

APPENDIX B

NETWORK ADJUSTMENT REPORTS
NETWORKS 1-5

2008
GEODETTIC CONTROL
RESTORATION

of

JEFFERSON COUNTY, KENTUCKY

OCTOBER, 2007

Jacobi, Toombs and Lanz, Inc.
401 West Main Street, Suite 600
Louisville, Kentucky 40202



Network Adjustment Report

Project : 0780-Network-1

User name	jtheis	Date & Time	11:55:22 AM 9/25/2007
Coordinate System	US State Plane 1983	Zone	Kentucky North 1601
Project Datum	NAD 1983 (Conus)		
Vertical Datum	Navd 88	Geoid Model	GO3U07
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

Adjustment Style Settings - 95% Confidence Limits

Residual Tolerances

To End Iterations : 0.000033sft
Final Convergence Cutoff : 0.016404sft

Covariance Display

Horizontal

Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000sft
Scale on Linear Error [S] : 1.96

Three-Dimensional

Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000sft
Scale on Linear Error [S] : 1.96

Elevation Errors were used in the calculations.

Adjustment Controls

Compute Correlations for Geoid : False

Horizontal and Vertical adjustment performed

Set-up Errors

GPS

Error in Height of Antenna : 0.0000sft

Centering Error : 0.0000sft

Statistical Summary

Successful Adjustment in 1 iteration(s)

Network Reference Factor : 0.66

Chi Square Test ($\alpha=95\%$) : PASS

Degrees of Freedom : 18.00

GPS Observation Statistics

Reference Factor : 0.66

Redundancy Number (r) : 18.00

Individual GPS Observation Statistics

Observation ID	Reference Factor	Redundancy Number
B3	0.58	1.87
B4	0.56	2.49
B6	0.73	2.03
B7	0.64	1.91
B8	0.47	1.86
B11	0.93	2.51
B15	0.47	1.61
B16	0.75	1.74
B17	0.54	1.98

Geoid Model Statistics

Reference Factor : 0.52

Redundancy Number (r) : 0.00

Weighting Strategies

GPS Observations

User-defined Scalar Applied to All Observations

Scalar : 2.88

Geoid Observations

Default Scalar Applied to All Observations

Scalar : 1.00

Adjusted Coordinates

Adjustment performed in **NAD 1983 (Conus)**

Number of Points : 4

Number of Constrained Points : 3

Elevation Only : 1

Horizontal and Elevation Only : 2

Adjusted Grid Coordinates

Errors are reported using 1.96σ .

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
EDWARD 2	289720.1400sft	0.0000sft	1164992.6000sft	0.0000sft	917.0900sft	0.0000sft	NE e
GPS86-7	290629.9700sft	0.0000sft	1195432.2500sft	0.0000sft	463.9500sft	0.0000sft	NE e
GPS86-8 RESET	286899.7196sft	0.0055sft	1186452.6015sft	0.0054sft	438.4779sft	0.1792sft	
STA043-2001	278525.5240sft	0.0078sft	1186831.0469sft	0.0079sft	456.0600sft	0.0000sft	e

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ .

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
EDWARD 2	38°17'01.83162"N	0.0000sft	85°54'22.99744"W	0.0000sft	808.1050sft	0.1526sft	Lat Long e
GPS86-7	38°17'16.06259"N	0.0000sft	85°48'01.47535"W	0.0000sft	354.6379sft	0.1526sft	Lat Long e
GPS86-8 RESET	38°16'37.68306"N	0.0055sft	85°49'53.28259"W	0.0054sft	329.2731sft	0.0940sft	
STA043-2001	38°15'14.97546"N	0.0078sft	85°49'46.73632"W	0.0079sft	346.9156sft	0.1526sft	e

Coordinate Deltas

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height	Δ Geoid Separation
EDWARD 2	0.0000sft	0.0000sft	0.0000sft	-0.0002sft	0.0002sft
GPS86-7	0.0000sft	0.0000sft	0.0000sft	-0.0002sft	0.0002sft
GPS86-8 RESET	0.0000sft	0.0000sft	0.0000sft	-0.0002sft	0.0002sft
STA043-2001	0.0000sft	0.0000sft	0.0000sft	-0.0002sft	0.0002sft

Control Coordinate Comparisons

Values shown are control coord minus adjusted coord.

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height
EDWARD 2	N/A	N/A	N/A	N/A
GPS86-7	N/A	N/A	N/A	N/A
STA043-2001	-0.0040sft	-0.0069sft	N/A	N/A

Adjusted Observations

Adjustment performed in **NAD 1983 (Conus)**

GPS Observations

GPS Transformation Group: <GPS Default>

Deflection in Longitude : -0°00'00.2996" **(1.96 σ)** : 0°00'01.4438"
Deflection in Latitude : 0°00'00.9099" **(1.96 σ)** : 0°00'03.3672"
Azimuth Rotation : -0°00'00.1962" **(1.96 σ)** : 0°00'00.0939"
Network Scale : 1.00000161 **(1.96 σ)** : 0.00000043
Number of Observations : 9
Number of Outliers : 0

Observation Adjustment (Critical Tau = 2.85). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B11	EDWARD 2	STA043-2001	Az.	116°06'35.3286"	0°00'00.1147"	-0°00'00.1920"	-1.25
			ΔHt.	-461.2056sft	0.0270sft	0.0567sft	2.13
			Dist.	24541.3452sft	0.0136sft	0.0069sft	0.45
B6	EDWARD 2	GPS86-8 RESET	Az.	96°27'25.0103"	0°00'00.1301"	0°00'00.0375"	0.40
			ΔHt.	-478.8119sft	0.0265sft	-0.0355sft	-1.67
			Dist.	21645.2887sft	0.0129sft	-0.0032sft	-0.31
B16	STA043-2001	GPS86-8 RESET	Az.	356°25'47.1112"	0°00'00.0997"	0°00'00.0596"	1.04
			ΔHt.	-17.6069sft	0.0079sft	0.0083sft	1.49
			Dist.	8383.0223sft	0.0042sft	0.0003sft	0.13
B4	EDWARD 2	GPS86-8 RESET	Az.	96°27'25.0103"	0°00'00.1301"	0°00'00.0502"	-0.32
			ΔHt.	-478.8119sft	0.0265sft	-0.0396sft	-1.23
			Dist.	21645.2887sft	0.0129sft	0.0122sft	0.87
B7	GPS86-7	GPS86-8 RESET	Az.	246°28'36.7703"	0°00'00.0891"	0°00'00.0616"	1.14
			ΔHt.	-25.3955sft	0.0080sft	0.0062sft	0.99
			Dist.	9723.9577sft	0.0042sft	0.0001sft	0.05
B15	GPS86-7	STA043-2001	Az.	214°25'56.5289"	0°00'00.0679"	0°00'00.0487"	-1.14
			ΔHt.	-7.7891sft	0.0094sft	0.0018sft	0.31
			Dist.	14849.6856sft	0.0049sft	0.0006sft	0.22
B3	EDWARD 2	GPS86-7	Az.	87°15'27.5497"	0°00'00.0939"	0°00'00.0019"	0.03
			ΔHt.	-453.4170sft	0.0267sft	0.0031sft	0.16
			Dist.	30454.2962sft	0.0130sft	-0.0105sft	-1.14

B17	STA043-2001	GPS86-8 RESET	Az.	356°25'47.1112"	0°00'00.0997"	-0°00'00.0418"	-0.54
			ΔHt.	-17.6069sft	0.0079sft	-0.0056sft	-1.10
			Dist.	8383.0223sft	0.0042sft	-0.0017sft	-0.55
B8	GPS86-7	GPS86-8 RESET	Az.	246°28'36.7703"	0°00'00.0891"	-0°00'00.0082"	-0.13
			ΔHt.	-25.3955sft	0.0080sft	-0.0028sft	-0.59
			Dist.	9723.9577sft	0.0042sft	0.0032sft	1.07

Geoid Observations

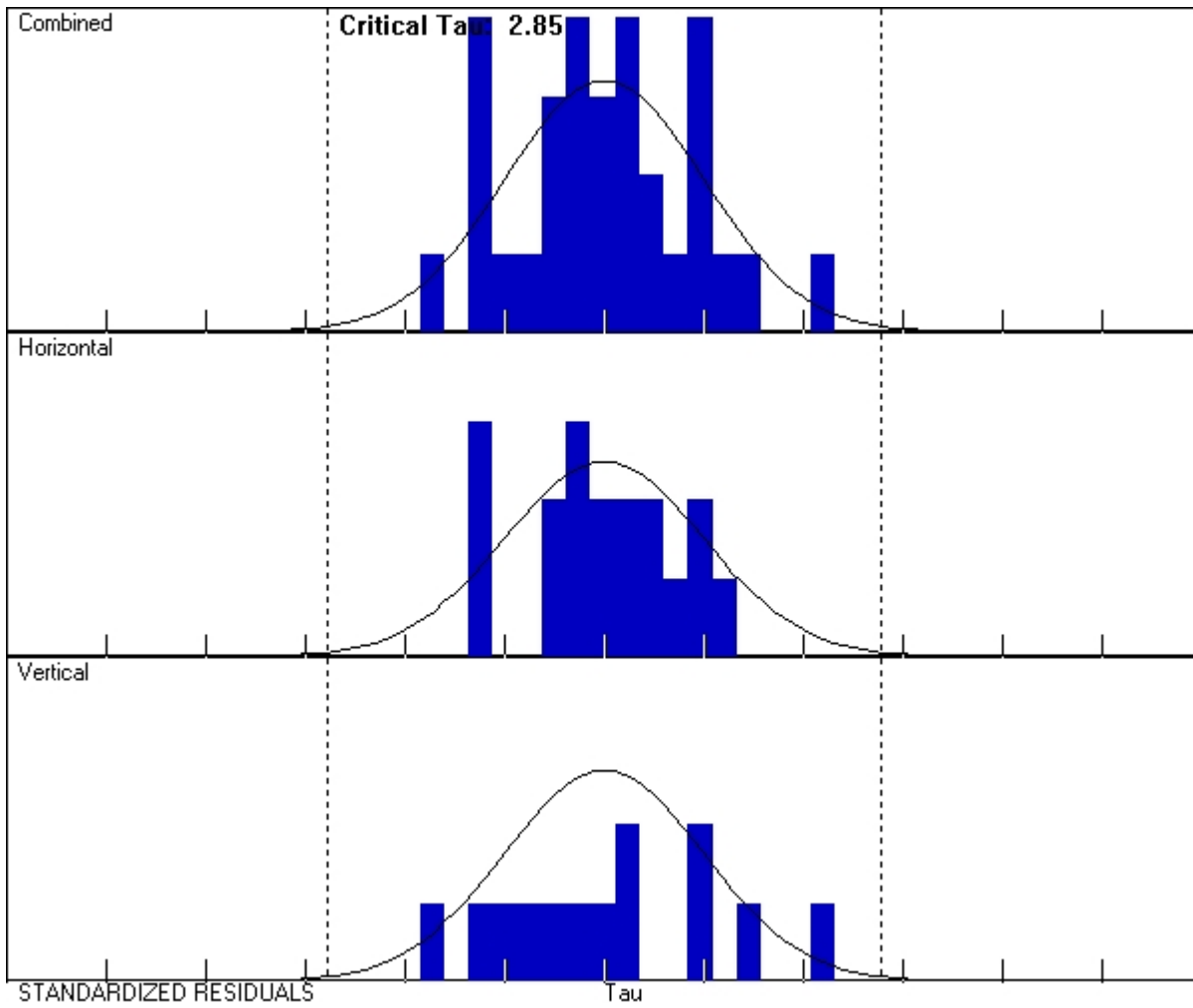
Number of Observations : 4

Number of Outliers : 0

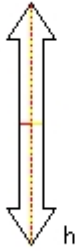
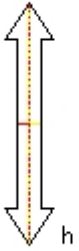
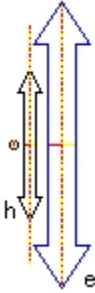
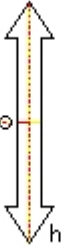
Observation Adjustment (Critical Tau = 2.85). Any outliers are in **red**.

Observation ID	Point Name	Separation	A-posteriori Error (1.96σ)	Residual	Standardized Residual
G6	GPS86-7	-109.3121sft	0.1526sft	0.0006sft	0.97
G8	STA043-2001	-109.1444sft	0.1526sft	-0.0005sft	-0.74
G5	EDWARD 2	-108.9850sft	0.1526sft	-0.0001sft	-0.16
G7	GPS86-8 RESET	-109.2048sft	0.1526sft	0.0000sft	0.00

Histograms of Standardized Residuals



Point Error Ellipses

EDWARD 2	GPS86-7	GPS86-8 RESET
 0°	 0°	 -76°
Tick Size: 0.0010sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
STA043-2001		
 -30°		
Tick Size: 0.0010sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		

Covariant Terms

Adjustment performed in **NAD 1983 (Conus)**

From Point	To Point		Components	A-posteriori Error (1.96σ)	Horiz. Precision (Ratio)	3D Precision (Ratio)
EDWARD 2	GPS86-7	Az.	87°15'27.7452"	0°00'00.0000"	1:0	1:0
		ΔHt.	-453.4671sft	0.2159sft		
		ΔElev.	-453.1400sft	0.0000sft		
		Dist.	30454.2471sft	0.0000sft		

EDWARD 2	GPS86-8 RESET	Az.	96°27'25.2060"	0°00'00.0527"	1:4014019	1:4014019
		ΔHt.	-478.8319sft	0.1491sft		
		ΔElev.	-478.6121sft	0.1792sft		
		Dist.	21645.2538sft	0.0054sft		
EDWARD 2	STA043- 2001	Az.	116°06'35.5242"	0°00'00.0646"	1:3080142	1:3080142
		ΔHt.	-461.1894sft	0.2159sft		
		ΔElev.	-461.0300sft	0.0000sft		
		Dist.	24541.3056sft	0.0080sft		
GPS86-7	GPS86-8 RESET	Az.	246°28'36.9667"	0°00'00.1178"	1:1809832	1:1809832
		ΔHt.	-25.3649sft	0.0950sft		
		ΔElev.	-25.4721sft	0.1792sft		
		Dist.	9723.9420sft	0.0054sft		
GPS86-7	STA043- 2001	Az.	214°25'56.7252"	0°00'00.1107"	1:1931987	1:1931987
		ΔHt.	-7.7223sft	0.2159sft		
		ΔElev.	-7.8900sft	0.0000sft		
		Dist.	14849.6617sft	0.0077sft		
GPS86-8 RESET	STA043- 2001	Az.	176°25'43.2532"	0°00'00.1361"	1:1507758	1:1507758
		ΔHt.	17.6425sft	0.1361sft		
		ΔElev.	17.5821sft	0.1792sft		
		Dist.	8383.0088sft	0.0056sft		

Network Adjustment Report

Project : 0780-Network-2

User name	jtheis	Date & Time	8:47:53 AM 9/26/2007
Coordinate System	US State Plane 1983	Zone	Kentucky North 1601
Project Datum	NAD 1983 (Conus)		
Vertical Datum	NAVD88	Geoid Model	GO3U07
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

Adjustment Style Settings - 95% Confidence Limits

Residual Tolerances

To End Iterations : 0.000033sft

Final Convergence Cutoff : 0.016404sft

Covariance Display

Horizontal

Propagated Linear Error [E] : U.S.

Constant Term [C] : 0.00000000sft

Scale on Linear Error [S] : 1.96

Three-Dimensional

Propagated Linear Error [E] : U.S.

Constant Term [C] : 0.00000000sft

Scale on Linear Error [S] : 1.96

Elevation Errors were used in the calculations.

Adjustment Controls

Compute Correlations for Geoid : False

Horizontal and Vertical adjustment performed

Set-up Errors

GPS

Error in Height of Antenna : 0.0000sft

Centering Error : 0.0000sft

Statistical Summary

Successful Adjustment in 1 iteration(s)

Network Reference Factor : 1.15

Chi Square Test ($\alpha=95\%$) : PASS

Degrees of Freedom : 20.00

GPS Observation Statistics

Reference Factor : 1.15

Redundancy Number (r) : 20.00

Individual GPS Observation Statistics

Observation ID	Reference Factor	Redundancy Number
B2	0.79	2.44
B6	1.45	1.58
B7	1.92	1.86
B8	0.58	1.97
B9	1.35	1.62
B10	1.15	1.45
B11	0.26	1.96
B13	1.47	2.77
B15	1.04	2.28
B17	0.47	2.06

Geoid Model Statistics

Reference Factor : 1.57

Redundancy Number (r) : 0.00

Weighting Strategies

GPS Observations

User-defined Scalar Applied to All Observations

Scalar : 4.05

Geoid Observations

Default Scalar Applied to All Observations

Scalar : 1.00

Adjusted Coordinates

Adjustment performed in **NAD 1983 (Conus)**

Number of Points : 5

Number of Constrained Points : 3

Horizontal and Elevation Only : 3

Adjusted Grid Coordinates

Errors are reported using 1.96σ .

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
GPS86-3	302620.8700sft	0.0000sft	1240590.8100sft	0.0000sft	448.3000sft	0.0000sft	N E e
STA047-2003	310294.8500sft	0.0000sft	1253780.4400sft	0.0000sft	591.9800sft	0.0000sft	N E e
AZI024-2001	301960.0353sft	0.0123sft	1249009.6060sft	0.0084sft	631.5525sft	0.1730sft	
STA024- 2001RESET	302375.4023sft	0.0129sft	1248128.0179sft	0.0101sft	603.7527sft	0.1743sft	
STA023-2001	294225.5700sft	0.0000sft	1255116.2300sft	0.0000sft	633.5300sft	0.0000sft	N E e

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ .

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
GPS86-3	38°19'21.71878"N	0.0000sft	85°38'37.41490"W	0.0000sft	338.7933sft	0.1476sft	Lat Long e
STA047-2003	38°20'39.51235"N	0.0000sft	85°35'53.33171"W	0.0000sft	482.4308sft	0.1476sft	Lat Long e
AZI024-2001	38°19'16.43282"N	0.0123sft	85°36'51.66021"W	0.0084sft	522.0764sft	0.0902sft	
STA024-2001RESET	38°19'20.40926"N	0.0129sft	85°37'02.79877"W	0.0101sft	494.2695sft	0.0926sft	
STA023-2001	38°18'00.86870"N	0.0000sft	85°35'33.62604"W	0.0000sft	524.1414sft	0.1476sft	Lat Long e

Coordinate Deltas

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height	Δ Geoid Separation
GPS86-3	0.0000sft	0.0000sft	0.0000sft	0.0040sft	-0.0040sft
STA047-2003	0.0000sft	0.0000sft	0.0000sft	-0.0494sft	0.0494sft
AZI024-2001	-0.0028sft	0.0027sft	0.0149sft	0.0149sft	0.0000sft
STA024-2001RESET	-0.0029sft	-0.0007sft	0.0049sft	0.0049sft	0.0000sft
STA023-2001	0.0000sft	0.0000sft	0.0000sft	0.0632sft	-0.0632sft

Control Coordinate Comparisons

Values shown are control coord minus adjusted coord.

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height
GPS86-3	N/A	N/A	N/A	N/A
STA047-2003	N/A	N/A	N/A	N/A
AZI024-2001	0.0047sft	-0.0060sft	-0.0225sft	N/A
STA023-2001	N/A	N/A	N/A	N/A

Adjusted Observations

Adjustment performed in **NAD 1983 (Conus)**

GPS Observations

GPS Transformation Group: <GPS Default>

Deflection in Longitude : 0°00'00.0630" **(1.96 σ)** : 0°00'02.7597"

Deflection in Latitude : 0°00'01.6354" **(1.96 σ)** : 0°00'02.7438"

Azimuth Rotation : -0°00'00.1387" **(1.96 σ)** : 0°00'00.1536"

Network Scale : 0.99999764 **(1.96 σ)** : 0.00000075

Number of Observations : 10

Number of Outliers : 0

Observation Adjustment (Critical Tau = 2.89). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B7	GPS86-3	STA024-2001RESET	Az.	90°59'53.9328"	0°00'00.3815"	0°00'00.3138"	-1.26
			ΔHt.	155.4741sft	0.0396sft	0.0394sft	1.71
			Dist.	7541.4482sft	0.0117sft	0.0229sft	2.35
B13	GPS86-3	STA023-2001	Az.	119°09'35.1869"	0°00'00.1536"	0°00'00.2883"	-0.61
			ΔHt.	185.2801sft	0.0474sft	0.0177sft	0.20
			Dist.	16777.5695sft	0.0126sft	-0.0534sft	-2.12
B9	AZI024-2001	STA047-2003	Az.	28°56'16.8325"	0°00'00.2249"	0°00'00.0520"	-0.40
			ΔHt.	-39.5792sft	0.0320sft	-0.0115sft	-0.77
			Dist.	9603.9600sft	0.0140sft	0.0169sft	1.83
B15	STA023-2001	STA047-2003	Az.	354°24'46.1699"	0°00'00.1536"	0°00'00.2121"	1.52
			ΔHt.	-41.5817sft	0.0388sft	0.0085sft	0.31
			Dist.	16125.2262sft	0.0122sft	0.0019sft	0.11
B6	GPS86-3	AZI024-2001	Az.	93°37'16.4550"	0°00'00.3320"	0°00'00.2603"	-1.11
			ΔHt.	183.2776sft	0.0393sft	-0.0089sft	-0.37
			Dist.	8444.9657sft	0.0098sft	-0.0059sft	-1.34
B10	AZI024-2001	STA024-2001RESET	Az.	294°22'44.6547"	0°00'02.9659"	0°00'00.7823"	-0.46
			ΔHt.	-27.8023sft	0.0328sft	-0.0030sft	-0.12
			Dist.	974.5711sft	0.0096sft	0.0061sft	1.30
B2	GPS86-3	STA047-2003	Az.	58°56'28.8466"	0°00'00.1536"	0°00'00.0827"	-0.36
			ΔHt.	143.6971sft	0.0420sft	0.0040sft	0.12
			Dist.	15260.1313sft	0.0115sft	0.0184sft	1.12

B8	STA047-2003	STA024-2001RESET	Az.	214°40'41.7097"	0°00'00.2501"	0°00'00.1511"	-0.76
			ΔHt.	11.7781sft	0.0339sft	-0.0029sft	-0.13
			Dist.	9730.0435sft	0.0147sft	-0.0029sft	-0.21
B17	STA023-2001	STA024-2001RESET	Az.	318°33'09.7281"	0°00'00.2976"	0°00'00.0698"	-0.23
			ΔHt.	-29.8048sft	0.0385sft	-0.0129sft	-0.50
			Dist.	10736.0245sft	0.0135sft	-0.0002sft	-0.02
B11	STA023-2001	AZI024-2001	Az.	320°52'20.6721"	0°00'00.2949"	0°00'00.0083"	0.03
			ΔHt.	-2.0013sft	0.0367sft	0.0059sft	0.26
			Dist.	9854.8970sft	0.0132sft	-0.0034sft	-0.31

Geoid Observations

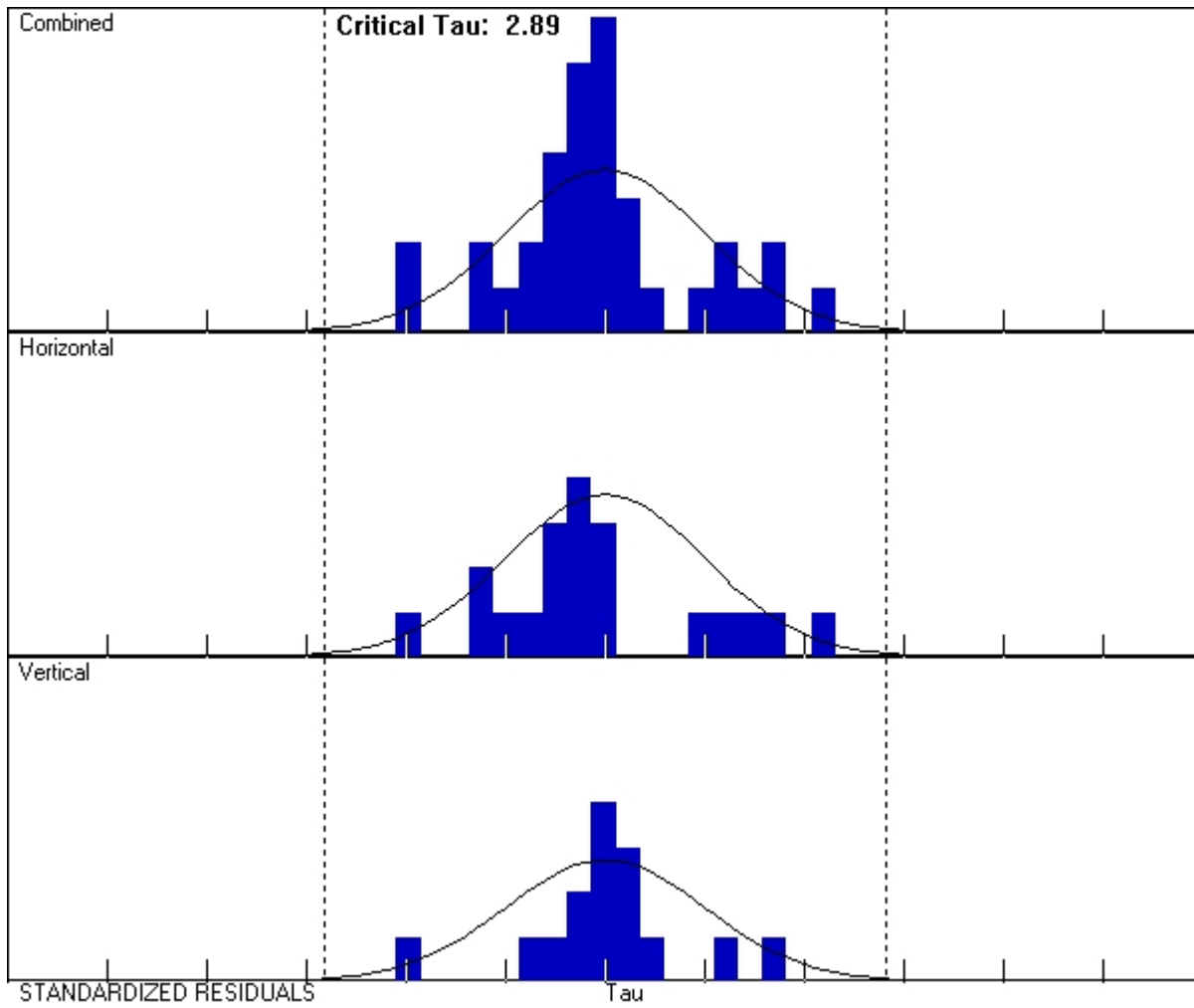
Number of Observations : 5

Number of Outliers : 0

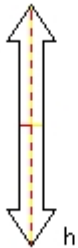
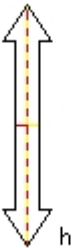
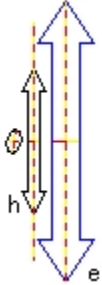
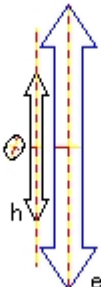
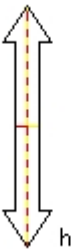
Observation Adjustment (Critical Tau = 2.89). Any outliers are in **red**.

Observation ID	Point Name	Separation	A-posteriori Error (1.96σ)	Residual	Standardized Residual
G2	STA047-2003	-109.5492sft	0.1476sft	-0.0005sft	-2.01
G1	GPS86-3	-109.5067sft	0.1476sft	0.0003sft	1.22
G5	STA023-2001	-109.3886sft	0.1476sft	0.0001sft	0.52
G3	AZI024-2001	-109.4761sft	0.1476sft	0.0000sft	0.00
G4	STA024-2001RESET	-109.4832sft	0.1476sft	0.0000sft	0.00

Histograms of Standardized Residuals



Point Error Ellipses

GPS86-3	STA047-2003	AZI024-2001
		
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
STA024-2001RESET	STA023-2001	
		
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		

Covariant Terms

Adjustment performed in **NAD 1983 (Conus)**

From Point	To Point		Components	A-posteriori Error (1.96σ)	Horiz. Precision (Ratio)	3D Precision (Ratio)
GPS86-3	STA047-2003	Az.	58°56'28.9848"	0°00'00.0000"	1:0	1:0
		ΔHt.	143.6376sft	0.2088sft		
		ΔElev.	143.6800sft	0.0000sft		
		Dist.	15260.1672sft	0.0000sft		

GPS86-3	AZI024-2001	Az.	93°37'16.5934"	0°00'00.3028"	1:1017129	1:1017129
		ΔHt.	183.2832sft	0.1127sft		
		ΔElev.	183.2525sft	0.1730sft		
		Dist.	8444.9855sft	0.0083sft		
GPS86-3	STA024-2001RESET	Az.	90°59'54.0712"	0°00'00.3537"	1:747832	1:747832
		ΔHt.	155.4763sft	0.1024sft		
		ΔElev.	155.4527sft	0.1743sft		
		Dist.	7541.4660sft	0.0101sft		
GPS86-3	STA023-2001	Az.	119°09'35.3251"	0°00'00.0000"	1:0	1:0
		ΔHt.	185.3482sft	0.2088sft		
		ΔElev.	185.2300sft	0.0000sft		
		Dist.	16777.6089sft	0.0000sft		
STA047-2003	AZI024-2001	Az.	208°56'53.1480"	0°00'00.1845"	1:787215	1:787215
		ΔHt.	39.6456sft	0.1339sft		
		ΔElev.	39.5725sft	0.1730sft		
		Dist.	9603.9826sft	0.0122sft		
STA047-2003	STA024-2001RESET	Az.	214°40'41.8487"	0°00'00.2052"	1:734994	1:734994
		ΔHt.	11.8387sft	0.1366sft		
		ΔElev.	11.7727sft	0.1743sft		
		Dist.	9730.0664sft	0.0132sft		
STA047-2003	STA023-2001	Az.	174°24'34.0895"	0°00'00.0000"	1:0	1:0
		ΔHt.	41.7106sft	0.2088sft		
		ΔElev.	41.5500sft	0.0000sft		
		Dist.	16125.2642sft	0.0000sft		
AZI024-2001	STA024-2001RESET	Az.	294°22'44.7935"	0°00'02.9672"	1:100973	1:100973
		ΔHt.	-27.8069sft	0.0350sft		
		ΔElev.	-27.7999sft	0.2456sft		
		Dist.	974.5734sft	0.0097sft		

AZI024-2001	STA023-2001	Az.	140°51'32.4357"	0°00'00.2310"	1:980939	1:980939
		ΔHt.	2.0650sft	0.1247sft		
		ΔElev.	1.9775sft	0.1730sft		
		Dist.	9854.9202sft	0.0100sft		
STA024-2001RESET	STA023-2001	Az.	138°32'14.5859"	0°00'00.2446"	1:1037787	1:1037787
		ΔHt.	29.8719sft	0.1356sft		
		ΔElev.	29.7773sft	0.1743sft		
		Dist.	10736.0498sft	0.0103sft		

[Back to top](#)

Network Adjustment Report

Project : 0780-Network-3

User name	jtheis	Date & Time	10:05:10 AM 10/1/2007
Coordinate System	US State Plane 1983	Zone	Kentucky North 1601
Project Datum	NAD 1983 (Conus)		
Vertical Datum	NAVD 88	Geoid Model	GO3U07
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

Adjustment Style Settings - 95% Confidence Limits

Residual Tolerances

To End Iterations : 0.000033sft

Final Convergence Cutoff : 0.016404sft

Covariance Display

Horizontal

Propagated Linear Error [E] : U.S.

Constant Term [C] : 0.00000000sft

Scale on Linear Error [S] : 1.96

Three-Dimensional

Propagated Linear Error [E] : U.S.

Constant Term [C] : 0.00000000sft

Scale on Linear Error [S] : 1.96

Elevation Errors were used in the calculations.

Adjustment Controls

Compute Correlations for Geoid : False

Horizontal and Vertical adjustment performed

Set-up Errors

GPS

Error in Height of Antenna : 0.0000sft

Centering Error : 0.0000sft

Statistical Summary

Successful Adjustment in 1 iteration(s)

Network Reference Factor : 1.17

Chi Square Test ($\alpha=95\%$) : PASS

Degrees of Freedom : 17.00

GPS Observation Statistics

Reference Factor : 1.17

Redundancy Number (r) : 17.00

Individual GPS Observation Statistics

Observation ID	Reference Factor	Redundancy Number
B3	0.95	0.82
B5	0.92	2.02
B8	1.38	2.07
B9	1.88	1.43
B11	1.04	1.89
B15	0.58	1.87
B17	1.00	2.19
B18	1.29	2.36
B19	1.12	2.34

Geoid Model Statistics

Reference Factor : 0.86

Redundancy Number (r) : 0.00

Weighting Strategies

GPS Observations

User-defined Scalar Applied to All Observations

Scalar : 5.60

Geoid Observations

Default Scalar Applied to All Observations

Scalar : 1.00

Adjusted Coordinates

Adjustment performed in **NAD 1983 (Conus)**

Number of Points : 5

Number of Constrained Points : 3

Horizontal and Elevation Only : 3

Adjusted Grid Coordinates

Errors are reported using 1.96σ .

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
STA037-2001	280623.0497sft	0.0219sft	1291410.1720sft	0.0228sft	619.5681sft	0.1873sft	
AZI037-2001RESET	280936.8172sft	0.0194sft	1290789.1361sft	0.0199sft	628.4075sft	0.1843sft	
STA039-2001	269358.6100sft	0.0000sft	1290785.3700sft	0.0000sft	678.9100sft	0.0000sft	NE e
GPS-#47	288616.3300sft	0.0000sft	1279782.5300sft	0.0000sft	753.3900sft	0.0000sft	NE e
AZI8627-2001	280136.0100sft	0.0000sft	1305411.3500sft	0.0000sft	710.9100sft	0.0000sft	NE e

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ .

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
STA037-2001	38°15'51.39531"N	0.0219sft	85°27'56.11916"W	0.0228sft	510.2378sft	0.1122sft	
AZI037-2001RESET	38°15'54.41572"N	0.0194sft	85°28'03.95730"W	0.0199sft	519.0788sft	0.1070sft	
STA039-2001	38°13'59.96745"N	0.0000sft	85°28'02.08598"W	0.0000sft	569.5992sft	0.1500sft	Lat Long e
GPS-#47	38°17'08.86403"N	0.0000sft	85°30'23.26508"W	0.0000sft	644.0678sft	0.1500sft	Lat Long e
AZI8627-2001	38°15'48.37103"N	0.0000sft	85°25'00.50314"W	0.0000sft	601.5172sft	0.1500sft	Lat Long e

Coordinate Deltas

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height	Δ Geoid Separation
STA037-2001	0.0000sft	0.0000sft	0.0000sft	0.0000sft	0.0000sft
AZI037-2001RESET	0.0000sft	0.0000sft	0.0000sft	0.0000sft	0.0000sft
STA039-2001	0.0000sft	0.0000sft	0.0000sft	0.0001sft	-0.0001sft
GPS-#47	0.0000sft	0.0000sft	0.0000sft	0.0000sft	0.0000sft
AZI8627-2001	0.0000sft	0.0000sft	0.0000sft	0.0000sft	0.0000sft

Control Coordinate Comparisons

Values shown are control coord minus adjusted coord.

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height
STA037-2001	-0.0197sft	-0.0220sft	0.1019sft	N/A
STA039-2001	N/A	N/A	N/A	N/A
GPS-#47	N/A	N/A	N/A	N/A
AZI8627-2001	N/A	N/A	N/A	N/A

Adjusted Observations

Adjustment performed in **NAD 1983 (Conus)**

GPS Observations

GPS Transformation Group: <GPS Default>

Deflection in Longitude : 0°00'00.5530" **(1.96 σ)** : 0°00'01.9934"
Deflection in Latitude : 0°00'00.1079" **(1.96 σ)** : 0°00'02.6193"
Azimuth Rotation : 0°00'00.0397" **(1.96 σ)** : 0°00'00.2176"
Network Scale : 0.99999966 **(1.96 σ)** : 0.00000098
Number of Observations : 9
Number of Outliers : 0

Observation Adjustment (Critical Tau = 2.84). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B9	GPS-#47	AZI037-2001RESET	Az.	124°07'21.5444"	0°00'00.4197"	0°00'00.3281"	1.33
			ΔHt.	-125.0225sft	0.0857sft	-0.0035sft	-0.08
			Dist.	13421.3197sft	0.0234sft	0.0238sft	2.34
B8	STA039-2001	AZI037-2001RESET	Az.	359°15'41.1778"	0°00'00.3960"	0°00'00.6744"	-1.86
			ΔHt.	-50.5137sft	0.0744sft	0.0435sft	0.88
			Dist.	11578.5594sft	0.0217sft	0.0065sft	0.37
B18	AZI8627-2001	STA039-2001	Az.	232°53'19.8021"	0°00'00.2176"	0°00'00.2867"	-1.14
			ΔHt.	-31.8848sft	0.0856sft	-0.0129sft	-0.21
			Dist.	18168.4246sft	0.0178sft	-0.0361sft	-1.47
B19	GPS-#47	AZI8627-2001	Az.	107°31'38.5873"	0°00'00.2176"	0°00'00.3432"	1.45
			ΔHt.	-42.6236sft	0.0998sft	-0.0288sft	-0.30
			Dist.	26996.2741sft	0.0265sft	-0.0262sft	-1.05
B11	AZI8627-2001	STA037-2001	Az.	271°15'58.9578"	0°00'00.3509"	0°00'00.2084"	0.87
			ΔHt.	-91.2416sft	0.0809sft	-0.0472sft	-0.92
			Dist.	14010.0851sft	0.0252sft	-0.0225sft	-1.22
B17	STA039-2001	GPS-#47	Az.	329°30'04.9945"	0°00'00.2177"	0°00'00.3215"	-1.15
			ΔHt.	74.5090sft	0.0870sft	0.0485sft	1.06
			Dist.	22180.0085sft	0.0218sft	0.0119sft	0.40
B5	STA037-2001	STA039-2001	Az.	182°25'06.9206"	0°00'00.4418"	0°00'00.3060"	-0.81
			ΔHt.	59.3569sft	0.0802sft	0.0288sft	0.54
			Dist.	11282.0966sft	0.0237sft	0.0138sft	0.76

B3	STA037-2001	AZI037-2001RESET	Az.	296°02'53.5865"	0°00'06.2842"	0°00'01.8091"	0.79
			ΔHt.	8.8430sft	0.0628sft	-0.0143sft	-0.62
			Dist.	695.8204sft	0.0175sft	0.0010sft	0.22
B15	AZI8627-2001	AZI037-2001RESET	Az.	272°24'31.9134"	0°00'00.3214"	0°00'00.1728"	0.77
			ΔHt.	-82.3987sft	0.0764sft	0.0027sft	0.06
			Dist.	14644.5851sft	0.0237sft	-0.0062sft	-0.35

Geoid Observations

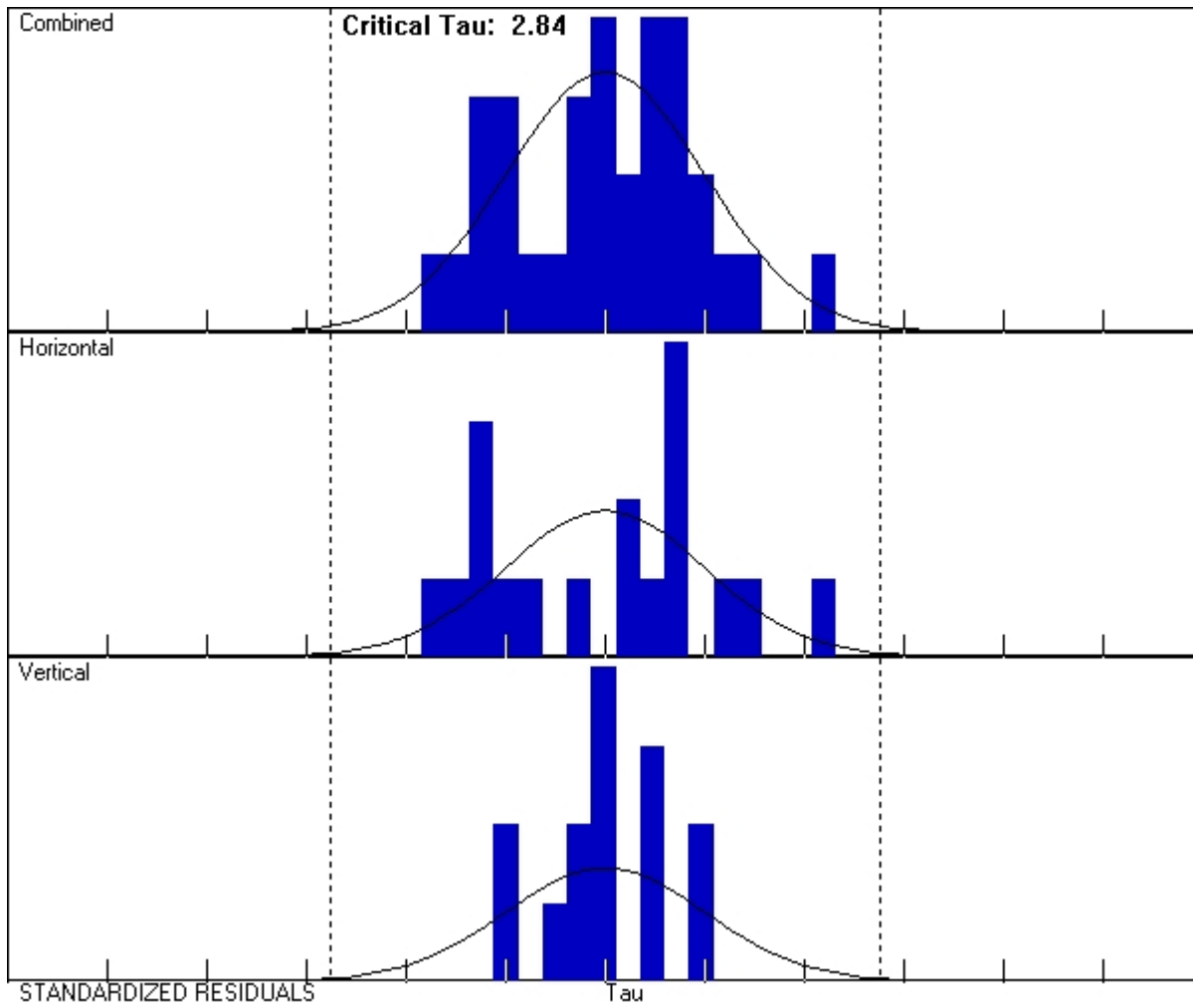
Number of Observations : 5

Number of Outliers : 0

Observation Adjustment (Critical Tau = 2.84). Any outliers are in **red**.

Observation ID	Point Name	Separation	A-posteriori Error (1.96σ)	Residual	Standardized Residual
G28	STA039-2001	-109.3108sft	0.1500sft	-0.0003sft	-0.89
G29	GPS-#47	-109.3222sft	0.1500sft	0.0001sft	0.60
G30	AZI8627-2001	-109.3928sft	0.1500sft	0.0001sft	0.56
G26	STA037-2001	-109.3303sft	0.1501sft	0.0000sft	0.00
G27	AZI037-2001RESET	-109.3287sft	0.1501sft	0.0000sft	0.00

Histograms of Standardized Residuals



Point Error Ellipses

STA037-2001	AZI037-2001RESET	STA039-2001
 37°	 40°	 0°
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
GPS-#47	AZI8627-2001	
 0°	 0°	
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		

Covariant Terms

Adjustment performed in **NAD 1983 (Conus)**

From Point	To Point		Components	A-posteriori Error (1.96σ)	Horiz. Precision (Ratio)	3D Precision (Ratio)
STA037-2001	AZI037-2001RESET	Az.	296°02'53.5469"	0°00'06.2628"	1:39941	1:39941
		ΔHt.	8.8410sft	0.0627sft		
		ΔElev.	8.8394sft	0.2628sft		
		Dist.	695.8206sft	0.0174sft		
STA037-2001	STA039-2001	Az.	182°25'06.8811"	0°00'00.4150"	1:511719	1:511719
		ΔHt.	59.3614sft	0.1522sft		
		ΔElev.	59.3419sft	0.1873sft		
		Dist.	11282.1004sft	0.0220sft		

STA037-2001	AZI8627-2001	Az.	91°14'10.1620"	0°00'00.3236"	1:615524	1:615524
		ΔHt.	91.2794sft	0.1406sft		
		ΔElev.	91.3419sft	0.1873sft		
		Dist.	14010.0898sft	0.0228sft		
AZI037-2001RESET	STA039-2001	Az.	179°15'39.9795"	0°00'00.3554"	1:599593	1:599593
		ΔHt.	50.5203sft	0.1495sft		
		ΔElev.	50.5025sft	0.1843sft		
		Dist.	11578.5634sft	0.0193sft		
AZI037-2001RESET	GPS-#47	Az.	304°08'47.7980"	0°00'00.3220"	1:737333	1:737333
		ΔHt.	124.9890sft	0.1221sft		
		ΔElev.	124.9825sft	0.1843sft		
		Dist.	13421.3243sft	0.0182sft		
AZI037-2001RESET	AZI8627-2001	Az.	92°22'38.2625"	0°00'00.2745"	1:740687	1:740687
		ΔHt.	82.4384sft	0.1400sft		
		ΔElev.	82.5025sft	0.1843sft		
		Dist.	14644.5901sft	0.0198sft		
STA039-2001	GPS-#47	Az.	329°30'04.9546"	0°00'00.0000"	1:0	1:0
		ΔHt.	74.4686sft	0.2122sft		
		ΔElev.	74.4800sft	0.0000sft		
		Dist.	22180.0161sft	0.0000sft		
STA039-2001	AZI8627-2001	Az.	52°51'27.3498"	0°00'00.0000"	1:0	1:0
		ΔHt.	31.9181sft	0.2122sft		
		ΔElev.	32.0000sft	0.0000sft		
		Dist.	18168.4308sft	0.0000sft		
GPS-#47	AZI8627-2001	Az.	107°31'38.5477"	0°00'00.0000"	1:0	1:0
		ΔHt.	-42.5506sft	0.2122sft		
		ΔElev.	-42.4800sft	0.0000sft		
		Dist.	26996.2832sft	0.0000sft		

Network Adjustment Report

Project : 0780-Network-4

User name	jtheis	Date & Time	8:50:50 AM 10/1/2007
Coordinate System	US State Plane 1983	Zone	Kentucky North 1601
Project Datum	NAD 1983 (Conus)		
Vertical Datum	NAVD 88	Geoid Model	GO3U07
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

Adjustment Style Settings - 95% Confidence Limits

Residual Tolerances

To End Iterations : 0.000033sft

Final Convergence Cutoff : 0.016404sft

Covariance Display

Horizontal

Propagated Linear Error [E] : U.S.

Constant Term [C] : 0.00000000sft

Scale on Linear Error [S] : 1.96

Three-Dimensional

Propagated Linear Error [E] : U.S.

Constant Term [C] : 0.00000000sft

Scale on Linear Error [S] : 1.96

Elevation Errors were used in the calculations.

Adjustment Controls

Compute Correlations for Geoid : False

Horizontal and Vertical adjustment performed

Set-up Errors

GPS

Error in Height of Antenna : 0.0000sft

Centering Error : 0.0000sft

Statistical Summary

Successful Adjustment in 2 iteration(s)

Network Reference Factor : 0.76

Chi Square Test ($\alpha=95\%$) : PASS

Degrees of Freedom : 20.00

GPS Observation Statistics

Reference Factor : 0.76

Redundancy Number (r) : 20.00

Individual GPS Observation Statistics

Observation ID	Reference Factor	Redundancy Number
B2	0.67	1.14
B4	1.20	1.64
B5	0.28	2.05
B6	0.60	2.32
B9	0.77	2.08
B10	1.33	1.70
B11	0.78	2.38
B12	0.46	2.59
B14	0.55	1.80
B17	0.59	2.30

Geoid Model Statistics

Reference Factor : 1.25

Redundancy Number (r) : 0.00

Weighting Strategies

GPS Observations

User-defined Scalar Applied to All Observations

Scalar : 2.84

Geoid Observations

Default Scalar Applied to All Observations

Scalar : 1.00

Adjusted Coordinates

Adjustment performed in **NAD 1983 (Conus)**

Number of Points : 5

Number of Constrained Points : 3

Horizontal and Elevation Only : 3

Adjusted Grid Coordinates

Errors are reported using 1.96σ .

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
BP35-2	241837.7179sft	0.0077sft	1248048.1121sft	0.0075sft	661.2880sft	0.1153sft	
BL32-01	248879.6300sft	0.0000sft	1245819.7400sft	0.0000sft	598.1500sft	0.0000sft	N E e
AZI8637-2001	234935.4300sft	0.0000sft	1256310.2700sft	0.0000sft	672.4500sft	0.0000sft	N E e
BP35-3 RESET	240886.3812sft	0.0068sft	1247925.7800sft	0.0064sft	669.8715sft	0.1139sft	
BS30-01	235380.1000sft	0.0000sft	1240142.3600sft	0.0000sft	637.2800sft	0.0000sft	N E e

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ .

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
BP35-2	38°09'22.01028"N	0.0077sft	85°36'52.54704"W	0.0075sft	552.1507sft	0.0620sft	
BL32-01	38°10'31.28948"N	0.0000sft	85°37'21.75657"W	0.0000sft	488.9959sft	0.0973sft	Lat Long e
AZI8637-2001	38°08'14.98074"N	0.0000sft	85°35'07.86456"W	0.0000sft	563.2804sft	0.0973sft	Lat Long e
BP35-3 RESET	38°09'12.58876"N	0.0068sft	85°36'53.90194"W	0.0064sft	560.7369sft	0.0593sft	
BS30-01	38°08'17.00990"N	0.0000sft	85°38'30.29241"W	0.0000sft	528.1819sft	0.0973sft	Lat Long e

Coordinate Deltas

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height	Δ Geoid Separation
BP35-2	-0.0021sft	-0.0179sft	-0.0035sft	-0.0035sft	0.0000sft
BL32-01	0.0000sft	0.0000sft	0.0000sft	0.0001sft	-0.0001sft
AZI8637-2001	0.0000sft	0.0000sft	0.0000sft	-0.0001sft	0.0001sft
BP35-3 RESET	-0.0007sft	-0.0023sft	0.0034sft	0.0034sft	0.0000sft
BS30-01	0.0000sft	0.0000sft	0.0000sft	0.0001sft	-0.0001sft

Control Coordinate Comparisons

Values shown are control coord minus adjusted coord.

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height
BP35-2	0.0021sft	0.0179sft	0.0120sft	N/A
BL32-01	N/A	N/A	N/A	N/A
AZI8637-2001	N/A	N/A	N/A	N/A
BS30-01	N/A	N/A	N/A	N/A

Adjusted Observations

Adjustment performed in **NAD 1983 (Conus)**

GPS Observations

GPS Transformation Group: <GPS Default>

Deflection in Longitude : 0°00'00.5974" **(1.96 σ)** : 0°00'01.7866"

Deflection in Latitude : 0°00'00.4069" **(1.96 σ)** : 0°00'01.8514"

Azimuth Rotation : 0°00'00.1346" **(1.96 σ)** : 0°00'00.0853"

Network Scale : 1.00000103 **(1.96 σ)** : 0.00000040

Number of Observations : 10

Number of Outliers : 0

Observation Adjustment (Critical Tau = 2.90). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B10	AZI8637-2001	BS30-01	Az.	270°44'40.3843"	0°00'00.0853"	0°00'00.1236"	-1.97
			ΔHt.	-35.0517sft	0.0246sft	0.0282sft	2.29
			Dist.	16174.3878sft	0.0065sft	0.0060sft	1.49
B4	AZI8637-2001	BP35-3 RESET	Az.	304°32'04.8756"	0°00'00.1664"	0°00'00.1109"	-1.09
			ΔHt.	-2.5080sft	0.0244sft	-0.0330sft	-2.05
			Dist.	10281.9459sft	0.0074sft	-0.0059sft	-1.48
B11	BL32-01	BS30-01	Az.	201°57'20.9448"	0°00'00.0853"	0°00'00.1632"	1.65
			ΔHt.	39.1745sft	0.0199sft	-0.0094sft	-0.65
			Dist.	14645.1490sft	0.0059sft	0.0013sft	0.15
B9	BP35-2	BP35-3 RESET	Az.	186°28'42.9640"	0°00'01.9585"	0°00'00.7516"	0.43
			ΔHt.	8.5841sft	0.0187sft	0.0039sft	0.27
			Dist.	959.1930sft	0.0094sft	-0.0117sft	-1.51
B6	BL32-01	BP35-3 RESET	Az.	164°23'07.6401"	0°00'00.1798"	0°00'00.0724"	0.33
			ΔHt.	71.7183sft	0.0159sft	-0.0086sft	-0.51
			Dist.	8266.2479sft	0.0074sft	-0.0118sft	-1.27
B2	BP35-2	BL32-01	Az.	341°35'29.3185"	0°00'00.2144"	0°00'00.0782"	0.87
			ΔHt.	-63.1347sft	0.0164sft	0.0028sft	0.45
			Dist.	7386.2653sft	0.0077sft	-0.0039sft	-1.22
B17	BS30-01	BP35-3 RESET	Az.	53°51'26.3717"	0°00'00.1611"	0°00'00.1466"	0.93
			ΔHt.	32.5432sft	0.0202sft	0.0049sft	0.29
			Dist.	9534.4111sft	0.0080sft	0.0070sft	0.81
B12	AZI8637-2001	BL32-01	Az.	322°12'51.1980"	0°00'00.0853"	0°00'00.1120"	0.66
			ΔHt.	-74.2268sft	0.0249sft	0.0233sft	0.72
			Dist.	17450.1212sft	0.0070sft	-0.0182sft	-0.89

B14	BP35-2	BS30-01	Az.	229°54'29.8445"	0°00'00.1666"	0°00'00.0415"	0.40
			ΔHt.	-23.9596sft	0.0206sft	-0.0079sft	-0.71
			Dist.	10208.1647sft	0.0085sft	0.0051sft	0.82
B5	BL32-01	BP35-3 RESET	Az.	164°23'07.6401"	0°00'00.1798"	0°00'00.0505"	0.35
			ΔHt.	71.7183sft	0.0159sft	0.0032sft	0.28
			Dist.	8266.2479sft	0.0074sft	0.0030sft	0.54

Geoid Observations

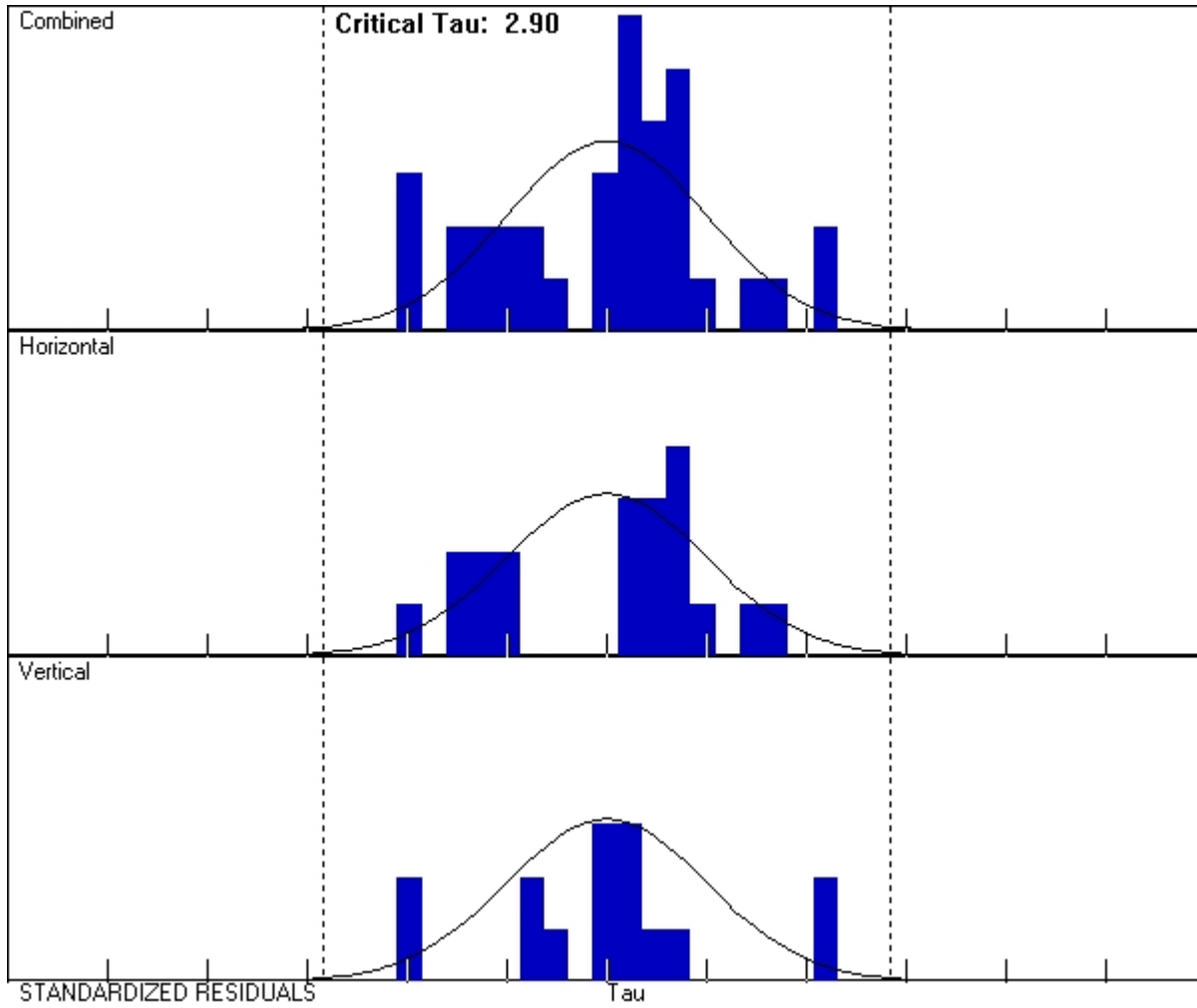
Number of Observations : 5

Number of Outliers : 0

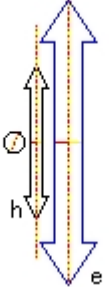
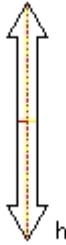
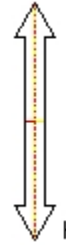
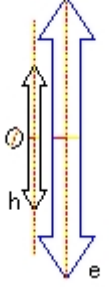
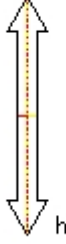
Observation Adjustment (Critical Tau = 2.90). Any outliers are in **red**.

Observation ID	Point Name	Separation	A-posteriori Error (1.96σ)	Residual	Standardized Residual
G2	BL32-01	-109.1541sft	0.0973sft	0.0004sft	2.16
G5	BS30-01	-109.0981sft	0.0973sft	-0.0004sft	-1.89
G3	AZI8637-2001	-109.1696sft	0.0973sft	0.0000sft	-0.06
G1	BP35-2	-109.1373sft	0.0973sft	0.0000sft	0.00
G4	BP35-3 RESET	-109.1346sft	0.0973sft	0.0000sft	0.00

Histograms of Standardized Residuals



Point Error Ellipses

BP35-2	BL32-01	AZI8637-2001
 67°	 0°	 0°
Tick Size: 0.0010sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
BP35-3 RESET	BS30-01	
 66°	 0°	
Tick Size: 0.0010sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		

Covariant Terms

Adjustment performed in **NAD 1983 (Conus)**

From Point	To Point		Components	A-posteriori Error (1.96σ)	Horiz. Precision (Ratio)	3D Precision (Ratio)
BP35-2	BL32-01	Az.	341°35'29.1838"	0°00'00.2112"	1:970938	1:970938
		ΔHt.	-63.1548sft	0.0637sft		
		ΔElev.	-63.1380sft	0.1153sft		
		Dist.	7386.2577sft	0.0076sft		

BP35-2	BP35-3 RESET	Az.	186°28'42.8295"	0°00'01.9528"	1:102556	1:102556
		ΔHt.	8.5863sft	0.0207sft		
		ΔElev.	8.5835sft	0.1621sft		
		Dist.	959.1920sft	0.0094sft		
BP35-2	BS30-01	Az.	229°54'29.7101"	0°00'00.1512"	1:1327908	1:1327908
		ΔHt.	-23.9687sft	0.0982sft		
		ΔElev.	-24.0080sft	0.1153sft		
		Dist.	10208.1542sft	0.0077sft		
BL32-01	AZI8637- 2001	Az.	142°11'28.3434"	0°00'00.0000"	1:0	1:0
		ΔHt.	74.2844sft	0.1375sft		
		ΔElev.	74.3000sft	0.0000sft		
		Dist.	17450.1033sft	0.0000sft		
BL32-01	BP35-3 RESET	Az.	164°23'07.5056"	0°00'00.1629"	1:1246882	1:1246882
		ΔHt.	71.7410sft	0.0711sft		
		ΔElev.	71.7215sft	0.1139sft		
		Dist.	8266.2394sft	0.0066sft		
BL32-01	BS30-01	Az.	201°57'20.8105"	0°00'00.0000"	1:0	1:0
		ΔHt.	39.1860sft	0.1375sft		
		ΔElev.	39.1300sft	0.0000sft		
		Dist.	14645.1339sft	0.0000sft		
AZI8637- 2001	BP35-3 RESET	Az.	304°32'04.7410"	0°00'00.1371"	1:1628536	1:1628536
		ΔHt.	-2.5434sft	0.0816sft		
		ΔElev.	-2.5785sft	0.1139sft		
		Dist.	10281.9354sft	0.0063sft		
AZI8637- 2001	BS30-01	Az.	270°44'40.2499"	0°00'00.0000"	1:0	1:0
		ΔHt.	-35.0984sft	0.1375sft		
		ΔElev.	-35.1700sft	0.0000sft		
		Dist.	16174.3712sft	0.0000sft		

BP35-3 RESET	BS30-01	Az.	233°52'25.7739"	0°00'00.1393"	1:1419240	1:1419240
		ΔHt.	-32.5550sft	0.0912sft		
		ΔElev.	-32.5915sft	0.1139sft		
		Dist.	9534.4013sft	0.0067sft		

Network Adjustment Report

Project : 0780-Network-5

User name	jtheis	Date & Time	3:30:11 PM 9/28/2007
Coordinate System	US State Plane 1983	Zone	Kentucky North 1601
Project Datum	NAD 1983 (Conus)		
Vertical Datum	NAVD 88	Geoid Model	GO3U07
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

Adjustment Style Settings - 95% Confidence Limits

Residual Tolerances

To End Iterations : 0.000033sft
Final Convergence Cutoff : 0.016404sft

Covariance Display

Horizontal

Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000sft
Scale on Linear Error [S] : 1.96

Three-Dimensional

Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000sft
Scale on Linear Error [S] : 1.96

Elevation Errors were used in the calculations.

Adjustment Controls

Compute Correlations for Geoid : False

Horizontal and Vertical adjustment performed

Set-up Errors

GPS

Error in Height of Antenna : 0.0000sft

Centering Error : 0.0000sft

Statistical Summary

Successful Adjustment in 1 iteration(s)

Network Reference Factor : 1.03

Chi Square Test ($\alpha=95\%$) : PASS

Degrees of Freedom : 65.00

GPS Observation Statistics

Reference Factor : 1.03

Redundancy Number (r) : 65.00

Individual GPS Observation Statistics

Observation ID	Reference Factor	Redundancy Number
B1	0.73	0.96
B2	0.62	2.64
B5	1.59	2.47
B6	1.21	1.28
B7	1.60	0.89
B8	1.87	1.28
B10	1.59	1.76
B30	0.76	2.30
B31	1.61	2.29
B33	1.01	2.28
B34	0.55	2.29
B36	0.70	2.57
B38	0.71	1.01
B39	1.24	2.27
B43	0.74	2.64
B45	0.33	2.72
B47	0.89	1.67
B48	0.40	2.61
B51	0.87	2.23
B56	2.29	1.65
B59	0.70	2.65
B60	0.39	2.25
B65	0.44	2.15
B67	1.28	1.98
B68	1.17	1.98
B69	0.39	2.53
B70	0.13	2.41
B71	0.47	2.14

B72	1.33	2.21
B73	0.83	2.43
B75	1.39	2.46

Geoid Model Statistics

Reference Factor : 1.51

Redundancy Number (r) : 0.00

The GPS height errors exceed the geoid errors. Further scaling of the geoid errors is not recommended.

Weighting Strategies

GPS Observations

Alternative Scalar Applied to All Observations

Scalar : 3.81

Geoid Observations

User-defined Scalar Applied to All Observations

Scalar : 0.01

Adjusted Coordinates

Adjustment performed in **NAD 1983 (Conus)**

Number of Points : 11

Number of Constrained Points : 5

Horizontal Only : 2

Elevation Only : 2

Horizontal and Elevation Only : 1

Adjusted Grid Coordinates

Errors are reported using 1.96σ .

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
STA012-2001	217965.9100sft	0.0199sft	1237024.9195sft	0.0200sft	596.2616sft	0.0486sft	
GPS86-20 RESET	214602.9468sft	0.0193sft	1245068.6159sft	0.0196sft	624.8624sft	0.0545sft	
LOUISVILLE S B	240989.4400sft	0.0000sft	1185268.1600sft	0.0000sft	470.2000sft	0.0000sft	N E e
AZI8620-2001 RES	214567.6349sft	0.0177sft	1245703.5084sft	0.0164sft	623.5801sft	0.0426sft	
AZI8616-2001 RES	187413.6109sft	0.0180sft	1155323.2859sft	0.0181sft	428.7374sft	0.0327sft	
GPS86-15	195754.8018sft	0.0207sft	1160612.8140sft	0.0193sft	441.0669sft	0.0327sft	
GPS86-16	187143.1908sft	0.0196sft	1155459.2407sft	0.0188sft	422.3200sft	0.0000sft	e
SNOW RM A RESET	149462.6405sft	0.0000sft	1134898.9949sft	0.0000sft	895.5191sft	0.1032sft	N E
STA013-2001	217117.2898sft	0.0176sft	1252172.5694sft	0.0161sft	674.1400sft	0.0000sft	e
31K ECC RESET	181207.7835sft	0.0175sft	1217822.7178sft	0.0167sft	444.6679sft	0.0621sft	
KY 13	147286.3300sft	0.0000sft	1260784.8700sft	0.0000sft	679.9737sft	0.1123sft	N E

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ .

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
STA012-2001	38°05'24.41032"N	0.0199sft	85°39'05.99096"W	0.0200sft	487.1996sft	0.0473sft	
GPS86-20 RESET	38°04'52.36660"N	0.0193sft	85°37'24.76087"W	0.0196sft	515.7350sft	0.0533sft	
LOUISVILLE S B	38°09'03.69573"N	0.0000sft	85°49'58.24030"W	0.0000sft	361.4009sft	0.0113sft	Lat Long e
AZI8620- 2001 RES	38°04'52.11107"N	0.0177sft	85°37'16.81464"W	0.0164sft	514.4473sft	0.0411sft	
AZI8616- 2001 RES	38°00'08.89263"N	0.0180sft	85°56'00.79577"W	0.0181sft	320.5610sft	0.0307sft	

GPS86-15	38°01'32.28890"N	0.0207sft	85°54'56.60699"W	0.0193sft	332.7942sft	0.0307sft	
GPS86-16	38°00'06.24432"N	0.0196sft	85°55'59.03579"W	0.0188sft	314.1444sft	0.0113sft	e
SNOW RM A RESET	37°53'50.01693"N	0.0000sft	86°00'06.90027"W	0.0000sft	787.9529sft	0.1026sft	Lat Long
STA013-2001	38°05'18.25795"N	0.0176sft	85°35'56.38253"W	0.0161sft	564.9565sft	0.0113sft	e
31K ECC RESET	37°59'18.11652"N	0.0175sft	85°42'58.83027"W	0.0167sft	335.7814sft	0.0611sft	
KY 13	37°53'49.22782"N	0.0000sft	85°33'56.19394"W	0.0000sft	570.4931sft	0.1117sft	Lat Long

Coordinate Deltas

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height	Δ Geoid Separation
STA012-2001	0.0014sft	0.0004sft	1.1727sft	1.1727sft	0.0000sft
GPS86-20 RESET	0.0011sft	0.0003sft	1.2880sft	1.2880sft	0.0000sft
LOUISVILLE S B	0.0000sft	0.0000sft	0.0000sft	0.4665sft	-0.4665sft
AZI8620-2001 RES	0.0006sft	-0.0006sft	1.3030sft	1.3030sft	0.0000sft
AZI8616-2001 RES	-0.0029sft	-0.0033sft	-2.0235sft	-2.0235sft	0.0000sft
GPS86-15	-0.0025sft	-0.0034sft	-1.6186sft	-1.6186sft	0.0000sft
GPS86-16	-0.0024sft	-0.0030sft	0.0000sft	-2.0284sft	2.0284sft
SNOW RM A RESET	0.0000sft	0.0000sft	-3.7815sft	-3.7815sft	0.0000sft
STA013-2001	0.0020sft	0.0010sft	0.0000sft	1.5619sft	-1.5619sft
31K ECC RESET	-0.0021sft	-0.0011sft	-0.4978sft	-0.4978sft	0.0000sft
KY 13	0.0000sft	0.0000sft	-0.3810sft	-0.3810sft	0.0000sft

Control Coordinate Comparisons

Values shown are control coord minus adjusted coord.

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight
STA012-2001	-0.0200sft	0.0105sft	-0.0116sft	N/A
LOUISVILLE S B	N/A	N/A	N/A	N/A
GPS86-15	-0.0018sft	-0.0140sft	-0.0669sft	N/A
GPS86-16	-0.0008sft	-0.0007sft	N/A	N/A
SNOW RM A RESET	N/A	N/A	N/A	N/A
STA013-2001	0.0202sft	0.0206sft	N/A	N/A
31K ECC RESET	N/A	N/A	0.0021sft	N/A
KY 13	N/A	N/A	N/A	N/A

Adjusted Observations

Adjustment performed in **NAD 1983 (Conus)**

GPS Observations

GPS Transformation Group: <GPS Default>

Deflection in Longitude : -0°00'00.0489" **(1.96σ)** : 0°00'00.1291"

Deflection in Latitude : -0°00'00.0840" **(1.96σ)** : 0°00'00.2819"

Azimuth Rotation : 0°00'00.0317" **(1.96σ)** : 0°00'00.0293"

Network Scale : 0.99999996 **(1.96σ)** : 0.00000015

Number of Observations : 31

Number of Outliers : 0

Observation Adjustment (Critical Tau = 3.36). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B56	SNOW RM A RESET	KY 13	Az.	89°54'08.3996"	0°00'00.0293"	0°00'00.0535"	-3.21
			ΔHt.	-217.4300sft	0.0710sft	0.0898sft	2.03
			Dist.	125903.2666sft	0.0191sft	0.0240sft	1.72
B31	GPS86-20 RESET	LOUISVILLE S B	Az.	292°57'14.9557"	0°00'00.0678"	0°00'00.0492"	0.62
			ΔHt.	-154.3588sft	0.0670sft	-0.0422sft	-0.77
			Dist.	65364.4032sft	0.0204sft	-0.0485sft	-2.61
B8	GPS86-15	AZI8616-2001 RES	Az.	211°20'39.8459"	0°00'00.2185"	0°00'00.1023"	-0.85
			ΔHt.	-12.2309sft	0.0257sft	-0.0167sft	-1.79
			Dist.	9877.0390sft	0.0127sft	-0.0159sft	-2.60
B7	GPS86-16	AZI8616-2001 RES	Az.	332°15'42.7412"	0°00'06.3065"	0°00'04.3547"	-2.37
			ΔHt.	6.4165sft	0.0286sft	0.0175sft	1.38
			Dist.	302.6742sft	0.0097sft	-0.0014sft	-0.42
B10	SNOW RM A RESET	AZI8616-2001 RES	Az.	27°11'54.6310"	0°00'00.0957"	0°00'00.1159"	1.58
			ΔHt.	-467.4028sft	0.0731sft	0.0748sft	1.40
			Dist.	43097.7672sft	0.0194sft	0.0267sft	2.26
B5	AZI8616-2001 RES	LOUISVILLE S B	Az.	28°09'17.7498"	0°00'00.0639"	0°00'00.1700"	2.04
			ΔHt.	40.8247sft	0.0640sft	0.0265sft	0.44
			Dist.	61377.3111sft	0.0196sft	0.0419sft	1.25
B72	KY 13	AZI8620-2001 RES	Az.	346°32'49.8769"	0°00'00.0498"	0°00'00.0835"	1.87
			ΔHt.	-56.0769sft	0.0552sft	-0.0186sft	-0.33
			Dist.	68951.0592sft	0.0184sft	-0.0119sft	-0.74

B67	STA013-2001	AZI8620-2001 RES	Az.	247°38'59.5238"	0°00'00.3956"	0°00'00.0552"	-0.18
			ΔHt.	-50.5097sft	0.0408sft	-0.0661sft	-1.43
			Dist.	6953.4892sft	0.0127sft	0.0230sft	1.82
B75	KY 13	31K ECC RESET	Az.	307°28'28.1059"	0°00'00.0738"	0°00'00.0038"	-0.04
			ΔHt.	-234.7356sft	0.0554sft	-0.0203sft	-0.23
			Dist.	54739.2767sft	0.0182sft	-0.0398sft	-1.63
B39	STA013-2001	LOUISVILLE S B	Az.	288°47'49.8082"	0°00'00.0556"	0°00'00.0834"	1.62
			ΔHt.	-203.5809sft	0.0600sft	0.0012sft	0.02
			Dist.	71037.1509sft	0.0176sft	-0.0232sft	-1.22
B68	STA013-2001	31K ECC RESET	Az.	222°53'19.8176"	0°00'00.0643"	0°00'00.0728"	1.62
			ΔHt.	-229.1683sft	0.0469sft	0.0290sft	0.77
			Dist.	49693.6004sft	0.0174sft	0.0142sft	1.17
B33	STA013-2001	GPS86-15	Az.	256°01'36.5408"	0°00'00.0440"	0°00'00.0046"	-0.10
			ΔHt.	-232.1747sft	0.0545sft	0.0463sft	0.84
			Dist.	94020.0153sft	0.0179sft	-0.0194sft	-1.38
B47	AZI8620-2001 RES	GPS86-20 RESET	Az.	272°19'49.3298"	0°00'05.1987"	0°00'00.3701"	0.14
			ΔHt.	1.2876sft	0.0547sft	0.0360sft	0.81
			Dist.	635.8835sft	0.0169sft	-0.0165sft	-1.31
B30	STA013-2001	AZI8620-2001 RES	Az.	247°38'59.5238"	0°00'00.3956"	0°00'00.4537"	1.21
			ΔHt.	-50.5097sft	0.0408sft	0.0049sft	0.13
			Dist.	6953.4892sft	0.0127sft	-0.0034sft	-0.23
B6	GPS86-15	GPS86-16	Az.	209°51'43.0279"	0°00'00.2085"	0°00'00.0018"	-0.02
			ΔHt.	-18.6474sft	0.0299sft	0.0157sft	1.12
			Dist.	10035.9613sft	0.0131sft	0.0076sft	1.15

B73	KY 13	GPS86-20 RESET	Az.	346°02'24.3140"	0°00'00.0599"	0°00'00.0121"	-0.15
			ΔHt.	-54.7894sft	0.0610sft	0.0172sft	0.36
			Dist.	69127.0918sft	0.0204sft	0.0306sft	1.14
B43	AZI8620- 2001 RES	AZI8616- 2001 RES	Az.	252°25'24.8960"	0°00'00.0401"	0°00'00.0037"	-0.06
			ΔHt.	-193.8960sft	0.0539sft	0.0648sft	0.69
			Dist.	94372.1945sft	0.0173sft	0.0259sft	1.13
B1	STA012-2001	GPS86-20 RESET	Az.	111°49'02.3283"	0°00'00.3289"	0°00'00.1185"	1.11
			ΔHt.	28.5387sft	0.0533sft	-0.0111sft	-0.44
			Dist.	8718.5424sft	0.0160sft	0.0007sft	0.11
B38	STA012-2001	STA013-2001	Az.	92°20'05.1293"	0°00'00.1935"	0°00'00.0754"	-1.11
			ΔHt.	77.7608sft	0.0475sft	0.0077sft	0.38
			Dist.	15171.6491sft	0.0152sft	-0.0004sft	-0.06
B36	SNOW RM A RESET	31K ECC RESET	Az.	67°57'47.6608"	0°00'00.0479"	0°00'00.0344"	0.34
			ΔHt.	-452.1656sft	0.0764sft	0.0770sft	0.61
			Dist.	88792.1025sft	0.0220sft	0.0478sft	1.02
B51	31K ECC RESET	LOUISVILLE S B	Az.	330°31'00.0027"	0°00'00.0605"	0°00'00.0708"	1.02
			ΔHt.	25.5874sft	0.0595sft	-0.0351sft	-0.80
			Dist.	68071.8145sft	0.0197sft	-0.0072sft	-0.32
B59	GPS86-15	31K ECC RESET	Az.	103°13'51.4218"	0°00'00.0745"	0°00'00.0171"	0.14
			ΔHt.	3.0063sft	0.0525sft	0.0773sft	0.87
			Dist.	59030.7487sft	0.0179sft	0.0084sft	0.34
B2	LOUISVILLE S B	AZI8620- 2001 RES	Az.	112°37'49.4128"	0°00'00.0616"	0°00'00.0517"	0.59
			ΔHt.	153.0712sft	0.0635sft	-0.0100sft	-0.12
			Dist.	65959.9100sft	0.0184sft	-0.0233sft	-0.80

B34	GPS86-16	AZI8620-2001 RES	Az.	72°03'01.4335"	0°00'00.0411"	0°00'00.0250"	-0.67
			ΔHt.	200.3124sft	0.0563sft	-0.0018sft	-0.03
			Dist.	94320.2648sft	0.0177sft	0.0125sft	0.77
B71	STA013-2001	KY 13	Az.	172°07'48.4328"	0°00'00.0469"	0°00'00.0010"	-0.03
			ΔHt.	5.5673sft	0.0531sft	-0.0280sft	-0.68
			Dist.	70360.2709sft	0.0184sft	-0.0042sft	-0.21
B48	31K ECC RESET	AZI8620-2001 RES	Az.	38°58'32.2543"	0°00'00.0798"	0°00'00.0269"	0.23
			ΔHt.	178.6587sft	0.0519sft	-0.0001sft	0.00
			Dist.	43477.0506sft	0.0187sft	0.0154sft	0.62
B60	GPS86-16	31K ECC RESET	Az.	94°23'25.5951"	0°00'00.0648"	0°00'00.0270"	-0.46
			ΔHt.	21.6538sft	0.0527sft	0.0070sft	0.15
			Dist.	62645.5489sft	0.0176sft	0.0096sft	0.55
B65	KY 13	AZI8616-2001 RES	Az.	290°00'42.0383"	0°00'00.0343"	0°00'00.0122"	-0.46
			ΔHt.	-249.9730sft	0.0535sft	0.0339sft	0.49
			Dist.	112837.3781sft	0.0179sft	-0.0137sft	-0.44
B69	GPS86-20 RESET	31K ECC RESET	Az.	218°21'18.2155"	0°00'00.0908"	0°00'00.0438"	0.46
			ΔHt.	-179.9462sft	0.0575sft	0.0027sft	0.04
			Dist.	43100.0122sft	0.0208sft	-0.0124sft	-0.42
B45	AZI8616-2001 RES	31K ECC RESET	Az.	94°37'26.2983"	0°00'00.0630"	0°00'00.0183"	0.17
			ΔHt.	15.2373sft	0.0503sft	-0.0285sft	-0.21
			Dist.	62807.0404sft	0.0175sft	0.0021sft	0.04
B70	STA012-2001	31K ECC RESET	Az.	206°42'36.5960"	0°00'00.0952"	0°00'00.0081"	-0.08
			ΔHt.	-151.4076sft	0.0559sft	-0.0014sft	-0.03
			Dist.	41471.9047sft	0.0201sft	-0.0052sft	-0.17

Geoid Observations

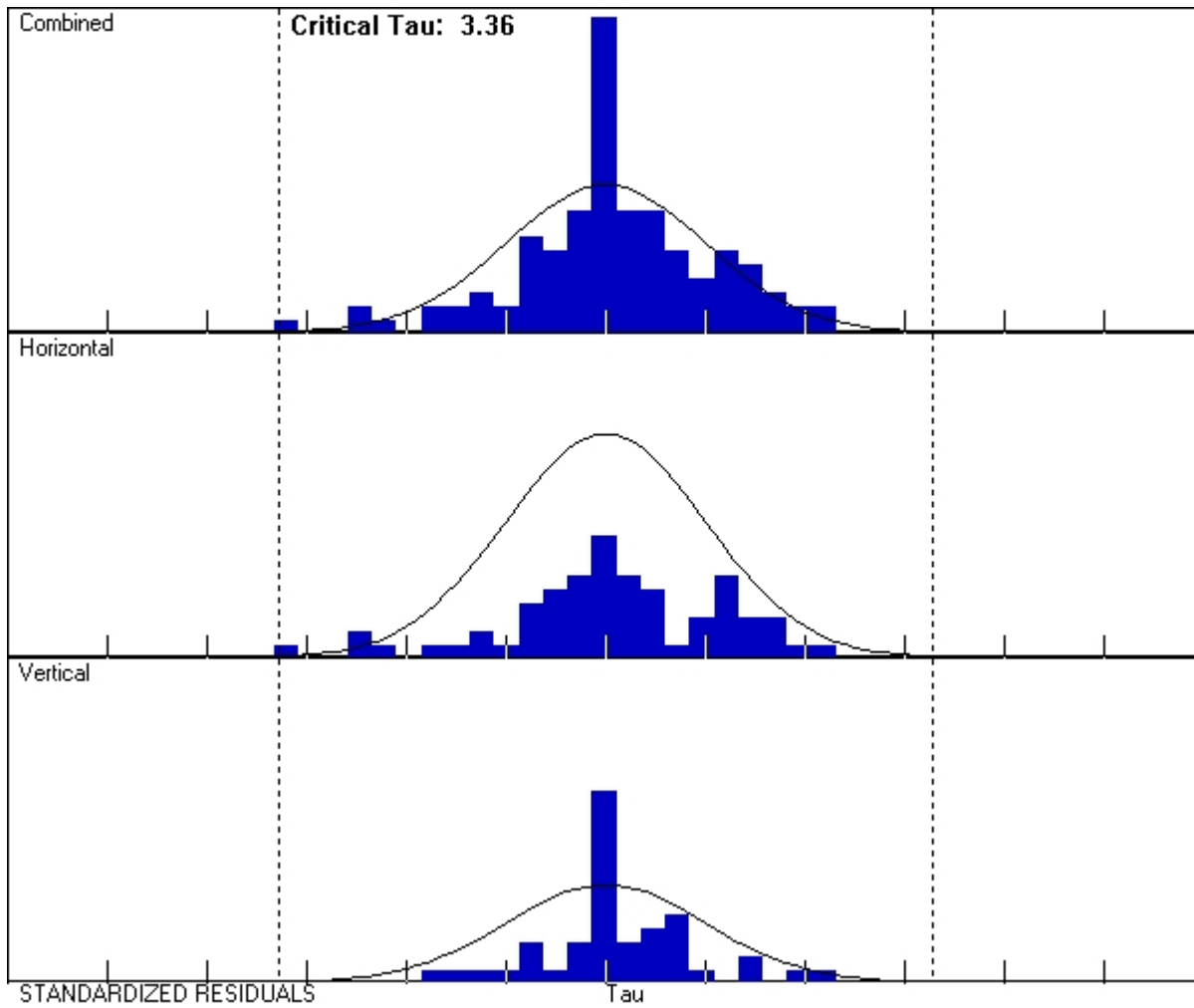
Number of Observations : 11

Number of Outliers : 0

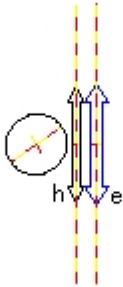
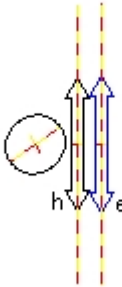

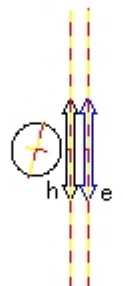
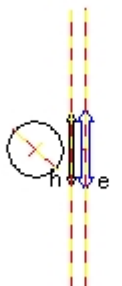
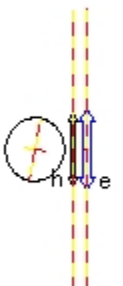

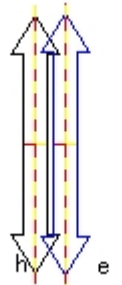

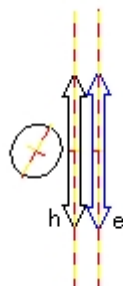
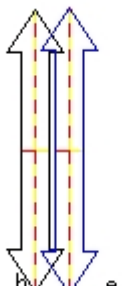
Observation Adjustment (Critical Tau = 3.36). Any outliers are in red.

Observation ID	Point Name	Separation	A-posteriori Error (1.96σ)	Residual	Standardized Residual
G40	GPS86-16	-108.1756sft	0.0113sft	0.0000sft	2.23
G42	STA013-2001	-109.1835sft	0.0113sft	0.0000sft	-1.23
G36	LOUISVILLE S B	-108.7991sft	0.0113sft	0.0000sft	-0.88
G35	GPS86-20 RESET	-109.1274sft	0.0113sft	0.0000sft	0.00
G44	KY 13	-109.4805sft	0.0113sft	0.0000sft	0.00
G34	STA012-2001	-109.0620sft	0.0113sft	0.0000sft	0.00
G37	AZI8620-2001 RES	-109.1328sft	0.0113sft	0.0000sft	0.00
G38	AZI8616-2001 RES	-108.1764sft	0.0113sft	0.0000sft	0.00
G39	GPS86-15	-108.2728sft	0.0113sft	0.0000sft	0.00
G41	SNOW RM A RESET	-107.5662sft	0.0113sft	0.0000sft	0.00
G43	31K ECC RESET	-108.8866sft	0.0113sft	0.0000sft	0.00

Histograms of Standardized Residuals



Point Error Ellipses

STA012-2001	GPS86-20 RESET	LOUISVILLE S B
 <p>37°</p>	 <p>37°</p>	 <p>0°</p>
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
AZI8620-2001 RES	AZI8616-2001 RES	GPS86-15
 <p>74°</p>	 <p>-43°</p>	 <p>78°</p>
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
GPS86-16	SNOW RM A RESET	STA013-2001
 <p>80°</p>	 <p>0°</p>	 <p>77°</p>
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
31K ECC RESET	KY 13	
 <p>59°</p>	 <p>0°</p>	
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		

Covariant Terms

Adjustment performed in **NAD 1983 (Conus)**

From Point	To Point		Components	A-posteriori Error (1.96 σ)	Horiz. Precision (Ratio)	3D Precision (Ratio)
STA012-2001	GPS86-20 RESET	Az.	111°49'02.2966"	0°00'00.3299"	1:542111	1:542111
		ΔHt.	28.5354sft	0.0549sft		
		ΔElev.	28.6009sft	0.0730sft		
		Dist.	8718.5427sft	0.0161sft		
STA012-2001	STA013-2001	Az.	92°20'05.0977"	0°00'00.1959"	1:988740	1:988740
		ΔHt.	77.7569sft	0.0464sft		
		ΔElev.	77.8784sft	0.0486sft		
		Dist.	15171.6497sft	0.0153sft		
STA012-2001	31K ECC RESET	Az.	206°42'36.5643"	0°00'00.0992"	1:1994110	1:1994110
		ΔHt.	-151.4182sft	0.0714sft		
		ΔElev.	-151.5936sft	0.0789sft		
		Dist.	41471.9064sft	0.0208sft		
GPS86-20 RESET	LOUISVILLE S B	Az.	292°57'14.9239"	0°00'00.0623"	1:3415712	1:3415712
		ΔHt.	-154.3341sft	0.0545sft		
		ΔElev.	-154.6624sft	0.0545sft		
		Dist.	65364.4058sft	0.0191sft		
GPS86-20 RESET	AZI8620-2001 RES	Az.	92°19'44.3970"	0°00'05.1988"	1:37713	1:37713
		ΔHt.	-1.2877sft	0.0547sft		
		ΔElev.	-1.2824sft	0.0692sft		
		Dist.	635.8835sft	0.0169sft		

GPS86-20 RESET	31K ECC RESET	Az.	218°21'18.1837"	0°00'00.0949"	1:2006915	1:2006915
		ΔHt.	-179.9536sft	0.0680sft		
		ΔElev.	-180.1945sft	0.0826sft		
		Dist.	43100.0139sft	0.0215sft		
GPS86-20 RESET	KY 13	Az.	166°00'15.9068"	0°00'00.0595"	1:3635477	1:3635477
		ΔHt.	54.7581sft	0.1067sft		
		ΔElev.	55.1112sft	0.1248sft		
		Dist.	69127.0946sft	0.0190sft		
LOUISVILLE S B	AZI8620-2001 RES	Az.	112°37'49.3812"	0°00'00.0556"	1:4039608	1:4039608
		ΔHt.	153.0464sft	0.0426sft		
		ΔElev.	153.3801sft	0.0426sft		
		Dist.	65959.9127sft	0.0163sft		
LOUISVILLE S B	AZI8616-2001 RES	Az.	208°13'01.3123"	0°00'00.0612"	1:3438072	1:3438072
		ΔHt.	-40.8399sft	0.0326sft		
		ΔElev.	-41.4626sft	0.0327sft		
		Dist.	61377.3136sft	0.0179sft		
LOUISVILLE S B	STA013-2001	Az.	108°39'10.0915"	0°00'00.0512"	1:4420694	1:4420694
		ΔHt.	203.5556sft	0.0159sft		
		ΔElev.	203.9400sft	0.0000sft		
		Dist.	71037.1538sft	0.0161sft		
LOUISVILLE S B	31K ECC RESET	Az.	150°26'41.3543"	0°00'00.0530"	1:4090975	1:4090975
		ΔHt.	-25.6195sft	0.0633sft		
		ΔElev.	-25.5321sft	0.0621sft		
		Dist.	68071.8171sft	0.0166sft		

AZI8620-2001 RES	AZI8616-2001 RES	Az.	252°25'24.8641"	0°00'00.0472"	1:4551052	1:4551052
		ΔHt.	-193.8863sft	0.0507sft		
		ΔElev.	-194.8427sft	0.0537sft		
		Dist.	94372.1982sft	0.0207sft		
AZI8620-2001 RES	GPS86-16	Az.	252°14'32.9509"	0°00'00.0485"	1:4442067	1:4442067
		ΔHt.	-200.3029sft	0.0424sft		
		ΔElev.	-201.2601sft	0.0426sft		
		Dist.	94320.2686sft	0.0212sft		
AZI8620-2001 RES	STA013-2001	Az.	67°38'09.8795"	0°00'00.3970"	1:547171	1:547171
		ΔHt.	50.5092sft	0.0397sft		
		ΔElev.	50.5599sft	0.0426sft		
		Dist.	6953.4895sft	0.0127sft		
AZI8620-2001 RES	31K ECC RESET	Az.	219°02'02.9521"	0°00'00.0850"	1:2226023	1:2226023
		ΔHt.	-178.6659sft	0.0665sft		
		ΔElev.	-178.9121sft	0.0753sft		
		Dist.	43477.0524sft	0.0195sft		
AZI8620-2001 RES	KY 13	Az.	166°30'46.3608"	0°00'00.0500"	1:3952242	1:3952242
		ΔHt.	56.0458sft	0.1089sft		
		ΔElev.	56.3936sft	0.1201sft		
		Dist.	68951.0620sft	0.0174sft		
AZI8616-2001 RES	GPS86-15	Az.	31°20'00.2832"	0°00'00.2196"	1:777329	1:777329
		ΔHt.	12.2332sft	0.0285sft		
		ΔElev.	12.3296sft	0.0463sft		
		Dist.	9877.0394sft	0.0127sft		

AZI8616-2001 RES	GPS86-16	Az.	152°15'41.6259"	0°00'06.3066"	1:31132	1:31132
		ΔHt.	-6.4167sft	0.0285sft		
		ΔElev.	-6.4174sft	0.0327sft		
		Dist.	302.6742sft	0.0097sft		
AZI8616-2001 RES	SNOW RM A RESET	Az.	207°14'25.9468"	0°00'00.0873"	1:2413678	1:2413678
		ΔHt.	467.3919sft	0.0942sft		
		ΔElev.	466.7817sft	0.1083sft		
		Dist.	43097.7690sft	0.0179sft		
AZI8616-2001 RES	31K ECC RESET	Az.	94°37'26.2667"	0°00'00.0679"	1:3239598	1:3239598
		ΔHt.	15.2204sft	0.0607sft		
		ΔElev.	15.9306sft	0.0702sft		
		Dist.	62807.0429sft	0.0194sft		
AZI8616-2001 RES	KY 13	Az.	109°47'07.4140"	0°00'00.0327"	1:6205451	1:6205451
		ΔHt.	249.9321sft	0.1085sft		
		ΔElev.	251.2363sft	0.1170sft		
		Dist.	112837.3825sft	0.0182sft		
GPS86-15	GPS86-16	Az.	209°51'42.9962"	0°00'00.2104"	1:759306	1:759306
		ΔHt.	-18.6498sft	0.0293sft		
		ΔElev.	-18.7469sft	0.0327sft		
		Dist.	10035.9617sft	0.0132sft		
GPS86-15	STA013-2001	Az.	75°49'53.6215"	0°00'00.0511"	1:4364955	1:4364955
		ΔHt.	232.1623sft	0.0327sft		
		ΔElev.	233.0731sft	0.0327sft		
		Dist.	94020.0190sft	0.0215sft		
GPS86-15	31K ECC RESET	Az.	103°13'51.3902"	0°00'00.0790"	1:2991303	1:2991303
		ΔHt.	2.9872sft	0.0691sft		
		ΔElev.	3.6010sft	0.0702sft		
		Dist.	59030.7511sft	0.0197sft		

GPS86-16	31K ECC RESET	Az.	94°23'25.5636"	0°00'00.0699"	1:3193034	1:3193034
		ΔHt.	21.6370sft	0.0606sft		
		ΔElev.	22.3479sft	0.0621sft		
		Dist.	62645.5514sft	0.0196sft		
SNOW RM A RESET	31K ECC RESET	Az.	67°57'47.6294"	0°00'00.0391"	1:5133186	1:5133186
		ΔHt.	-452.1715sft	0.0883sft		
		ΔElev.	-450.8511sft	0.1205sft		
		Dist.	88792.1061sft	0.0173sft		
SNOW RM A RESET	KY 13	Az.	89°54'08.3682"	0°00'00.0000"	1:0	1:0
		ΔHt.	-217.4598sft	0.1002sft		
		ΔElev.	-215.5454sft	0.1525sft		
		Dist.	125903.2718sft	0.0000sft		
STA013-2001	31K ECC RESET	Az.	222°53'19.7858"	0°00'00.0705"	1:2674727	1:2674727
		ΔHt.	-229.1751sft	0.0604sft		
		ΔElev.	-229.4721sft	0.0621sft		
		Dist.	49693.6024sft	0.0186sft		
STA013-2001	KY 13	Az.	172°07'48.4010"	0°00'00.0478"	1:4034491	1:4034491
		ΔHt.	5.5366sft	0.1105sft		
		ΔElev.	5.8337sft	0.1123sft		
		Dist.	70360.2738sft	0.0174sft		
31K ECC RESET	KY 13	Az.	127°22'54.4215"	0°00'00.0674"	1:3372241	1:3372241
		ΔHt.	234.7117sft	0.0781sft		
		ΔElev.	235.3057sft	0.1283sft		
		Dist.	54739.2788sft	0.0162sft		