

OPUS solution : 018697_14_220_A0.14O OP1407774447859

opus <opus@ngs.noaa.gov>

Mon 8/11/2014 10:30 AM

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

FILE: 018697_14_220_A0.14O OP1407774447859

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: <http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: cmozol@neciusa.com DATE: August 11, 2014
RINEX FILE: 0186220r.14o TIME: 16:29:22 UTC

SOFTWARE: page5 1209.04 master51.pl 022814 START: 2014/08/08 17:14:00
EPHEMERIS: igr18045.eph [rapid] STOP: 2014/08/08 21:10:00
NAV FILE: brdc2200.14n OBS USED: 10035 / 10979 : 91%
ANT NAME: CHCX90D-OPUS NONE # FIXED AMB: 64 / 71 : 90%
ARP HEIGHT: 2.0000 OVERALL RMS: 0.020(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.6022)

X: -1385318.087(m) 0.002(m) -1385318.962(m) 0.002(m)
Y: -4034110.948(m) 0.006(m) -4034109.725(m) 0.006(m)
Z: 4727583.480(m) 0.007(m) 4727583.471(m) 0.007(m)

LAT: 48 8 1.48790 0.005(m) 48 8 1.50873 0.005(m)
E LON: 251 2 50.90175 0.002(m) 251 2 50.84253 0.002(m)
W LON: 108 57 9.09825 0.002(m) 108 57 9.15747 0.002(m)
EL HGT: 1032.729(m) 0.008(m) 1032.140(m) 0.008(m)
ORTHO HGT: 1048.067(m) 0.016(m) [NAVD88 (Computed using GEOID12A)]

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 12)	SPC (2500 MT)
Northing (Y) [meters]	5333193.152	431703.265
Easting (X) [meters]	652333.565	640732.380
Convergence [degrees]	1.52505441	0.40047859
Point Scale	0.99988514	0.99958476
Combined Factor	0.99972333	0.99942299

US NATIONAL GRID DESIGNATOR: 12UXU5233333193(NAD 83)

MONUMENT: NO DOMES NUMBER

XYZ -1425435.4171 -3984013.1973 4757493.9413 MON @ 2005.0000 (M)
 XYZ -0.0165 -0.0009 -0.0066 VEL (M/YR)
 NEU 0.0000 0.0000 0.0000 MON TO ARP (M)
 NEU 0.0003 0.0005 0.0559 ARP TO L1 PHASE CENTER (M)
 NEU 0.0001 0.0005 0.0580 ARP TO L2 PHASE CENTER (M)
 XYZ -0.1580 -0.0082 -0.0635 VEL TIMES 9.6013 YRS
 XYZ 0.0000 0.0000 0.0000 MON TO ARP
 XYZ -0.0119 -0.0348 0.0421 ARP TO L1 PHASE CENTER
 XYZ -1425435.5870 -3984013.2404 4757493.9199 L1 PHS CEN @ 2014.6022
 XYZ 0.0000 -0.0000 -0.0000 + XYZ ADJUSTMENTS
 XYZ -1425435.5870 -3984013.2404 4757493.9199 NEW L1 PHS CEN @ 2014.6022
 XYZ -1425435.5751 -3984013.2055 4757493.8778 NEW ARP @ 2014.6022
 XYZ -1425435.5751 -3984013.2055 4757493.8778 NEW MON @ 2014.6022
 LLH 48 32 27.44705 250 18 48.08174 773.4072 NEW L1 PHS CEN @ 2014.6022
 LLH 48 32 27.44705 250 18 48.08172 773.3513 NEW ARP @ 2014.6022
 LLH 48 32 27.44705 250 18 48.08172 773.3513 NEW MON @ 2014.6022

REMOTE STATION INFORMATION

STATION NAME: 0186 1

MONUMENT: NO DOMES NUMBER

XYZ -1385318.7567 -4034109.5932 4727582.8516 MON @ 2014.6020 (M)
 NEU -0.0011 0.0007 2.0000 MON TO ARP (M)
 NEU 0.0011 -0.0007 0.0892 ARP TO L1 PHASE CENTER (M)
 NEU 0.0007 -0.0031 0.1017 ARP TO L2 PHASE CENTER (M)
 XYZ -0.4331 -1.2634 1.4887 MON TO ARP
 XYZ -0.0197 -0.0554 0.0672 ARP TO L1 PHASE CENTER
 XYZ -1385319.2096 -4034110.9119 4727584.4074 L1 PHS CEN @ 2014.6022

BASELINE NAME: p052 0186

XYZ -0.2041 -0.1307 0.6221 + XYZ ADJUSTMENTS
 XYZ -1385319.4137 -4034111.0427 4727585.0295 NEW L1 PHS CEN @ 2014.6022
 XYZ -1385319.3939 -4034110.9873 4727584.9623 NEW ARP @ 2014.6022
 XYZ -1385318.9608 -4034109.7239 4727583.4737 NEW MON @ 2014.6022
 LLH 48 8 1.50883 251 2 50.84256 1034.2307 NEW L1 PHS CEN @ 2014.6022
 LLH 48 8 1.50879 251 2 50.84260 1034.1414 NEW ARP @ 2014.6022
 LLH 48 8 1.50883 251 2 50.84256 1032.1415 NEW MON @ 2014.6022

BASELINE NAME: p049 0186

XYZ -0.2058 -0.1355 0.6202 + XYZ ADJUSTMENTS
 XYZ -1385319.4154 -4034111.0475 4727585.0276 NEW L1 PHS CEN @ 2014.6022
 XYZ -1385319.3956 -4034110.9921 4727584.9604 NEW ARP @ 2014.6022
 XYZ -1385318.9625 -4034109.7287 4727583.4718 NEW MON @ 2014.6022
 LLH 48 8 1.50866 251 2 50.84256 1034.2326 NEW L1 PHS CEN @ 2014.6022
 LLH 48 8 1.50863 251 2 50.84259 1034.1434 NEW ARP @ 2014.6022
 LLH 48 8 1.50866 251 2 50.84256 1032.1434 NEW MON @ 2014.6022

BASELINE NAME: mtms 0186

XYZ -0.2060 -0.1293 0.6148 + XYZ ADJUSTMENTS
 XYZ -1385319.4156 -4034111.0412 4727585.0222 NEW L1 PHS CEN @ 2014.6022
 XYZ -1385319.3959 -4034110.9859 4727584.9550 NEW ARP @ 2014.6022
 XYZ -1385318.9627 -4034109.7225 4727583.4664 NEW MON @ 2014.6022

LLH 48 8 1.50869 251 2 50.84245 1034.2247 NEW L1 PHS CEN @ 2014.6022
 LLH 48 8 1.50865 251 2 50.84249 1034.1355 NEW ARP @ 2014.6022
 LLH 48 8 1.50869 251 2 50.84245 1032.1355 NEW MON @ 2014.6022

G-FILES

Axx2014 8 8 14 8 8

B2014 8 81714 14 8 821 9 1 page5 v1209.04IGS 126 1 2 27NGS 2014 811IFDDPX
 IIGS08_1804 IGS 20140803
 C00090005 1186706244 8-1040848405 20 -568739803 23 X2204A0186X2204AP052
 D 1 2 5803706 1 3 -7452692 2 3 -8815701

Axx2014 8 8 14 8 8

B2014 8 81714 14 8 821 9 1 page5 v1209.04IGS 126 1 2 27NGS 2014 811IFDDPX
 IIGS08_1804 IGS 20140803
 C00090001-1597808709 9 -107861382 17 -584989034 21 X2204A0186X2204AP049
 D 1 2 5731676 1 3 -4525297 2 3 -9014871

Axx2014 8 8 14 8 8

B2014 8 81714 14 8 821 9 1 page5 v1209.04IGS 126 1 2 27NGS 2014 811IFDDPX
 IIGS08_1804 IGS 20140803
 C00090002 -401166124 12 500965170 27 299104114 35 X2204A0186X2204AMTMS
 D 1 2 6009281 1 3 -8445237 2 3 -8335527

POST-FIT RMS BY SATELLITE VS. BASELINE

OVERALL 01 02 04 06 07 08 10 11
 p052-0186| 0.020 0.014 0.031 0.012 0.027 0.017 0.012 0.032 0.017
 12 15 17 19 20 24 25 26 28
 p052-0186| 0.028 0.018 0.034 0.016 0.028 0.015 0.014
 30
 p052-0186| 0.012

OVERALL 01 02 04 06 07 08 10 11
 p049-0186| 0.019 0.011 0.027 0.011 0.028 0.018 0.023 0.017 0.016
 12 15 17 19 20 24 25 26 28
 p049-0186| 0.025 0.017 0.036 0.017 0.015 0.011 0.016
 30
 p049-0186| 0.010

OVERALL 01 02 04 06 07 08 10 11
 mtms-0186| 0.021 0.016 0.026 0.015 0.025 0.021 0.020 0.021 0.019
 12 15 17 19 20 24 25 26 28
 mtms-0186| 0.026 0.021 0.037 0.018 0.032 0.021 0.014
 30
 mtms-0186| 0.016

OBS BY SATELLITE VS. BASELINE

OVERALL 01 02 04 06 07 08 10 11
 p052-0186| 3540 299 193 453 314 84 130 42 194
 12 15 17 19 20 24 25 26 28
 p052-0186| 195 239 220 360 28 199 388

```

30
p052-0186| 202
  OVERALL  01  02  04  06  07  08  10  11
p049-0186| 3501 311 161 464 314 83 149 23 192
  12 15 17 19 20 24 25 26 28
p049-0186| 162 247 ... .. 206 357 24 210 388
30
p049-0186| 210
  OVERALL  01  02  04  06  07  08  10  11
mtms-0186| 2994 259 154 370 283 30 103 5 142
  12 15 17 19 20 24 25 26 28
mtms-0186| 182 211 ... .. 164 358 2 209 341
30
mtms-0186| 181

```

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

```

0.0000007222  0.0000001035  -0.0000001356
0.0000001035  0.0000034378  -0.0000003750
-0.0000001356 -0.0000003750  0.0000058378

```

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

```

0.0000009451  -0.0000005630  0.0000004993
-0.0000005630  0.0000039952  0.0000012636
0.0000004993  0.0000012636  0.0000050574

```

Horizontal network accuracy = 0.00409 meters.

Vertical network accuracy = 0.00441 meters.

Derivation of NAD 83 vector components

Position of reference station ARP in NAD_83(2011)(EPOCH:2010.0000).

```

  Xa(m)      Ya(m)      Za(m)
P052 -1266647.47169 -4138195.81057 4670709.52375 2010.00
P049 -1545098.96458 -4044897.09606 4669084.59181 2010.00
MTMS -1425434.69795 -3984014.42122 4757493.88638 2010.00

```

Position of reference station monument in NAD_83(2011)(EPOCH:2010.0000).

```

  Xr(m)      Yr(m)      Zr(m)
P052 -1266647.47009 -4138195.80517 4670709.51765 2010.00
P049 -1545098.96258 -4044897.09076 4669084.58571 2010.00
MTMS -1425434.69795 -3984014.42122 4757493.88638 2010.00

```

Velocity of reference station monument in NAD_83(2011)(EPOCH:2010.0000).

```

  Vx (m/yr)  Vy (m/yr)  Vz (m/yr)
P052   -0.01580    0.00030   -0.00570
P049   -0.01570   -0.00020   -0.00670
MTMS   -0.01650   -0.00090   -0.00660

```

Vectors from unknown station monument to reference station monument
in NAD_83(2011)(EPOCH:2010.0000).

	Xr-X= DX(m)	Yr-Y= DY(m)	Zr-Z= DZ(m)	
P052	118670.61691	-104084.85717	-56873.96235	2010.00
P049	-159780.87558	-10786.14276	-58498.89429	2010.00
MTMS	-40116.61095	50096.52678	29910.40638	2010.00

STATE PLANE COORDINATES - International Foot

SPC (2500 MT)	
Northing (Y) [feet]	1416349.295
Easting (X) [feet]	2102140.354
Convergence [degrees]	0.40047859
Point Scale	0.99958476
Combined Factor	0.99942299

** 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: 1047.067 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

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.