-05 1.6835E-05 6.0482E-05 -3.9733E-05 1.6913E-05 6.0145E-05 -3.9430E-05 1.6945E-05 6.0194E-05 -4.0016E-05 1.6668E-05 6.0701E-05 -4.0732E-05

6 -1.0891E-05 -4.0110E-05 2.8821E-05 -1.2102E-05 -4.4583E-05 3.1919E-05 -1.1074E-05 -3.9709E-05 2.8310E-05 -1.1053E-05 -3.9888E-05 2.8534E-05 -1.0848E-05 -4.0249E-05 2.9010E-05 -1.0988E-05 -4.0011E-05 2.8439E-05 -1.1041E-05 -3.9780E-05 2.8232E-05 -1.1063E-05 -3.9814E-05 2.8632E-05 -1.0874E-05 -4.0161E-05 2.9122E-05

7 5.7128E-06 1.6951E-05 -1.1132E-05 5.7466E-06 1.6961E-05 -1.1074E-05 6.5007E-06 1.8572E-05 -1.2028E-05 5.7971E-06 1.6839E-05 -1.0984E-05 5.6899E-06 1.7005E-05 -1.1214E-05 5.7627E-06 1.6895E-05 -1.0932E-05 5.7912E-06 1.6785E-05 -1.0832E-05 5.8022E-06 1.6804E-05 -1.1035E-05 5.7033E-06 1.6964E-05 -1.1272E-05

8 1.6600E-05 5.9934E-05 -3.9718E-05 1.6665E-05 6.0040E-05 -3.9709E-05 1.8572E-05 6.5590E-05 -4.3182E-05 1.6736E-05 5.9885E-05 -3.9595E-05 1.6588E-05 6.0094E-05 -3.9892E-05 1.6687E-05 5.9954E-05 -3.9521E-05 1.6728E-05 5.9813E-05 -3.9391E-05 1.6743E-05 5.9839E-05 -3.9665E-05 1.6607E-05 6.0042E-05 -3.9972E-05

9 -1.0805E-05 -3.9458E-05 2.8275E-05 -1.0840E-05 -3.9545E-05 2.8310E-05 -1.2028E-05 -4.3182E-05 3.0847E-05 -1.0867E-05 -3.9490E-05 2.8270E-05 -1.0811E-05 -3.9563E-05 2.8376E-05 -1.0848E-05 -3.9514E-05 2.8241E-05 -1.0864E-05 -3.9464E-05 2.8195E-05 -1.0870E-05 -3.9473E-05 2.8297E-05 -1.0819E-05 -3.9544E-05 2.8406E-05

10 5.7091E-06 1.6920E-05 -1.1106E-05 5.7408E-06 1.6931E-05 -1.1053E-05 5.7971E-06 1.6736E-05 -1.0867E-05 6.4461E-06 1.8628E-05 -1.2154E-05 5.6891E-06 1.6974E-05 -1.1184E-05 5.7553E-06 1.6869E-05 -1.0922E-05 5.7811E-06 1.6766E-05 -1.0829E-05 5.7916E-06 1.6784E-05 -1.1017E-05 5.7014E-06 1.6886E-05 -1.1027E-05

U5 5./U14E-U6 1.6936E-U5 -1.1237E-U5

11 1.6638E-05 6.0218E-05 -3.9956E-05 1.6716E-05 6.0303E-05 -3.9888E-05 1.6839E-05 5.9885E-05 -3.9490E-05 1.8628E-05 6.6156E-05 -4.3750E-05 1.6605E-05 6.0394E-05 -4.0168E-05 1.6748E-05 6.0169E-05 -3.9606E-05 1.6804E-05 5.9950E-05 -3.9407E-05 1.6828E-05 5.9989E-05 -3.9813E-05 1.6632E-05 6.0313E-05 -4.0285E-05

12 -1.0851E-05 -3.9810E-05 2.8570E-05 -1.0903E-05 -3.9872E-05 2.8534E-05 -1.0984E-05 -3.9595E-05 2.8270E-05 -1.2154E-05 -4.3750E-05 3.1337E-05 -1.0830E-05 -3.9932E-05 2.8718E-05 -1.0924E-05 -3.9783E-05 2.8347E-05 -1.0961E-05 -3.9638E-05 2.8216E-05 -1.0977E-05 -3.9664E-05 2.8483E-05 -1.0848E-05 -3.9878E-05 2.8795E-05

13 5.6694E-06 1.6600E-05 -1.0836E-05 5.6829E-06 1.6631E-05 -1.0848E-05 5.6899E-06 1.6588E-05 -1.0811E-05 5.6891E-06 1.6605E-05 -1.0830E-05 6.1750E-06 1.8268E-05 -1.1998E-05 5.6844E-06 1.6618E-05 -1.0824E-05 5.6875E-06 1.6596E-05 -1.0806E-05 5.6900E-06 1.6599E-05 -1.0837E-05 5.6774E-06 1.6635E-05 -1.0882E-05

14 1.6716E-05 6.0794E-05 -4.0434E-05 1.6820E-05 6.0831E-05 -4.0249E-05 1.7005E-05 6.0094E-05 -3.9563E-05 1.6974E-05 6.0394E-05 -3.9932E-05 1.8268E-05 6.7871E-05 -4.5573E-05 1.6868E-05 6.0598E-05 -3.9780E-05 1.6952E-05 6.0212E-05 -3.9437E-05 1.6990E-05 6.0274E-05 -4.0094E-05 1.6686E-05 6.0862E-05 -4.0909E-05

15 -1.0950E-05 -4.0565E-05 2.9201E-05 -1.1040E-05 -4.0569E-05 2.9010E-05 -1.1214E-05 -3.9892E-05 2.8376E-05 -1.1184E-05 -4.0168E-05 2.8718E-05 -1.1998E-05 -4.5573E-05 3.3133E-05 -1.1084E-05 -4.0354E-05 2.8574E-05 -1.1164E-05 -4.0000E-05 2.8257E-05 -1.1198E-05 -4.0057E-05 2.8870E-05 -1.0913E-05 -4.0595E-05 2.9623E-05

16 5.6962E-06 1.6817E-05 -1.1019E-05 5.7223E-06 1.6835E-05 -1.0988E-05 5.7627E-06 1.6687E-05 -1.0848E-05 5.7553E-06 1.6748E-05 -1.0924E-05 5.6844E-06 1.6868E-05 -1.1084E-05 6.3416E-06 1.8573E-05 -1.1996E-05 5.7514E-06 1.6712E-05 -1.0821E-05 5.7584E-06 1.6721E-05 -1.0957E-05 5.6929E-06 1.6837E-05 -1.1122E-05

17 1.6664E-05 6.0411E-05 -4.0116E-05 1.6752E-05 6.0482E-05 -4.0011E-05 1.6895E-05 5.9954E-05 -3.9514E-05 1.6869E-05 6.0169E-05 -3.9783E-05 1.6618E-05 6.0598E-05 -4.0354E-05 1.8573E-05 6.6807E-05 -4.3745E-05 1.6855E-05 6.0043E-05 -3.9420E-05 1.6880E-05 6.0076E-05 -3.9901E-05 1.6648E-05 6.0487E-05 -4.0487E-05

18 -1.0833E-05 -3.9662E-05 2.8444E-05 -1.0877E-05 -3.9733E-05 2.8439E-05 -1.0932E-05 -3.9521E-05 2.8241E-05 -1.0922E-05 -3.9606E-05 2.8347E-05 -1.0824E-05 -3.9780E-05 2.8574E-05 -1.1996E-05 -4.3745E-05 3.1098E-05 -1.0917E-05 -3.9558E-05 2.8205E-05 -1.0926E-05 -3.9568E-05 2.8393E-05 -1.0836E-05 -3.9734E-05 2.8625E-05

19 5.7062E-06 1.6899E-05 -1.1089E-05 5.7372E-06 1.6913E-05 -1.1041E-05 5.7912E-06 1.6728E-05 -1.0864E-05 5.7811E-06 1.6804E-05 -1.0961E-05 5.6875E-06 1.6952E-05 -1.1164E-05 5.7514E-06 1.6855E-05 -1.0917E-05 6.4400E-06 1.8568E-05 -1.1931E-05 5.7853E-06 1.6771E-05 -1.1005E-05 5.6988E-06 1.6914E-05 -1.1214E-05

20 1.6615E-05 6.0045E-05 -3.9811E-05 1.6686E-05 6.0145E-05 -3.9780E-05 1.6785E-05 5.9813E-05 -3.9464E-05 1.6766E-05 5.9950E-05 -3.9638E-05 1.6596E-05 6.0212E-05 -4.0000E-05 1.6712E-05 6.0043E-05 -3.9558E-05 1.8568E-05 6.5909E-05 -4.3121E-05 1.6774E-05 5.9890E-05 -3.9717E-05 1.6616E-05 6.0142E-05 -4.0089E-05

21 -1.0790E-05 -3.9336E-05 2.8171E-05 -1.0818E-05 -3.9430E-05 2.8232E-05 -1.0832E-05 -3.9391E-05 2.8195E-05 -1.0829E-05 -3.9407E-05 2.8216E-05 -1.0806E-05 -3.9437E-05 2.8257E-05 -1.0821E-05 -3.9420E-05 2.8205E-05 -1.1931E-05 -4.3121E-05 3.0709E-05 -1.0830E-05 -3.9398E-05 2.8225E-05 -1.0809E-05 -3.9426E-05 2.8268E-05

22 5.7112E-06 1.6935E-05 -1.1119E-05 5.7436E-06 1.6945E-05 -1.1063E-05 5.8022E-06 1.6743E-05 -1.0870E-05 5.7916E-06 1.6828E-05 -1.0977E-05 5.6900E-06 1.6990E-05 -1.1198E-05 5.7584E-06 1.6880E-05 -1.0926E-05 5.7853E-06 1.6774E-05 -1.0830E-05 6.4668E-06 1.8591E-05 -1.2254E-05 5.7031E-06 1.6952E-05 -1.1255E-05

23 1.6623E-05 6.0103E-05 -3.9859E-05 1.6695E-05 6.0194E-05 -3.9814E-05 1.6804E-05 5.9839E-05 -3.9473E-05 1.6784E-05 5.9989E-05 -3.9664E-05 1.6599E-05 6.0274E-05 -4.0057E-05 1.6721E-05 6.0076E-05 -3.9568E-05 1.6771E-05 5.9890E-05 -3.9398E-05 1.8591E-05 6.5818E-05 -4.3834E-05 1.6624E-05 6.0210E-05 -4.0162E-05

24 -1.0871E-05 -3.9966E-05 2.8701E-05 -1.0931E-05 -4.0016E-05 2.8632E-05 -1.1035E-05 -3.9665E-05 2.8297E-05 -1.1017E-05 -3.9813E-05 2.8483E-05 -1.0837E-05 -4.0094E-05 2.8870E-05

-1.0957E-05 -3.9901E-05 2.8393E-05 -1.1005E-05 -3.9717E-05 2.8225E-05 -1.2254E-05 -4.3834E-05  
3.1650E-05 -1.0861E-05 -4.0029E-05 2.8970E-05  
25 5.6745E-06 1.6641E-05 -1.0870E-05 5.6901E-06 1.6668E-05 -1.0874E-05 5.7033E-06 1.6607E-  
05 -1.0819E-05 5.7014E-06 1.6632E-05 -1.0848E-05 5.6774E-06 1.6686E-05 -1.0913E-05 5.6929E-  
06 1.6648E-05 -1.0836E-05 5.6988E-06 1.6616E-05 -1.0809E-05 5.7031E-06 1.6624E-05 -1.0861E-  
05 6.1967E-06 1.8293E-05 -1.2100E-05  
26 1.6697E-05 6.0656E-05 -4.0319E-05 1.6795E-05 6.0701E-05 -4.0161E-05 1.6964E-05 6.0042E-  
05 -3.9544E-05 1.6936E-05 6.0313E-05 -3.9878E-05 1.6635E-05 6.0862E-05 -4.0595E-05 1.6837E-  
05 6.0487E-05 -3.9734E-05 1.6914E-05 6.0142E-05 -3.9426E-05 1.6952E-05 6.0210E-05 -4.0029E-  
05 1.8293E-05 6.7293E-05 -4.5610E-05  
27 -1.0972E-05 -4.0740E-05 2.9349E-05 -1.1071E-05 -4.0732E-05 2.9122E-05 -1.1272E-05  
-3.9972E-05 2.8406E-05 -1.1237E-05 -4.0285E-05 2.8795E-05 -1.0882E-05 -4.0909E-05 2.9623E-05  
-1.1122E-05 -4.0487E-05 2.8625E-05 -1.1214E-05 -4.0089E-05 2.8268E-05 -1.1255E-05 -4.0162E-05  
2.8970E-05 -1.2100E-05 -4.5610E-05 3.3675E-05

### Correlation matrix of the 9 vectors

1 1.0000E+00 8.9775E-01 -8.4856E-01 9.1039E-01 8.1611E-01 -7.7341E-01 8.9899E-01  
8.2240E-01 -7.8058E-01 9.0220E-01 8.2071E-01 -7.7771E-01 9.1537E-01 8.1407E-01 -7.6324E-01  
9.0754E-01 8.1799E-01 -7.7939E-01 9.0217E-01 8.2115E-01 -7.8123E-01 9.0108E-01 8.2207E-01  
-7.7526E-01 9.1460E-01 8.1664E-01 -7.5857E-01  
2 8.9775E-01 1.0000E+00 -9.6147E-01 8.1502E-01 9.0044E-01 -8.6528E-01 8.1028E-01  
9.0195E-01 -8.6587E-01 8.1221E-01 9.0235E-01 -8.6676E-01 8.1418E-01 8.9938E-01 -8.5890E-01  
8.1391E-01 9.0080E-01 -8.6683E-01 8.1161E-01 9.0144E-01 -8.6513E-01 8.1165E-01 9.0293E-01  
-8.6583E-01 8.1474E-01 9.0119E-01 -8.5565E-01  
3 -8.4856E-01 -9.6147E-01 1.0000E+00 -7.6876E-01 -8.6224E-01 8.9572E-01 -7.6666E-01  
-8.6111E-01 8.9388E-01 -7.6806E-01 -8.6256E-01 8.9615E-01 -7.6569E-01 -8.6178E-01 8.9075E-01  
-7.6833E-01 -8.6178E-01 8.9562E-01 -7.6724E-01 -8.6104E-01 8.9262E-01 -7.6771E-01 -8.6269E-01  
8.9578E-01 -7.6674E-01 -8.6302E-01 8.8804E-01  
4 9.1039E-01 8.1502E-01 -7.6876E-01 1.0000E+00 9.0080E-01 -8.5412E-01 8.9870E-01  
8.2050E-01 -7.7820E-01 9.0159E-01 8.1949E-01 -7.7664E-01 9.1187E-01 8.1411E-01 -7.6473E-01  
9.0605E-01 8.1722E-01 -7.7771E-01 9.0145E-01 8.1953E-01 -7.7837E-01 9.0058E-01 8.2054E-01  
-7.7477E-01 9.1143E-01 8.1634E-01 -7.6070E-01  
5 8.1611E-01 9.0044E-01 -8.6224E-01 9.0080E-01 1.0000E+00 -9.6157E-01 8.1061E-01  
9.0336E-01 -8.6759E-01 8.1260E-01 9.0343E-01 -8.6791E-01 8.1553E-01 8.9974E-01 -8.5881E-01  
8.1463E-01 9.0168E-01 -8.6820E-01 8.1211E-01 9.0274E-01 -8.6703E-01 8.1196E-01 9.0411E-01  
-8.6673E-01 8.1592E-01 9.0167E-01 -8.5529E-01  
6 -7.7341E-01 -8.6528E-01 8.9572E-01 -8.5412E-01 1.0000E+00 -7.6875E-01  
-8.6784E-01 9.0220E-01 -7.7058E-01 -8.6804E-01 9.0220E-01 -7.7270E-01 -8.6475E-01 8.9207E-01  
-7.7230E-01 -8.6644E-01 9.0264E-01 -7.7007E-01 -8.6730E-01 9.0174E-01 -7.7001E-01 -8.6864E-01  
9.0083E-01 -7.7316E-01 -8.6655E-01 8.8826E-01  
7 8.9899E-01 8.1028E-01 -7.6666E-01 8.9870E-01 8.1061E-01 -7.6875E-01 1.0000E+00  
8.9942E-01 -8.4936E-01 8.9554E-01 8.1202E-01 -7.6961E-01 8.9806E-01 8.0957E-01 -7.6408E-01  
8.9752E-01 8.1069E-01 -7.6889E-01 8.9505E-01 8.1091E-01 -7.6665E-01 8.9489E-01 8.1237E-01  
-7.6934E-01 8.9860E-01 8.1109E-01 -7.6186E-01  
8 8.2240E-01 9.0195E-01 -8.6111E-01 8.2050E-01 9.0336E-01 -8.6784E-01 8.9942E-01  
1.0000E+00 -9.6002E-01 8.1391E-01 9.0912E-01 -8.7337E-01 8.2427E-01 9.0068E-01 -8.5572E-01  
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 D 26 27 -9581252

ITRF position of bm\_\_ as determined by individual baselines

	X	Y	Z
p037	-1404863.479	-4851630.349	3885430.587
rg23	-1404863.496	-4851630.388	3885430.629
cti4	-1404863.457	-4851630.348	3885430.626
rg21	-1404863.485	-4851630.375	3885430.628
amc2	-1404863.479	-4851630.424	3885430.680
p123	-1404863.523	-4851630.358	3885430.582
...	...	...	...

```

rg09 -1404863.474 -4851630.360 3885430.634
r301 -1404863.521 -4851630.397 3885430.613
ctmc -1404863.527 -4851630.387 3885430.576

```

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up	
p037	0.027	-0.037	0.035	0.035	0.036	0.011	0.043
rg23	0.011	-0.076	0.077	0.077	0.031	0.018	0.103
cti4	0.050	-0.036	0.073	0.073	0.058	0.046	0.061
rg21	0.022	-0.063	0.076	0.076	0.039	0.027	0.090
amc2	0.028	-0.111	0.128	0.128	0.058	0.041	0.157
p123	-0.016	-0.046	0.030	0.030	-0.003	-0.006	0.056
rg09	0.032	-0.047	0.082	0.082	0.044	0.043	0.079
r301	-0.014	-0.085	0.061	0.061	0.010	-0.004	0.104
ctmc	-0.020	-0.075	0.024	0.024	0.001	-0.028	0.076

STATE PLANE COORDINATES - U.S. Survey Foot  
SPC (0503 CO S)

```

Northing (Y) [feet] 1397059.709
Easting (X) [feet] 2812325.947
Convergence [degrees] -0.39818378
Point Scale 0.99994634
Combined Factor 0.99958226

```

\*\*\*\*\* New Reference Frame Preview \*\*\*\*\*

We are replacing the nation's NAD 83 and NAVD 88 datums, to improve access and accuracy of the National Spatial Reference System. More at <https://geodesy.noaa.gov/datums/newdatums/>

Below are approximate coordinates for this solution in the new frames:

APPROX ORTHO HGT: 2337.031 (m) [PROTOTYPE (Computed using xGeoid16B,GRS80,IGS08)]

```

dop from interpolation is 0.340
scatter (mean square distance from rover) is 23514.926
average edop for rover is 0.720
average ndop for rover is 0.830
average hdop for rover is 1.099
average vdop for rover is 1.840
average gdop for rover is 2.510

```

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.

8002 Did you observe at U285 MP63.35 ? [https://geodesy.noaa.gov/cgi-bin/ds\\_mark.pr?PidBox=AJ7779](https://geodesy.noaa.gov/cgi-bin/ds_mark.pr?PidBox=AJ7779)

8002 To help maintain the NSRS database, please consider sharing either your

8002 -- data & recovery notes (see <https://geodesy.noaa.gov/marks/sharing/>)

8002 -- recovery notes only (see <https://geodesy.noaa.gov/marks/recovery/>)