



Adam Plumley <apsurveying@gmail.com>

OPUS solution : log0130a.jps OP1454253980141

opus <opus@ngs.noaa.gov>
 Reply-To: ngs.opus@noaa.gov
 To: apsurveying@gmail.com

Sun, Jan 31, 2016 at 10:27 AM

FILE: log0130a.jps OP1454253980141

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 SOLUTION REPORT =====

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

USER: apsurveying@gmail.com DATE: January 31, 2016
 RINEX FILE: log0030n.16o TIME: 15:27:24 UTC

SOFTWARE: page5 1209.04 [master93.pl](#) 022814 START: 2016/01/30 13:57:00
 EPHEMERIS: igu18816.eph [ultra-rapid] STOP: 2016/01/30 14:24:00
 NAV FILE: brdc0300.16n OBS USED: 972 / 1044 : 93%
 ANT NAME: JAVTRIUMPH_2A NONE # FIXED AMB: 16 / 21 : 76%
 ARP HEIGHT: 0.025 OVERALL RMS: 0.012(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2016.0808)

X:	765721.746(m)	0.101(m)	765720.924(m)	0.101(m)
Y:	-5144667.952(m)	0.029(m)	-5144666.480(m)	0.029(m)
Z:	3679525.921(m)	0.110(m)	3679525.809(m)	0.110(m)

LAT:	35 27 28.61306	0.081(m)	35 27 28.63978	0.081(m)
E LON:	278 27 56.29731	0.102(m)	278 27 56.27366	0.102(m)
W LON:	81 32 3.70269	0.102(m)	81 32 3.72634	0.102(m)
EL HGT:	271.162(m)	0.077(m)	269.812(m)	0.077(m)
ORTHO HGT:	303.060(m)	0.131(m)	[NAVD88 (Computed using GEOID12B)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 17)	SPC (3200 NC)
Northing (Y) [meters]	3923960.858	192399.455
Easting (X) [meters]	451511.590	379593.145
Convergence [degrees]	-0.30999218	-1.46275828
Point Scale	0.99962897	0.99987904
Combined Factor	0.99958643	0.99983649

US NATIONAL GRID DESIGNATOR: 17SMV5151123960(NAD 83)

BASE STATIONS USED				
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH7137	NCMG MORGANTON CORS ARP	N354227.073	W0813923.998	29828.3

DM3523 NCHI HICKORY CORS ARP N354431.010 W0811830.934 37570.8
 DE8425 GAST GASTON CORS ARP N351839.791 W0811119.541 35379.6

NEAREST NGS PUBLISHED CONTROL POINT
 FA4968 GRAPE N352809.575 W0813026.808 2749.5

BASE STATION INFORMATION

STATION NAME: ncmg a 2 (Morganton; Morganton, North Carolina USA)

MONUMENT: NO DOMES NUMBER

XYZ 752408.0543 -5130405.9081 3702089.6628 MON @ 2005.0000 (M)
 XYZ -0.0143 0.0010 0.0007 VEL (M/YR)
 NEU 0.0000 0.0000 0.0000 MON TO ARP (M)
 NEU 0.0011 -0.0003 0.0668 ARP TO L1 PHASE CENTER (M)
 NEU 0.0001 0.0007 0.0578 ARP TO L2 PHASE CENTER (M)
 XYZ -0.1582 0.0106 0.0081 VEL TIMES 11.0792 YRS
 XYZ 0.0000 0.0000 0.0000 MON TO ARP
 XYZ 0.0075 -0.0530 0.0399 ARP TO L1 PHASE CENTER
 XYZ 752407.9036 -5130405.9506 3702089.7108 L1 PHS CEN @ 2016.0808
 XYZ 0.0000 -0.0000 -0.0000 + XYZ ADJUSTMENTS
 XYZ 752407.9036 -5130405.9506 3702089.7108 NEW L1 PHS CEN @ 2016.0808
 XYZ 752407.8961 -5130405.8975 3702089.6709 NEW ARP @ 2016.0808
 XYZ 752407.8961 -5130405.8975 3702089.6709 NEW MON @ 2016.0808
 LLH 35 42 27.10076 278 20 35.97743 343.5441 NEW L1 PHS CEN @ 2016.0808
 LLH 35 42 27.10072 278 20 35.97744 343.4773 NEW ARP @ 2016.0808
 LLH 35 42 27.10072 278 20 35.97744 343.4773 NEW MON @ 2016.0808

STATION NAME: nchi a 1 (Hickory; Hickory, North Carolina USA)

MONUMENT: NO DOMES NUMBER

XYZ 783222.0033 -5123520.6382 3705180.0207 MON @ 2005.0000 (M)
 XYZ -0.0140 -0.0008 0.0018 VEL (M/YR)
 NEU 0.0000 0.0000 0.0000 MON TO ARP (M)
 NEU 0.0011 -0.0003 0.0668 ARP TO L1 PHASE CENTER (M)
 NEU 0.0001 0.0007 0.0578 ARP TO L2 PHASE CENTER (M)
 XYZ -0.1546 -0.0084 0.0204 VEL TIMES 11.0792 YRS
 XYZ 0.0000 0.0000 0.0000 MON TO ARP
 XYZ 0.0078 -0.0530 0.0399 ARP TO L1 PHASE CENTER
 XYZ 783221.8566 -5123520.6996 3705180.0810 L1 PHS CEN @ 2016.0808
 XYZ 0.0000 -0.0000 -0.0000 + XYZ ADJUSTMENTS
 XYZ 783221.8566 -5123520.6996 3705180.0810 NEW L1 PHS CEN @ 2016.0808
 XYZ 783221.8488 -5123520.6466 3705180.0411 NEW ARP @ 2016.0808
 XYZ 783221.8488 -5123520.6466 3705180.0411 NEW MON @ 2016.0808
 LLH 35 44 31.03717 278 41 29.04156 325.0215 NEW L1 PHS CEN @ 2016.0808
 LLH 35 44 31.03713 278 41 29.04157 324.9547 NEW ARP @ 2016.0808
 LLH 35 44 31.03713 278 41 29.04157 324.9547 NEW MON @ 2016.0808

STATION NAME: gast a 4 (Gaston; Gastonia, North Carolina, U.S.A.)

MONUMENT: 49561S001

XYZ 798177.3856 -5149234.1978 3666204.8080 MON @ 2005.0000 (M)
 XYZ -0.0136 0.0008 0.0014 VEL (M/YR)
 NEU 0.0000 0.0000 0.0000 MON TO ARP (M)
 NEU 0.0011 -0.0003 0.0668 ARP TO L1 PHASE CENTER (M)
 NEU 0.0001 0.0007 0.0578 ARP TO L2 PHASE CENTER (M)
 XYZ -0.1506 0.0092 0.0152 VEL TIMES 11.0792 YRS
 XYZ 0.0000 0.0000 0.0000 MON TO ARP
 XYZ 0.0079 -0.0533 0.0395 ARP TO L1 PHASE CENTER
 XYZ 798177.2429 -5149234.2419 3666204.8627 L1 PHS CEN @ 2016.0808
 XYZ -0.0000 -0.0000 -0.0000 + XYZ ADJUSTMENTS

XYZ 798177.2429 -5149234.2419 3666204.8627 NEW L1 PHS CEN @ 2016.0808
 XYZ 798177.2350 -5149234.1886 3666204.8232 NEW ARP @ 2016.0808
 XYZ 798177.2350 -5149234.1886 3666204.8232 NEW MON @ 2016.0808
 LLH 35 18 39.81835 278 48 40.43563 212.4116 NEW L1 PHS CEN @ 2016.0808
 LLH 35 18 39.81831 278 48 40.43564 212.3448 NEW ARP @ 2016.0808
 LLH 35 18 39.81831 278 48 40.43564 212.3448 NEW MON @ 2016.0808

REMOTE STATION INFORMATION

STATION NAME: log0 1

MONUMENT: NO DOMES NUMBER

XYZ 765720.7839 -5144666.2948 3679526.3254 MON @ 2016.0808 (M)
 NEU -0.0028 0.0005 0.0249 MON TO ARP (M)
 NEU 0.0028 -0.0005 0.0503 ARP TO L1 PHASE CENTER (M)
 NEU -0.0032 0.0019 0.0356 ARP TO L2 PHASE CENTER (M)
 XYZ 0.0037 -0.0216 0.0122 MON TO ARP
 XYZ 0.0053 -0.0390 0.0314 ARP TO L1 PHASE CENTER
 XYZ 765720.7929 -5144666.3554 3679526.3690 L1 PHS CEN @ 2016.0808

BASELINE NAME: ncmg log0

XYZ 0.1200 -0.1992 -0.4701 + XYZ ADJUSTMENTS
 XYZ 765720.9129 -5144666.5546 3679525.8989 NEW L1 PHS CEN @ 2016.0808
 XYZ 765720.9076 -5144666.5156 3679525.8675 NEW ARP @ 2016.0808
 XYZ 765720.9039 -5144666.4940 3679525.8553 NEW MON @ 2016.0808
 LLH 35 27 28.64080 278 27 56.27279 269.9230 NEW L1 PHS CEN @ 2016.0808
 LLH 35 27 28.64071 278 27 56.27281 269.8728 NEW ARP @ 2016.0808
 LLH 35 27 28.64080 278 27 56.27279 269.8478 NEW MON @ 2016.0808

BASELINE NAME: nchi log0

XYZ 0.1001 -0.1855 -0.4976 + XYZ ADJUSTMENTS
 XYZ 765720.8930 -5144666.5409 3679525.8714 NEW L1 PHS CEN @ 2016.0808
 XYZ 765720.8878 -5144666.5020 3679525.8400 NEW ARP @ 2016.0808
 XYZ 765720.8840 -5144666.4803 3679525.8278 NEW MON @ 2016.0808
 LLH 35 27 28.64038 278 27 56.27210 269.8937 NEW L1 PHS CEN @ 2016.0808
 LLH 35 27 28.64029 278 27 56.27211 269.8434 NEW ARP @ 2016.0808
 LLH 35 27 28.64038 278 27 56.27210 269.8185 NEW MON @ 2016.0808

BASELINE NAME: gast log0

XYZ 0.2016 -0.1707 -0.5803 + XYZ ADJUSTMENTS
 XYZ 765720.9945 -5144666.5261 3679525.7887 NEW L1 PHS CEN @ 2016.0808
 XYZ 765720.9892 -5144666.4871 3679525.7573 NEW ARP @ 2016.0808
 XYZ 765720.9855 -5144666.4655 3679525.7451 NEW MON @ 2016.0808
 LLH 35 27 28.63819 278 27 56.27616 269.8459 NEW L1 PHS CEN @ 2016.0808
 LLH 35 27 28.63810 278 27 56.27618 269.7957 NEW ARP @ 2016.0808
 LLH 35 27 28.63819 278 27 56.27616 269.7707 NEW MON @ 2016.0808

G-FILES

Axx2016 130 16 130

B2016 1301357 16 1301423 1 page5 v1209.04IGS 126 1 2 27NGS 2016 131IFDDPX
 IIGS08_1881 IGS 20160124
 C00090002 -133130078 28 142605964 103 225638157 78 X0306ALOG0X0306ANCMG
 D 1 2 -4071862 1 3 -2162782 2 3 -7478752

Axx2016 130 16 130

B2016 1301357 16 1301423 1 page5 v1209.04IGS 126 1 2 27NGS 2016 131IFDDPX
 IIGS08_1881 IGS 20160124
 C00090004 175009648 14 211458337 78 256542133 55 X0306ALOG0X0306ANCHI
 D 1 2 -458441 1 3 1219506 2 3 -9366501

Axx2016 130 16 130

B2016 1301357 16 1301423 1 page5 v1209.04IGS 126 1 2 27NGS 2016 131IFDDPX
 IIGS08_1881 IGS 20160124
 C00090005 324562495 83 -45677231 176 -133209218 120 X0306ALOG0X0306AGAST
 D 1 2 -6652239 1 3 3311863 2 3 -9145602

POST-FIT RMS BY SATELLITE VS. BASELINE

	OVERALL	05	10	13	14	15	18	20	21
ncmg-log0|	0.013	0.016	...	0.009	...	...	0.015	0.011	0.012
	22	24	25	27	29	31			
ncmg-log0|	...	0.016	...	...	0.013	...			

	OVERALL	05	10	13	14	15	18	20	21
nchi-log0|	0.011	0.016	...	0.009	...	...	0.008	0.010	0.009
	22	24	25	27	29	31			
nchi-log0|	...	0.017	...	...	0.012	...			

	OVERALL	02	05	10	13	14	15	18	20
gast-log0|	0.012	...	0.017	...	0.008	...	...	0.009	0.011
	21	22	24	25	27	29	31		
gast-log0|	0.011	...	0.017	...	...	0.013	...		

OBS BY SATELLITE VS. BASELINE

	OVERALL	05	10	13	14	15	18	20	21
ncmg-log0|	324	50	...	50	...	...	50	50	50
	22	24	25	27	29	31			
ncmg-log0|	...	24	...	...	50	...			
	OVERALL	05	10	13	14	15	18	20	21
nchi-log0|	324	50	...	50	...	...	50	50	50
	22	24	25	27	29	31			
nchi-log0|	...	24	...	...	50	...			
	OVERALL	02	05	10	13	14	15	18	20
gast-log0|	324	...	50	...	50	...	...	50	50
	21	22	24	25	27	29	31		
gast-log0|	50	...	24	...	...	50	...		

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

0.0000165422	0.0000010186	-0.0000027299
0.0000010186	0.0000838000	-0.0000061903
-0.0000027299	-0.0000061903	0.0001057911

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

0.0000182965	0.0000032705	-0.0000108764
0.0000032705	0.0000924768	0.0000131001
-0.0000108764	0.0000131001	0.0000953601

Horizontal network accuracy = 0.01941 meters.

Vertical network accuracy = 0.01915 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)	
NCMG	752408.72234	-5130407.37533	3702089.78851	2010.00
NCHI	783222.67322	-5123522.11571	3705180.15080	2010.00
GAST	798178.05610	-5149235.67326	3666204.93935	2010.00

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

	Xr(m)	Yr(m)	Zr(m)	
NCMG	752408.72234	-5130407.37533	3702089.78851	2010.00
NCHI	783222.67322	-5123522.11571	3705180.15080	2010.00
GAST	798178.05610	-5149235.67326	3666204.93935	2010.00

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

	Vx (m/yr)	Vy (m/yr)	Vz (m/yr)
NCMG	-0.01430	0.00100	0.00070
NCHI	-0.01400	-0.00080	0.00180
GAST	-0.01360	0.00080	0.00140

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)	
NCMG	-13313.02366	14260.57667	22563.86751	2010.00
NCHI	17500.92722	21145.83629	25654.22980	2010.00
GAST	32456.31010	-4567.72126	-13320.98165	2010.00

STATE PLANE COORDINATES - U.S. Survey Foot

SPC (3200 NC)

Northing (Y) [feet]	631230.545
Easting (X) [feet]	1245381.843
Convergence [degrees]	-1.46275828
Point Scale	0.99987904
Combined Factor	0.99983649

** 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: 302.787 (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.