Survey Report – Ortho Ground Control

Mobile County, AL

Submitted To:
City of Mobile
205 Government St.
P.O. Box 1827
Mobile, Al 36633-1827

May 2014
Revised August 2014

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I, H. Alan Kimbrough, hereby state that this document was prepared by me or under my direct supervision. This volume contains 145 pages beginning with a title sheet and ends with a sheet intentionally left blank. Any additions or deletions of this volume will void this certification.

H. Alan Kimbrough, P.L.S
Alabama License No. 21780

ALABAMA LICENSED NO. 21780 PROFESSIONAL LAND SURVEYOR H. ALAN KIMBROUGH

8-25-2014
Date

1 Narrative

1.1 Introduction

A survey was performed to support the acquisition of digital Orthophotography, Base Mapping and Limited Topographic Mapping for Mobile County, Alabama.

1.2 Applicable Standards

This Geodetic Control Survey was conducted so as to support digital imagery data in accordance with the ASPRS Class II Map Accuracy.

2 Ground Control Survey

2.1 Field Control Points

A survey crew was sent to the project area to recover and create aerial targets on twenty-six (26) client provided control monuments and survey six (6) new digital imagery targets set Mobile County, Alabama to be utilized for digital imagery ground control.

- All aerial photo control targets were a “Chevron Style” vinyl material having a width of 2 feet and each leg length of 10 feet. The target point was ether an existing metal disk in a concrete monument or a 1/2” rebar set with a stamped 2” aluminum cap identifying each control point. Each control point is located at the inside intersection of the chevron legs.

A graphical representation of all the control points is provided in figure 1:

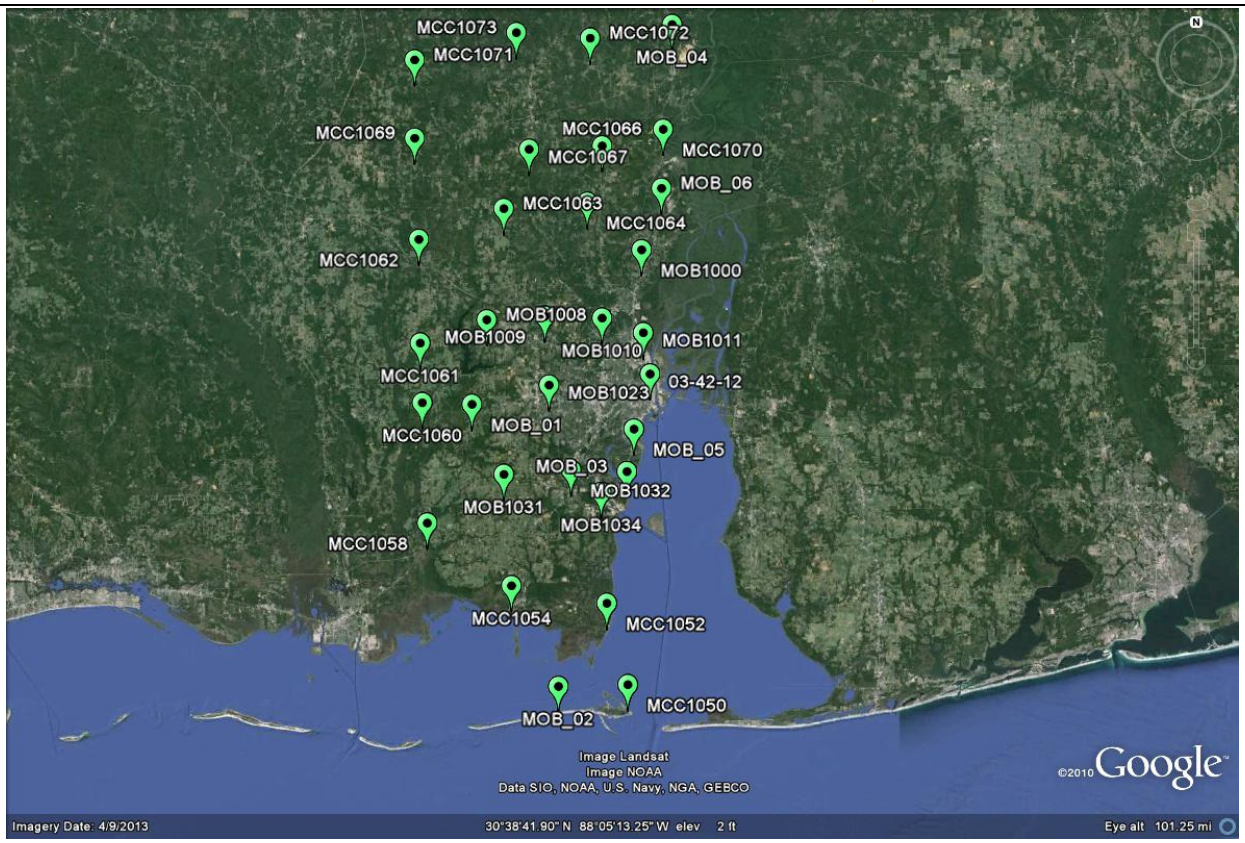

Figure 1: Photography Control Points

2.2 Ground Station Collection

GPS observations for the six (6) new digital imagery targets and one (1) client provided monument were made with Topcon HiPerV configured to log data at 1 Hz, and at 10 degrees mask, for a minimum duration of twenty (20) minutes. All observations were conducted between February 19, 2014 and March 6, 2014. GPS Session Forms may be found in Appendix A and Field Sketches may be found in Appendix C for the new digital imagery targets.

2.3 Data Processing and Analysis

Data collected during each GPS session was uploaded to the National Geodetic Survey's (NGS) On-Line Positioning User Service (OPUS) server with their respective GPS antenna type, and antenna height reading. The resulting solution for each observation is referenced to NAD-83 (North American Datum) and can be found in Appendix B. The RMS values for the latitude, longitude and ellipsoid heights for each result were reviewed to ensure that they are within acceptable limits. Ellipsoidal elevations were transformed into orthometric heights utilizing Geoid12A supplied by NGS. A tabulated summary of the final coordinates resulting from the survey are listed in section 2.3.1 through section 2.3.3.

2.3.1 OPUS Output Station Geographic Coordinates

Geographic (NAD83), Ellipsoidal (GRS80) meters

Ground Control Points			
Point ID	Latitude	Longitude	Ellipsoid Height meters
MOB_01	30 38 6.48250	88 19 44.99359	17.971
MOB_02	30 14 55.92335	88 11 30.34356	-26.376
MOB_03	30 32 34.59959	88 4 58.33165	-25.647
MOB_04	31 9 16.95521	88 0 35.29179	-12.283
MOB_05	30 36 3.75020	88 4 17.93943	-26.007
MOB_06	30 55 48.99157	88 1 37.64448	-17.186
MOB1010	30 45 10.33257	88 7 19.69488	-13.563

2.3.2 OPUS Output Station UTM Coordinates (WGS84)

UTM (zone 16) meters, NAVD88 (Geoid12A) meters

Ground Control Points			
Point ID	UTM Easting (x) meters	UTM Northing (y) meters	Ortho Height meters
MOB_01	372623.774	3389919.711	46.506
MOB_02	385341.083	3346963.187	1.339
MOB_03	396129.899	3379449.323	2.679
MOB_04	403751.713	3447186.693	16.043
MOB_05	397267.461	3385877.810	2.391
MOB_06	401870.799	3422326.865	11.305
MOB1010	392595.388	3402752.110	14.996

2.3.3 OPUS Output Station Coordinates in State Plane Coordinate System

Alabama West State Plane Coordinate System (SPCS) US survey feet, NAVD88 (Geoid12A) US survey feet

Ground Control Points			
Point ID	Easting (x) US Survey Feet	Northing (y) US Survey Feet	Ortho Height US Survey Feet
MOB_01	231948.233	1707723.851	152.578
MOB_02	91170.187	1750079.344	4.393
MOB_03	197931.864	1785012.732	8.789
MOB_04	420330.734	1809029.638	52.634
MOB_05	219044.079	1788652.095	7.844

Point ID	Easting (x) US Survey Feet	Northing (y) US Survey Feet	Ortho Height US Survey Feet
MOB_06	338722.672	1803224.380	37.090
MOB1010	274350.173	1773073.725	49.199

2.4 National Geodetic Survey (NGS) Network Accuracies

Coordinates obtained from OPUS-Static (STATIC) processing are averaged from three independent single-baseline solutions computed by double-differenced, carrier-phase measurements between the control point data collected and each of three (3) surrounding Continuously Operating Reference Stations (CORS). Coordinates obtained from OPUS Rapid Static (OPUS-RS) are obtained by processing the control point data collected rapid-statically using Rapid Static GPS (RSGPS) software. RSGPS employs more aggressive algorithms to resolve carrier phase ambiguities but has more stringent data continuity and geometry requirements.

2.4.1 OPUS-RS Network Accuracy

OPUS accuracies are reported as peak-to-peak error for STATIC or standard deviations estimates for RAPID-STATIC (OPUS-RS). Absent of any warning messages, the best estimates of coordinate accuracies for RAPID-STATIC are the standard deviations reported by single baseline analysis. NGS experiments indicated that the actual error is less than these estimated accuracies more than 95 percent of the time.

OPUS Network Accuracies (meters)

Ground Control Points		
Point ID	Horizontal Accuracy	Vertical Accuracy
MOB_01	0.00432	0.02580
MOB_02	0.00364	0.02408
MOB_03	0.00414	0.02350
MOB_04	0.00563	0.02641
MOB_05	0.00415	0.02458
MOB_06	0.00724	0.05263
MOB1010	0.00445	0.03624

Additional information regarding Online Positioning User Service (OPUS) can be found at

http://www.ngs.noaa.gov/OPUS/about.html

3 Client Provided Data

3.1 Client Provided Coordinates Processing and Analysis

The Client Provided Coordinates used were converted using Corpscon 6.0.1 to provide orthometric heights in Geoid model 12A and coordinates in UTM zone 16 and Geographic formats. A tabulated summary of the Client Provided Data used is listed in section 3.1.1. A tabulated summary of the final coordinates resulting from the data conversion are listed in section 3.1.2 through section 3.1.3.

3.1.1 Client Provided Coordinates

Alabama West State Plane Coordinate System (SPCS) US survey feet, NAVD88 (*) US survey feet

Ground Control Points				
Point ID	Easting (x) US Survey Feet	Northing (y) US Survey Feet	Ortho Height US Survey Feet	* Geoid Model
MOB1000	308181.859	1793057.899	18.570	GEOID 99
MOB1008	273862.189	1715439.409	224.957	GEOID 99
MOB1009	275420.679	1744534.919	222.462	GEOID 99
MOB1011	266929.120	1793632.330	28.143	GEOID 99
MOB1023	241213.106	1746379.730	118.155	GEOID 99
MOB1031	196897.810	1723489.200	147.923	GEOID 99
MOB1033	197950.725	1785099.081	9.056	GEOID 99
MOB1034	187682.820	1772107.860	29.145	GEOID 99
MCC1050	91837.615	784782.361	3.002	GEOID 09
MCC1052	132437.323	1774544.848	7.640	GEOID 09
MCC1054	141476.410	1726928.340	3.215	GEOID 09
MCC1058	172953.863	1684997.093	12.833	GEOID 09
MCC1060	232830.420	1682898.585	106.720	GEOID 09
MCC1061	262497.765	1682075.483	172.195	GEOID 09
MCC1062	314135.190	1681687.977	84.522	GEOID 09
MCC1063	329139.772	1724288.791	284.934	GEOID 09
MCC1064	332030.804	1766014.891	244.375	GEOID 09
MCC1066	360058.500	1773655.573	266.055	GEOID 09
MCC1067	358599.384	1737081.764	128.646	GEOID 09
MCC1069	364539.765	1679895.638	161.361	GEOID 09
MCC1070	368142.653	1804219.496	48.828	GEOID 09
MCC1071	403601.402	1680077.391	268.176	GEOID 09
MCC1072	413813.719	1768019.857	300.662	GEOID 09
MCC1073	416813.570	1731081.575	216.050	GEOID 09
03-42-12	246393.980	1796878.990	13.946	GEOID 99

3.1.2 Client Provided Coordinates Converted Geographic

Geographic (NAD83), Ellipsoidal (GRS80) meters

Ground Control Points			
Point ID	Latitude	Longitude	Ellipsoid Height meters
MOB1000	30° 50' 46.22754	88° 03' 32.61383	-23.051
MOB1008	30° 45' 01.86875	88° 18' 20.12843	39.861
MOB1009	30° 45' 19.24597	88° 12' 46.82664	39.057
MOB1011	30° 43' 57.308	88° 03' 23.67063	-20.109
MOB1023	30° 39' 40.79363	88° 12' 23.21421	7.381
MOB1031	30° 32' 20.68780	88° 16' 41.77824	16.538
MOB1033	30° 32' 34.79067	88° 04' 57.34538	-25.565
MOB1034	30° 30' 52.47294	88° 07' 25.25505	-19.580
MCC1050	30° 15' 04.45313	88° 04' 54.73158	-26.787
MCC1052	30° 21' 45.78459	88° 06' 53.96062	-25.676
MCC1058	30° 28' 20.87357	88° 23' 59.71959	-24.391
MCC1060	30° 38' 13.31529	88° 18' 36.10990	3.999
MCC1061	30° 43' 06.86593	88° 24' 41.38788	23.867
MCC1062	30° 51' 37.87852	88° 24' 50.65756	-2.831
MCC1063	30° 54' 09.57363	88° 16' 43.13144	58.410
MCC1064	30° 54' 40.82313	88° 08' 44.40684	46.022
MCC1066	30° 59' 18.64885	88° 07' 18.49660	52.717
MCC1067	30° 59' 01.99492	88° 14' 18.54174	10.807
MCC1069	30° 59' 56.56494	88° 25' 15.99791	20.930
MCC1070	31° 00' 40.21711	88° 01' 27.80949	-13.659
MCC1071	31° 06' 23.14784	88° 25' 17.63339	53.780
MCC1072	31° 08' 10.34802	88° 08' 26.80339	63.446
MCC1073	31° 08' 37.72724	88° 15' 32.03723	37.798
03-42-12	30° 40' 34.85889	88° 02' 45.32516	-24.214
CIPF	30° 23' 12.32153	88° 15' 58.21904	-27.255

3.1.3 Client Provided Coordinates Converted State Plane

Alabama West State Plane Coordinate System (SPCS) US survey feet, NAVD88 (Geoid12A) US survey feet

Ground Control Points			
Point ID	Easting (x) US Survey Feet	Northing (y) US Survey Feet	Ortho Height US Survey Feet
MOB1000	1715439.334	273862.198	18.156
MOB1008	1715439.334	273862.198	224.56
MOB1009	1744534.667	275420.792	221.875
MOB1011	1793632.22	266929.229	27.588
MOB1023	1746379.675	241213.062	117.797
MOB1031	1723488.987	196897.684	147.378
MOB1033	197950.725	1785099.081	9.056
MOB1034	1772107.821	187682.871	28.61
MCC1050	91837.615	784782.361	3.002
MCC1052	132437.323	1774544.848	7.64
MCC1058	172953.863	1684997.093	12.833
MCC1060	232830.42	1682898.585	106.72
MCC1061	262497.765	1682075.483	172.195
MCC1062	1681687.996	314135.123	84.305
MCC1063	329139.772	1724288.791	284.934
MCC1064	332030.804	1766014.891	244.375
MCC1066	360058.5	1773655.573	266.055
MCC1067	1737081.728	358599.314	128.38
MCC1069	364539.765	1679895.638	161.361
MCC1070	1804219.559	368142.57	48.52
MCC1071	403601.402	1680077.391	268.176
MCC1072	1768019.871	413813.672	300.531
MCC1073	1731081.579	416813.486	215.886
03-42-12	246393.98	1796878.99	13.946
CIPF	1726922.669	141470.489	2.723

Appendix A: GPS Session Forms

GPS Station Session Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Monday, February 17, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB1010		

Collection Type *(check all that apply)*	File Name *(receiver generated)*
☐ ABGPS ☑ STATIC ☐ RTK ☐ OPUS-RS ☐ OPUS-STATIC	

GPS Receiver Information

Unit No.	Receiver Model	Receiver S/N	Antenna P/N	Antenna Model	Antenna S/N
☐ B1	Leica SR530	30192	667126	LEIAT502	11319
☐ R1	Leica SR530	130521	667126	LEIAT502	12609
☐ B2	Leica SR530	34467	667126	LEIAT502	8376
☐ R2	Leica SR530	136534	667126	LEIAT502	5151
☐ B3	Leica SR530	136512	667126	LEIAT502	7526
☐ R3	Leica SR530	136496	667126	LEIAT502	15894
☐ NOV1	NovAtel DL-4=L1L2	SVA06250545	1017187	NOV702_3.00	NVH05510048
☑ TOP1	Topcon 1001137-xx	Q0IQSN28B2O		HiPerV	1132-10002
☐ TOP2	Topcon 1001137-xx	Q0362CYEP0O		HiPerV	1132-10004
☐ Other	_____	_____	_____	_____	_____

Beginning Antenna Height in Feet				Beginning Antenna Height in Meters				Type of Measurement *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	
Ending Antenna Height in Feet				**Ending Antenna Height in Meters**				**Type of Measurement** *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	

Antenna Reference Point Measurement *(diagram in survey report)* **NOTE:** *True Vertical = ARP Height*

Leica Height Hook Measurement	0.000	*NovAtel Slope Measurement*	0.000	*Topcon Slope Measurement*	2.000

Start Date (UTC)	Start Time (UTC)	Approx. Lat. *(if available)*
17-Feb-2014	19:53	N 30 45 10.3
End Date (UTC)	**End Time (UTC)**	**Approx. Lat.** *(if available)*
17-Feb-2014	20:13	W 88 07 19.6

Describe any abnormalities and/or problems encountered during the session, include time of occurrence and duration.	**Site Diagram or Control Point Photograph**

GPS Station Session Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Saturday, February 15, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_01		

Collection Type *(check all that apply)*

☐ ABGPS ☑ STATIC ☐ RTK ☐ OPUS-RS ☐ OPUS-STATIC

File Name *(receiver generated)*

GPS Receiver Information

Unit No.	Receiver Model	Receiver S/N	Antenna P/N	Antenna Model	Antenna S/N
☐ B1	Leica SR530	30192	667126	LEIAT502	11319
☐ R1	Leica SR530	130521	667126	LEIAT502	12609
☐ B2	Leica SR530	34467	667126	LEIAT502	8376
☐ R2	Leica SR530	136534	667126	LEIAT502	5151
☐ B3	Leica SR530	136512	667126	LEIAT502	7526
☐ R3	Leica SR530	136496	667126	LEIAT502	15894
☐ NOV1	NovAtel DL-4=L1L2	SVA06250545	1017187	NOV702_3.00	NVH05510048
☑ TOP1	Topcon 1001137-xx	Q0IQSN28B2O		HiPerV	1132-10002
☐ TOP2	Topcon 1001137-xx	Q0362CYEP0O		HiPerV	1132-10004
☐ Other	_____	_____	_____	_____	_____

Beginning Antenna Height in Feet				Beginning Antenna Height in Meters				Type of Measurement *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	
Ending Antenna Height in Feet				**Ending Antenna Height in Meters**				**Type of Measurement** *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	

Antenna Reference Point Measurement *(diagram in survey report)* **NOTE:** *True Vertical = ARP Height*

Leica Height Hook Measurement	0.000	*NovAtel Slope Measurement*	0.000	*Topcon Slope Measurement*	2.000

Start Date (UTC)	Start Time (UTC)	Approx. Lat. *(if available)*
15-Feb-2014	20:51	N 30 38 06.4
End Date (UTC)	**End Time (UTC)**	**Approx. Lat.** *(if available)*
15-Feb-2014	21:18	W 88 19 44.9

Describe any abnormalities and/or problems encountered during the session, include time of occurrence and duration.

Site Diagram or Control Point Photograph

GPS Station Session Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Sunday, February 16, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_02		

Collection Type *(check all that apply)*

☐ ABGPS ☑ STATIC ☐ RTK ☐ OPUS-RS ☐ OPUS-STATIC

File Name *(receiver generated)*

GPS Receiver Information

Unit No.	Receiver Model	Receiver S/N	Antenna P/N	Antenna Model	Antenna S/N
☐ B1	Leica SR530	30192	667126	LEIAT502	11319
☐ R1	Leica SR530	130521	667126	LEIAT502	12609
☐ B2	Leica SR530	34467	667126	LEIAT502	8376
☐ R2	Leica SR530	136534	667126	LEIAT502	5151
☐ B3	Leica SR530	136512	667126	LEIAT502	7526
☐ R3	Leica SR530	136496	667126	LEIAT502	15894
☐ NOV1	NovAtel DL-4=L1L2	SVA06250545	1017187	NOV702_3.00	NVH05510048
☑ TOP1	Topcon 1001137-xx	Q0IQSN28B2O		HiPerV	1132-10002
☐ TOP2	Topcon 1001137-xx	Q0362CYEP0O		HiPerV	1132-10004
☐ Other	_____	_____	_____	_____	_____

Beginning Antenna Height in Feet				Beginning Antenna Height in Meters				Type of Measurement *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	

Ending Antenna Height in Feet				Ending Antenna Height in Meters				Type of Measurement *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	

Antenna Reference Point Measurement *(diagram in survey report)* **NOTE:** *True Vertical = ARP Height*

Leica Height Hook Measurement	0.000	*NovAtel Slope Measurement*	0.000	*Topcon Slope Measurement*	2.000

Start Date (UTC)	Start Time (UTC)	Approx. Lat. *(if available)*
16-Feb-2014	15:07	N 30 14 55.9
End Date (UTC)	**End Time (UTC)**	**Approx. Lat.** *(if available)*
16-Feb-2014	15:27	W 88 11 30.3

Describe any abnormalities and/or problems encountered during the session, include time of occurrence and duration.

Site Diagram or Control Point Photograph

GPS Station Session Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Sunday, February 16, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_03		

Collection Type *(check all that apply)*

☐ ABGPS ☑ STATIC ☐ RTK ☐ OPUS-RS ☐ OPUS-STATIC

File Name *(receiver generated)*

GPS Receiver Information

Unit No.	Receiver Model	Receiver S/N	Antenna P/N	Antenna Model	Antenna S/N
☐ B1	Leica SR530	30192	667126	LEIAT502	11319
☐ R1	Leica SR530	130521	667126	LEIAT502	12609
☐ B2	Leica SR530	34467	667126	LEIAT502	8376
☐ R2	Leica SR530	136534	667126	LEIAT502	5151
☐ B3	Leica SR530	136512	667126	LEIAT502	7526
☐ R3	Leica SR530	136496	667126	LEIAT502	15894
☐ NOV1	NovAtel DL-4=L1L2	SVA06250545	1017187	NOV702_3.00	NVH05510048
☑ TOP1	Topcon 1001137-xx	Q0IQSN28B2O		HiPerV	1132-10002
☐ TOP2	Topcon 1001137-xx	Q0362CYEP0O		HiPerV	1132-10004
☐ Other	_____	_____	_____	_____	_____

Beginning Antenna Height in Feet				Beginning Antenna Height in Meters				Type of Measurement *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	

Ending Antenna Height in Feet				Ending Antenna Height in Meters				Type of Measurement *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	

Antenna Reference Point Measurement *(diagram in survey report)* **NOTE:** *True Vertical = ARP Height*

Leica Height Hook Measurement	0.000	*NovAtel Slope Measurement*	0.000	*Topcon Slope Measurement*	2.000

Start Date (UTC)	Start Time (UTC)	Approx. Lat. *(if available)*
16-Feb-2014	19:05	N 30 32 34.5
End Date (UTC)	**End Time (UTC)**	**Approx. Lat.** *(if available)*
16-Feb-2014	19:25	W 88 04 58.3

Describe any abnormalities and/or problems encountered during the session, include time of occurrence and duration.

Site Diagram or Control Point Photograph

GPS Station Session Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Monday, February 17, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_04		

Collection Type *(check all that apply)*

☐ ABGPS ☑ STATIC ☐ RTK ☐ OPUS-RS ☐ OPUS-STATIC

File Name *(receiver generated)*

GPS Receiver Information

Unit No.	Receiver Model	Receiver S/N	Antenna P/N	Antenna Model	Antenna S/N
☐ B1	Leica SR530	30192	667126	LEIAT502	11319
☐ R1	Leica SR530	130521	667126	LEIAT502	12609
☐ B2	Leica SR530	34467	667126	LEIAT502	8376
☐ R2	Leica SR530	136534	667126	LEIAT502	5151
☐ B3	Leica SR530	136512	667126	LEIAT502	7526
☐ R3	Leica SR530	136496	667126	LEIAT502	15894
☐ NOV1	NovAtel DL-4=L1L2	SVA06250545	1017187	NOV702_3.00	NVH05510048
☑ TOP1	Topcon 1001137-xx	Q0IQSN28B2O		HiPerV	1132-10002
☐ TOP2	Topcon 1001137-xx	Q0362CYEP0O		HiPerV	1132-10004
☐ Other	_____	_____	_____	_____	_____

Beginning Antenna Height in Feet				Beginning Antenna Height in Meters				Type of Measurement *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	
Ending Antenna Height in Feet				**Ending Antenna Height in Meters**				**Type of Measurement** *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	

Antenna Reference Point Measurement *(diagram in survey report)* **NOTE:** *True Vertical = ARP Height*

Leica Height Hook Measurement	0.000	*NovAtel Slope Measurement*	0.000	*Topcon Slope Measurement*	2.000

Start Date (UTC)	Start Time (UTC)	Approx. Lat. *(if available)*
17-Feb-2014	15:46	N 31 09 16.9
End Date (UTC)	**End Time (UTC)**	**Approx. Lat.** *(if available)*
17-Feb-2014	16:06	W 88 00 35.2

Describe any abnormalities and/or problems encountered during the session, include time of occurrence and duration.

Site Diagram or Control Point Photograph

GPS Station Session Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Monday, February 17, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_05		

Collection Type *(check all that apply)*

☐ ABGPS ☑ STATIC ☐ RTK ☐ OPUS-RS ☐ OPUS-STATIC

File Name *(receiver generated)*

GPS Receiver Information

Unit No.	Receiver Model	Receiver S/N	Antenna P/N	Antenna Model	Antenna S/N
☐ B1	Leica SR530	30192	667126	LEIAT502	11319
☐ R1	Leica SR530	130521	667126	LEIAT502	12609
☐ B2	Leica SR530	34467	667126	LEIAT502	8376
☐ R2	Leica SR530	136534	667126	LEIAT502	5151
☐ B3	Leica SR530	136512	667126	LEIAT502	7526
☐ R3	Leica SR530	136496	667126	LEIAT502	15894
☐ NOV1	NovAtel DL-4=L1L2	SVA06250545	1017187	NOV702_3.00	NVH05510048
☑ TOP1	Topcon 1001137-xx	Q0IQSN28B2O		HiPerV	1132-10002
☐ TOP2	Topcon 1001137-xx	Q0362CYEP0O		HiPerV	1132-10004
☐ Other	_____	_____	_____	_____	_____

Beginning Antenna Height in Feet				Beginning Antenna Height in Meters				Type of Measurement *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	
Ending Antenna Height in Feet				**Ending Antenna Height in Meters**				**Type of Measurement** *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	

Antenna Reference Point Measurement *(diagram in survey report)* **NOTE:** *True Vertical = ARP Height*

Leica Height Hook Measurement	0.000	*NovAtel Slope Measurement*	0.000	*Topcon Slope Measurement*	2.000

Start Date (UTC)	Start Time (UTC)	Approx. Lat. *(if available)*
17-Feb-2014	20:56	N 30 36 03.7
End Date (UTC)	**End Time (UTC)**	**Approx. Lat.** *(if available)*
17-Feb-2014	21:16	W 88 04 17.9

Describe any abnormalities and/or problems encountered during the session, include time of occurrence and duration.

Site Diagram or Control Point Photograph

GPS Station Session Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Tuesday, February 18, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_06		

Collection Type *(check all that apply)*

☐ ABGPS ☑ STATIC ☐ RTK ☐ OPUS-RS ☐ OPUS-STATIC

File Name *(receiver generated)*

GPS Receiver Information

Unit No.	Receiver Model	Receiver S/N	Antenna P/N	Antenna Model	Antenna S/N
☐ B1	Leica SR530	30192	667126	LEIAT502	11319
☐ R1	Leica SR530	130521	667126	LEIAT502	12609
☐ B2	Leica SR530	34467	667126	LEIAT502	8376
☐ R2	Leica SR530	136534	667126	LEIAT502	5151
☐ B3	Leica SR530	136512	667126	LEIAT502	7526
☐ R3	Leica SR530	136496	667126	LEIAT502	15894
☐ NOV1	NovAtel DL-4=L1L2	SVA06250545	1017187	NOV702_3.00	NVH05510048
☑ TOP1	Topcon 1001137-xx	Q0IQSN28B2O		HiPerV	1132-10002
☐ TOP2	Topcon 1001137-xx	Q0362CYEP0O		HiPerV	1132-10004
☐ Other	_____	_____	_____	_____	_____

Beginning Antenna Height in Feet				Beginning Antenna Height in Meters				Type of Measurement *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	
Ending Antenna Height in Feet				**Ending Antenna Height in Meters**				**Type of Measurement** *(check one)*
1	2	3	AVG	1	2	3	AVG	☑ True Vertical ☐ Slant
6.374			**6.374**	1.943			**1.943**	

Antenna Reference Point Measurement *(diagram in survey report)* **NOTE:** *True Vertical = ARP Height*

Leica Height Hook Measurement	0.000	*NovAtel Slope Measurement*	0.000	*Topcon Slope Measurement*	2.000

Start Date (UTC)	Start Time (UTC)	Approx. Lat. *(if available)*
18-Feb-2014	14:54	N 30 55 48.9
End Date (UTC)	**End Time (UTC)**	**Approx. Lat.** *(if available)*
18-Feb-2014	15:14	W 88 01 37.6

Describe any abnormalities and/or problems encountered during the session, include time of occurrence and duration.

Site Diagram or Control Point Photograph

Appendix B: National Geodetic Survey STATIC / RAPID STATIC Solutions

FILE: MOB1010.14O OP1393266717660

6011 Warning - OPUS-RS was able to find a set of reference stations
6011 with data suitable for use with your dataset. However, your
6011 position does not fall within the polygon enclosing these reference
6011 stations. This means that the geographic interpolation algorithms
6011 performed within OPUS-RS must instead perform extrapolation.
6011 Extrapolation, especially if your position is far from the
6011 reference stations, is prone to error. Use this solution with
6011 caution.
Your station is 0.1 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT
==========

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

USER: blkimbrough@theatlgrp.com DATE: February 24, 2014
RINEX FILE: mob1048t.14o TIME: 18:49:54 UTC

SOFTWARE: rsgps 1.37 RS81.prl 1.89 START: 2014/02/17 19:51:38
EPHEMERIS: igr17801.eph [rapid] STOP: 2014/02/17 20:13:11
NAV FILE: brdc0480.14n OBS USED: 1536 / 2072 : 74%
ANT NAME: TPSHIPER_V NONE QUALITY IND. 9.19/ 9.71
ARP HEIGHT: 2.00 NORMALIZED RMS: 0.307

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.13105)

X:	179772.141(m)	0.006(m)	179771.369(m)	0.006(m)
Y:	-5483093.880(m)	0.019(m)	-5483092.381(m)	0.019(m)
Z:	3242371.013(m)	0.013(m)	3242370.843(m)	0.013(m)

LAT:	30 45 10.33257	0.004(m)	30 45 10.35313	0.004(m)
E LON:	271 52 40.30512	0.006(m)	271 52 40.27795	0.006(m)
W LON:	88 7 19.69488	0.006(m)	88 7 19.72205	0.006(m)
EL HGT:	-13.563(m)	0.023(m)	-14.959(m)	0.023(m)
ORTHO HGT:	14.996(m)	0.025(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES UTM (Zone 16)	STATE PLANE COORDINATES SPC (0102 AL W)
Northing (Y) [meters]	3402752.110	83622.100
Easting (X) [meters]	392595.388	540433.953
Convergence [degrees]	-0.57384444	-0.31813074
Point Scale	0.99974230	0.99997709
Combined Factor	0.99974443	0.99997922

US NATIONAL GRID DESIGNATOR: 16RCV9259502752(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI3826	AL90 ALDOT 9 DIV OFF CORS ARP	N304126.969	W0880154.137	11060.7
DM2660	AL92 ALDOT 9 DIV DIS 2 CORS ARP	N305458.985	W0874632.462	37778.6
DL3486	ALDI DAUPHIN ISLAND CORS ARP	N301456.987	W0880440.688	56001.8
DM5371	ALEB WS NEAL SCHOOL CORS ARP	N310529.223	W0870320.306	108627.6
DM3973	ALRE REPTON JR HGH SCH CORS ARP	N312440.664	W0871403.268	111834.8
DM5367	ALBU CHOCTAW ELEM SCH CORS ARP	N320453.895	W0881359.331	147703.7
DL3065	FLE5 EGLIN 5 CORS ARP	N303836.931	W0863306.887	150915.9
DI8426	MLF5 MILLERS FERRY 5 CORS ARP	N320524.917	W0872330.503	163733.0

NEAREST NGS PUBLISHED CONTROL POINT

BH1572	S 444	N304518.	W0880708.	390.9

OPUS-RS Extended Output, Level 2

FINAL COORDINATES (ITRF at epoch of observations)

al90	188545.995	-5486311.748	3236456.346
al92	212564.689	-5472685.314	3257975.711
aldi	184948.616	-5511274.928	3194254.866
aleb	280806.417	-5459556.655	3274587.859
alre	262901.924	-5442090.364	3304942.067
albu	166780.579	-5406697.794	3368114.563
fle5	330327.630	-5482334.211	3231985.121
mlf5	246129.258	-5403152.449	3368920.122
mob1	179771.369	-5483092.381	3242370.843

Covariance matrix of the stations:

1 4.5460E-07 -2.0840E-06 1.4020E-06 -4.1900E-08 2.9710E-07 -1.9530E-07 -4.0380E-08 3.0440E-07 -1.8520E-07 -6.2270E-08 3.5900E-07 -2.3540E-07 -5.2090E-08 3.1730E-07 -2.1750E-07 -1.2610E-08 1.4450E-07 -1.2430E-07 -8.3350E-08 4.2280E-07 -2.6100E-07 -3.6940E-08 2.3860E-07 -1.8290E-07 6.0140E-08 -3.7700E-07 2.5720E-07

2 -2.0840E-06 1.9470E-05 -1.2790E-05 2.9070E-07 -2.7820E-06 1.8330E-06 2.9640E-07 -2.8530E-06 1.8570E-06 3.2920E-07 -2.8970E-06 1.9050E-06 3.0470E-07 -2.7850E-06 1.8470E-06 2.1900E-07 -2.3820E-06 1.6180E-06 3.7780E-07 -3.0700E-06 1.9890E-06 2.6650E-07 -2.5750E-06 1.7360E-06 -1.8140E-08 9.7830E-08 -5.7640E-08

3 1.4020E-06 -1.2790E-05 8.7760E-06 -1.9180E-07 1.8400E-06 -1.2370E-06 -1.9080E-07 1.8630E-06 -1.2230E-06 -2.3080E-07 1.9350E-06 -1.2960E-06 -2.1010E-07 1.8620E-06 -

1.2670E-06 -1.2900E-07 1.5450E-06 -1.1020E-06 -2.7120E-07 2.0300E-06 -1.3250E-06 -1.7800E-07 1.7110E-06 -1.2010E-06 5.3640E-08 -4.3820E-07 3.1820E-07
4 -4.1900E-08 2.9070E-07 -1.9180E-07 4.5830E-07 -2.1360E-06 1.4330E-06 -4.4830E-08 3.0910E-07 -1.9850E-07 -5.7120E-08 3.5070E-07 -2.3240E-07 -5.0520E-08 3.1860E-07 -2.1610E-07 -2.6890E-08 1.9660E-07 -1.4570E-07 -7.1150E-08 4.0670E-07 -2.6050E-07 -4.0860E-08 2.6330E-07 -1.8800E-07 3.0800E-08 -1.3840E-07 9.4150E-08
5 2.9710E-07 -2.7820E-06 1.8400E-06 -2.1360E-06 1.9590E-05 -1.2890E-05 3.1070E-07 -2.8750E-06 1.8910E-06 3.2790E-07 -2.8900E-06 1.9090E-06 3.0870E-07 -2.7900E-06 1.8530E-06 2.4710E-07 -2.4620E-06 1.6560E-06 3.6600E-07 -3.0510E-06 1.9960E-06 2.7840E-07 -2.6110E-06 1.7480E-06 3.8940E-08 -4.3180E-07 2.9830E-07
6 -1.9530E-07 1.8330E-06 -1.2370E-06 1.4330E-06 -1.2890E-05 8.8620E-06 -2.0310E-07 1.8780E-06 -1.2550E-06 -2.2450E-07 1.9200E-06 -1.2930E-06 -2.1050E-07 1.8640E-06 -1.2670E-06 -1.5940E-07 1.6430E-06 -1.1450E-06 -2.5160E-07 2.0000E-06 -1.3270E-06 -1.8860E-07 1.7560E-06 -1.2130E-06 -5.4310E-09 1.0040E-07 -4.9100E-08
7 -4.0380E-08 2.9640E-07 -1.9080E-07 -4.4830E-08 3.1070E-07 -2.0310E-07 4.6590E-07 -2.1740E-06 1.4540E-06 -6.1710E-08 3.6650E-07 -2.3920E-07 -5.3190E-08 3.3010E-07 -2.2280E-07 -2.0630E-08 1.8190E-07 -1.4120E-07 -7.9520E-08 4.2480E-07 -2.6460E-07 -4.0590E-08 2.6370E-07 -1.9250E-07 4.2670E-08 -2.5060E-07 1.7320E-07
8 3.0440E-07 -2.8530E-06 1.8630E-06 3.0910E-07 -2.8750E-06 1.8780E-06 -2.1740E-06 2.0130E-05 -1.3070E-05 3.3090E-07 -2.9590E-06 1.9290E-06 3.1480E-07 -2.8780E-06 1.8820E-06 2.6280E-07 -2.6050E-06 1.7160E-06 3.6290E-07 -3.0960E-06 2.0050E-06 2.8970E-07 -2.7360E-06 1.7980E-06 6.3170E-08 -6.8860E-07 4.4310E-07
9 -1.8520E-07 1.8570E-06 -1.2230E-06 -1.9850E-07 1.8910E-06 -1.2550E-06 1.4540E-06 -1.3070E-05 8.9040E-06 -2.4600E-07 1.9970E-06 -1.3210E-06 -2.2210E-07 1.9200E-06 -1.2940E-06 -1.2480E-07 1.5630E-06 -1.1150E-06 -2.9270E-07 2.0890E-06 -1.3400E-06 -1.8510E-07 1.7540E-06 -1.2290E-06 5.7310E-08 -4.7370E-07 3.5980E-07
10 -6.2270E-08 3.2920E-07 -2.3080E-07 -5.7120E-08 3.2790E-07 -2.2450E-07 -6.1710E-08 3.3090E-07 -2.4600E-07 5.1850E-07 -2.4270E-06 1.6130E-06 -4.7020E-08 3.3250E-07 -2.1520E-07 -7.8440E-08 3.9010E-07 -2.2600E-07 -3.0340E-08 3.5520E-07 -2.5920E-07 -5.6640E-08 3.6110E-07 -2.1160E-07 -5.5760E-08 6.4970E-07 -4.4050E-07
11 3.5900E-07 -2.8970E-06 1.9350E-06 3.5070E-07 -2.8900E-06 1.9200E-06 3.6650E-07 -2.9590E-06 1.9970E-06 -2.4270E-06 2.0380E-05 -1.3380E-05 3.3120E-07 -2.8560E-06 1.8760E-06 3.6060E-07 -2.8430E-06 1.8280E-06 3.2500E-07 -2.9830E-06 2.0020E-06 3.3320E-07 -2.8220E-06 1.8190E-06 2.0840E-07 -1.7650E-06 1.1970E-06
12 -2.3540E-07 1.9050E-06 -1.2960E-06 -2.3240E-07 1.9090E-06 -1.2930E-06 -2.3920E-07 1.9290E-06 -1.3210E-06 1.6130E-06 -1.3380E-05 9.1500E-06 -2.2460E-07 1.9030E-06 -1.2790E-06 -2.3340E-07 1.8900E-06 -1.2550E-06 -2.2390E-07 1.9510E-06 -1.3270E-06 -2.2390E-07 1.8900E-06 -1.2550E-06 -1.1660E-07 9.7630E-07 -6.3930E-07
13 -5.2090E-08 3.0470E-07 -2.1010E-07 -5.0520E-08 3.0870E-07 -2.1050E-07 -5.3190E-08 3.1480E-07 -2.2210E-07 -4.7020E-08 3.3120E-07 -2.2460E-07 4.7760E-07 -2.2310E-06 1.5050E-06 -5.4100E-08 2.9290E-07 -1.8460E-07 -4.7530E-08 3.7230E-07 -2.5740E-07 -4.8150E-08 3.0690E-07 -1.9570E-07 -1.5710E-08 2.8750E-07 -1.9660E-07
14 3.1730E-07 -2.7850E-06 1.8620E-06 3.1860E-07 -2.7900E-06 1.8640E-06 3.3010E-07 -2.8780E-06 1.9200E-06 3.3250E-07 -2.8560E-06 1.9030E-06 -2.2310E-06 1.9550E-05 -1.2970E-05 2.7730E-07 -2.5010E-06 1.6780E-06 3.6140E-07 -3.0090E-06 1.9940E-06 2.9390E-07 -2.6070E-06 1.7450E-06 8.0340E-08 -6.8030E-07 4.8150E-07
15 -2.1750E-07 1.8470E-06 -1.2670E-06 -2.1610E-07 1.8530E-06 -1.2670E-06 -2.2280E-07 1.8820E-06 -1.2940E-06 -2.1520E-07 1.8760E-06 -1.2790E-06 1.5050E-06 -1.2970E-05

8.9680E-06 -2.0650E-07 1.7720E-06 -1.2000E-06 -2.2190E-07 1.9340E-06 -1.3200E-06 -2.0510E-07 1.8010E-06 -1.2180E-06 -8.0700E-08 7.1700E-07 -4.7710E-07
16 -1.2610E-08 2.1900E-07 -1.2900E-07 -2.6890E-08 2.4710E-07 -1.5940E-07 -2.0630E-08 2.6280E-07 -1.2480E-07 -7.8440E-08 3.6060E-07 -2.3340E-07 -5.4100E-08 2.7730E-07 -2.0650E-07 4.6210E-07 -1.9290E-06 1.2490E-06 -1.2730E-07 4.6110E-07 -2.5380E-07 -1.7150E-08 1.0080E-07 -1.4150E-07 1.5320E-07 -1.2640E-06 8.5400E-07
17 1.4450E-07 -2.3820E-06 1.5450E-06 1.9660E-07 -2.4620E-06 1.6430E-06 1.8190E-07 -2.6050E-06 1.5630E-06 3.9010E-07 -2.8430E-06 1.8900E-06 2.9290E-07 -2.5010E-06 1.7720E-06 -1.9290E-06 1.7920E-05 -1.1860E-05 5.8130E-07 -3.2370E-06 1.9700E-06 1.4260E-07 -1.7610E-06 1.4810E-06 -5.1830E-07 4.5400E-06 -3.0200E-06
18 -1.2430E-07 1.6180E-06 -1.1020E-06 -1.4570E-07 1.6560E-06 -1.1450E-06 -1.4120E-07 1.7160E-06 -1.1150E-06 -2.2600E-07 1.8280E-06 -1.2550E-06 -1.8460E-07 1.6780E-06 -1.2000E-06 1.2490E-06 -1.1860E-05 8.3090E-06 -3.0750E-07 2.0090E-06 -1.3000E-06 -1.2020E-07 1.3590E-06 -1.0680E-06 2.0590E-07 -1.7020E-06 1.1340E-06
19 -8.3350E-08 3.7780E-07 -2.7120E-07 -7.1150E-08 3.6600E-07 -2.5160E-07 -7.9520E-08 3.6290E-07 -2.9270E-07 -3.0340E-08 3.2500E-07 -2.2390E-07 -4.7530E-08 3.6140E-07 -2.2190E-07 -1.2730E-07 5.8130E-07 -3.0750E-07 6.3860E-07 -2.8410E-06 1.8110E-06 -7.4350E-08 4.6720E-07 -2.4250E-07 -1.3560E-07 1.3620E-06 -9.1970E-07
20 4.2280E-07 -3.0700E-06 2.0300E-06 4.0670E-07 -3.0510E-06 2.0000E-06 4.2480E-07 -3.0960E-06 2.0890E-06 3.5520E-07 -2.9830E-06 1.9510E-06 3.7230E-07 -3.0090E-06 1.9340E-06 4.6110E-07 -3.2370E-06 2.0090E-06 -2.8410E-06 2.1670E-05 -1.3940E-05 3.9720E-07 -3.0970E-06 1.9260E-06 3.4760E-07 -2.7790E-06 1.8480E-06
21 -2.6100E-07 1.9890E-06 -1.3250E-06 -2.6050E-07 1.9960E-06 -1.3270E-06 -2.6460E-07 2.0050E-06 -1.3400E-06 -2.5920E-07 2.0020E-06 -1.3270E-06 -2.5740E-07 1.9940E-06 -1.3200E-06 -2.5380E-07 1.9700E-06 -1.3000E-06 1.8110E-06 -1.3940E-05 9.3700E-06 -2.5360E-07 1.9820E-06 -1.3050E-06 -1.2970E-07 9.1090E-07 -5.6960E-07
22 -3.6940E-08 2.6650E-07 -1.7800E-07 -4.0860E-08 2.7840E-07 -1.8860E-07 -4.0590E-08 2.8970E-07 -1.8510E-07 -5.6640E-08 3.3320E-07 -2.2390E-07 -4.8150E-08 2.9390E-07 -2.0510E-07 -1.7150E-08 1.4260E-07 -1.2020E-07 -7.4350E-08 3.9720E-07 -2.5360E-07 4.3960E-07 -2.0010E-06 1.3540E-06 4.5310E-08 -2.6920E-07 1.7840E-07
23 2.3860E-07 -2.5750E-06 1.7110E-06 2.6330E-07 -2.6110E-06 1.7560E-06 2.6370E-07 -2.7360E-06 1.7540E-06 3.6110E-07 -2.8220E-06 1.8900E-06 3.0690E-07 -2.6070E-06 1.8010E-06 1.0080E-07 -1.7610E-06 1.3590E-06 4.6720E-07 -3.0970E-06 1.9820E-06 -2.0010E-06 1.8330E-05 -1.2250E-05 -2.0240E-07 1.8320E-06 -1.1910E-06
24 -1.8290E-07 1.7360E-06 -1.2010E-06 -1.8800E-07 1.7480E-06 -1.2130E-06 -1.9250E-07 1.7980E-06 -1.2290E-06 -2.1160E-07 1.8190E-06 -1.2550E-06 -1.9570E-07 1.7450E-06 -1.2180E-06 -1.4150E-07 1.4810E-06 -1.0680E-06 -2.4250E-07 1.9260E-06 -1.3050E-06 1.3540E-06 -1.2250E-05 8.6140E-06 1.5750E-08 -9.1530E-08 4.8590E-08
25 6.0140E-08 -1.8140E-08 5.3640E-08 3.0800E-08 3.8940E-08 -5.4310E-09 4.2670E-08 6.3170E-08 5.7310E-08 -5.5760E-08 2.0840E-07 -1.1660E-07 -1.5710E-08 8.0340E-08 -8.0700E-08 1.5320E-07 -5.1830E-07 2.0590E-07 -1.3560E-07 3.4760E-07 -1.2970E-07 4.5310E-08 -2.0240E-07 1.5750E-08 3.7360E-06 -2.1110E-05 1.4620E-05
26 -3.7700E-07 9.7830E-08 -4.3820E-07 -1.3840E-07 -4.3180E-07 1.0040E-07 -2.5060E-07 -6.8860E-07 -4.7370E-07 6.4970E-07 -1.7650E-06 9.7630E-07 2.8750E-07 -6.8030E-07 7.1700E-07 -1.2640E-06 4.5400E-06 -1.7020E-06 1.3620E-06 -2.7790E-06 9.1090E-07 -2.6920E-07 1.8320E-06 -9.1530E-08 -2.1110E-05 2.3500E-04 -1.5760E-04
27 2.5720E-07 -5.7640E-08 3.1820E-07 9.4150E-08 2.9830E-07 -4.9100E-08 1.7320E-07 4.4310E-07 3.5980E-07 -4.4050E-07 1.1970E-06 -6.3930E-07 -1.9660E-07 4.8150E-07 -

4.7710E-07 8.5400E-07 -3.0200E-06 1.1340E-06 -9.1970E-07 1.8480E-06 -5.6960E-07
1.7840E-07 -1.1910E-06 4.8590E-08 1.4620E-05 -1.5760E-04 1.0920E-04

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

0.0000037360	-0.0000211100	0.0000146200
-0.0000211100	0.0002350000	-0.0001576000
0.0000146200	-0.0001576000	0.0001092000

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

0.0000026016	0.0000012695	0.0000164208
0.0000012695	0.0000036515	0.0000205919
0.0000164208	0.0000205919	0.0003416829

Horizontal network accuracy = 0.00445 meters.
Vertical network accuracy = 0.03624 meters.

		Vectors		
To	From	X	Y	Z
al90	mob1	8774.626	-3219.367	-5914.497
al92	mob1	32793.321	10407.066	15604.868
aldi	mob1	5177.247	-28182.547	-48115.977
aleb	mob1	101035.049	23535.726	32217.016
alre	mob1	83130.556	41002.016	62571.224
albu	mob1	-12990.790	76394.587	125743.720
fle5	mob1	150556.261	758.170	-10385.722
mlf5	mob1	66357.890	79939.932	126549.278

Covariance matrix of the 8 vectors
1 4.0703E-06 -2.2799E-05 1.5711E-05 3.6032E-06 -2.0475E-05 1.4173E-05 3.5928E-06
-2.0492E-05 1.4120E-05 3.6693E-06 -2.0582E-05 1.4244E-05 3.6395E-06 -2.0496E-05
1.4226E-05 3.5100E-06 -2.0070E-05 1.4033E-05 3.7281E-06 -2.0658E-05 1.4232E-05
3.5936E-06 -2.0292E-05 1.4164E-05
2 -2.2799E-05 2.5427E-04 -1.6989E-04 -2.0663E-05 2.3255E-04 -1.5581E-04 -2.0545E-05
2.3274E-04 -1.5521E-04 -2.1412E-05 2.3377E-04 -1.5661E-04 -2.1075E-05 2.3280E-04 -
1.5641E-04 -1.9609E-05 2.2798E-04 -1.5422E-04 -2.2076E-05 2.3461E-04 -1.5646E-04 -
2.0556E-05 2.3050E-04 -1.5571E-04
3 1.5711E-05 -1.6989E-04 1.1734E-04 1.4280E-05 -1.5562E-04 1.0769E-04 1.4202E-05
-1.5574E-04 1.0730E-04 1.4776E-05 -1.5642E-04 1.0823E-04 1.4553E-05 -1.5578E-04
1.0809E-04 1.3583E-05 -1.5260E-04 1.0665E-04 1.5215E-05 -1.5698E-04 1.0813E-04
1.4210E-05 -1.5426E-04 1.0763E-04
4 3.6032E-06 -2.0663E-05 1.4280E-05 4.1327E-06 -2.3147E-05 1.5964E-05 3.6177E-06
-2.0726E-05 1.4270E-05 3.7038E-06 -2.0829E-05 1.4410E-05 3.6704E-06 -2.0733E-05
1.4390E-05 3.5251E-06 -2.0257E-05 1.4174E-05 3.7696E-06 -2.0913E-05 1.4395E-05
3.6190E-06 -2.0506E-05 1.4322E-05
5 -2.0475E-05 2.3255E-04 -1.5562E-04 -2.3147E-05 2.5545E-04 -1.7089E-04 -2.0588E-05
2.3325E-04 -1.5553E-04 -2.1471E-05 2.3431E-04 -1.5697E-04 -2.1128E-05 2.3332E-04 -

1.5676E-04 -1.9638E-05 2.2843E-04 -1.5454E-04 -2.2145E-05 2.3516E-04 -1.5681E-04 -2.0601E-05 2.3099E-04 -1.5606E-04
6 1.4173E-05 -1.5581E-04 1.0769E-04 1.5964E-05 -1.7089E-04 1.1816E-04 1.4249E-05 -1.5627E-04 1.0763E-04 1.4841E-05 -1.5698E-04 1.0860E-04 1.4612E-05 -1.5632E-04 1.0846E-04 1.3612E-05 -1.5304E-04 1.0697E-04 1.5294E-05 -1.5755E-04 1.0849E-04 1.4258E-05 -1.5475E-04 1.0799E-04
7 3.5928E-06 -2.0545E-05 1.4202E-05 3.6177E-06 -2.0588E-05 1.4249E-05 4.1166E-06 -2.3097E-05 1.5843E-05 3.6874E-06 -2.0701E-05 1.4324E-05 3.6558E-06 -2.0610E-05 1.4305E-05 3.5195E-06 -2.0159E-05 1.4100E-05 3.7494E-06 -2.0782E-05 1.4312E-05 3.6074E-06 -2.0393E-05 1.4239E-05
8 -2.0492E-05 2.3274E-04 -1.5574E-04 -2.0726E-05 2.3325E-04 -1.5627E-04 -2.3097E-05 2.5651E-04 -1.7064E-04 -2.1492E-05 2.3449E-04 -1.5709E-04 -2.1146E-05 2.3349E-04 -1.5688E-04 -1.9646E-05 2.2854E-04 -1.5463E-04 -2.2172E-05 2.3537E-04 -1.5695E-04 -2.0614E-05 2.3112E-04 -1.5615E-04
9 1.4120E-05 -1.5521E-04 1.0730E-04 1.4270E-05 -1.5553E-04 1.0763E-04 1.5843E-05 -1.7064E-04 1.1738E-04 1.4757E-05 -1.5633E-04 1.0816E-04 1.4537E-05 -1.5569E-04 1.0802E-04 1.3584E-05 -1.5254E-04 1.0659E-04 1.5190E-05 -1.5689E-04 1.0807E-04 1.4199E-05 -1.5418E-04 1.0756E-04
10 3.6693E-06 -2.1412E-05 1.4776E-05 3.7038E-06 -2.1471E-05 1.4841E-05 3.6874E-06 -2.1492E-05 1.4757E-05 4.3660E-06 -2.4395E-05 1.6790E-05 3.7604E-06 -2.1508E-05 1.4926E-05 3.5601E-06 -2.0851E-05 1.4629E-05 3.8970E-06 -2.1752E-05 1.4931E-05 3.6898E-06 -2.1196E-05 1.4833E-05
11 -2.0582E-05 2.3377E-04 -1.5642E-04 -2.0829E-05 2.3431E-04 -1.5698E-04 -2.0701E-05 2.3449E-04 -1.5633E-04 -2.4395E-05 2.5891E-04 -1.7315E-04 -2.1275E-05 2.3459E-04 -1.5764E-04 -1.9694E-05 2.2938E-04 -1.5527E-04 -2.2355E-05 2.3656E-04 -1.5771E-04 -2.0716E-05 2.3211E-04 -1.5689E-04
12 1.4244E-05 -1.5661E-04 1.0823E-04 1.4410E-05 -1.5697E-04 1.0860E-04 1.4324E-05 -1.5709E-04 1.0816E-04 1.6790E-05 -1.7315E-04 1.1963E-04 1.4709E-05 -1.5715E-04 1.0904E-04 1.3649E-05 -1.5367E-04 1.0745E-04 1.5432E-05 -1.5847E-04 1.0908E-04 1.4334E-05 -1.5550E-04 1.0854E-04
13 3.6395E-06 -2.1075E-05 1.4553E-05 3.6704E-06 -2.1128E-05 1.4612E-05 3.6558E-06 -2.1146E-05 1.4537E-05 3.7604E-06 -2.1275E-05 1.4709E-05 4.2450E-06 -2.3709E-05 1.6402E-05 3.5444E-06 -2.0586E-05 1.4426E-05 3.8398E-06 -2.1373E-05 1.4689E-05 3.6583E-06 -2.0888E-05 1.4605E-05
14 -2.0496E-05 2.3280E-04 -1.5578E-04 -2.0733E-05 2.3332E-04 -1.5632E-04 -2.0610E-05 2.3349E-04 -1.5569E-04 -2.1508E-05 2.3459E-04 -1.5715E-04 -2.3709E-05 2.5591E-04 -1.7177E-04 -1.9649E-05 2.2864E-04 -1.5470E-04 -2.2191E-05 2.3545E-04 -1.5700E-04 -2.0627E-05 2.3124E-04 -1.5624E-04
15 1.4226E-05 -1.5641E-04 1.0809E-04 1.4390E-05 -1.5676E-04 1.0846E-04 1.4305E-05 -1.5688E-04 1.0802E-04 1.4926E-05 -1.5764E-04 1.0904E-04 1.6402E-05 -1.7177E-04 1.1912E-04 1.3640E-05 -1.5353E-04 1.0734E-04 1.5399E-05 -1.5823E-04 1.0893E-04 1.4317E-05 -1.5533E-04 1.0841E-04
16 3.5100E-06 -1.9609E-05 1.3583E-05 3.5251E-06 -1.9638E-05 1.3612E-05 3.5195E-06 -1.9646E-05 1.3584E-05 3.5601E-06 -1.9694E-05 1.3649E-05 3.5444E-06 -1.9649E-05 1.3640E-05 3.8917E-06 -2.1257E-05 1.4809E-05 3.5911E-06 -1.9732E-05 1.3642E-05 3.5203E-06 -1.9543E-05 1.3609E-05
17 -2.0070E-05 2.2798E-04 -1.5260E-04 -2.0257E-05 2.2843E-04 -1.5304E-04 -2.0159E-05 2.2854E-04 -1.5254E-04 -2.0851E-05 2.2938E-04 -1.5367E-04 -2.0586E-05 2.2864E-04 -

1.5353E-04 -2.1257E-05 2.4384E-04 -1.6474E-04 -2.1372E-05 2.3000E-04 -1.5352E-04 -2.0180E-05 2.2687E-04 -1.5301E-04
18 1.4033E-05 -1.5422E-04 1.0665E-04 1.4174E-05 -1.5454E-04 1.0697E-04 1.4100E-05 -1.5463E-04 1.0659E-04 1.4629E-05 -1.5527E-04 1.0745E-04 1.4426E-05 -1.5470E-04 1.0734E-04 1.4809E-05 -1.6474E-04 1.1524E-04 1.5026E-05 -1.5574E-04 1.0734E-04 1.4116E-05 -1.5335E-04 1.0695E-04
19 3.7281E-06 -2.2076E-05 1.5215E-05 3.7696E-06 -2.2145E-05 1.5294E-05 3.7494E-06 -2.2172E-05 1.5190E-05 3.8970E-06 -2.2355E-05 1.5432E-05 3.8398E-06 -2.2191E-05 1.5399E-05 3.5911E-06 -2.1372E-05 1.5026E-05 4.6458E-06 -2.5661E-05 1.7480E-05 3.7519E-06 -2.1802E-05 1.5281E-05
20 -2.0658E-05 2.3461E-04 -1.5698E-04 -2.0913E-05 2.3516E-04 -1.5755E-04 -2.0782E-05 2.3537E-04 -1.5689E-04 -2.1752E-05 2.3656E-04 -1.5847E-04 -2.1373E-05 2.3545E-04 -1.5823E-04 -1.9732E-05 2.3000E-04 -1.5574E-04 -2.5661E-05 2.6223E-04 -1.7430E-04 -2.0791E-05 2.3285E-04 -1.5743E-04
21 1.4232E-05 -1.5646E-04 1.0813E-04 1.4395E-05 -1.5681E-04 1.0849E-04 1.4312E-05 -1.5695E-04 1.0807E-04 1.4931E-05 -1.5771E-04 1.0908E-04 1.4689E-05 -1.5700E-04 1.0893E-04 1.3642E-05 -1.5352E-04 1.0734E-04 1.7480E-05 -1.7430E-04 1.1971E-04 1.4318E-05 -1.5534E-04 1.0842E-04
22 3.5936E-06 -2.0556E-05 1.4210E-05 3.6190E-06 -2.0601E-05 1.4258E-05 3.6074E-06 -2.0614E-05 1.4199E-05 3.6898E-06 -2.0716E-05 1.4334E-05 3.6583E-06 -2.0627E-05 1.4317E-05 3.5203E-06 -2.0180E-05 1.4116E-05 3.7519E-06 -2.0791E-05 1.4318E-05 4.0850E-06 -2.2639E-05 1.5780E-05
23 -2.0292E-05 2.3050E-04 -1.5426E-04 -2.0506E-05 2.3099E-04 -1.5475E-04 -2.0393E-05 2.3112E-04 -1.5418E-04 -2.1196E-05 2.3211E-04 -1.5550E-04 -2.0888E-05 2.3124E-04 -1.5533E-04 -1.9543E-05 2.2687E-04 -1.5335E-04 -2.1802E-05 2.3285E-04 -1.5534E-04 -2.2639E-05 2.4967E-04 -1.6857E-04
24 1.4164E-05 -1.5571E-04 1.0763E-04 1.4322E-05 -1.5606E-04 1.0799E-04 1.4239E-05 -1.5615E-04 1.0756E-04 1.4833E-05 -1.5689E-04 1.0854E-04 1.4605E-05 -1.5624E-04 1.0841E-04 1.3609E-05 -1.5301E-04 1.0695E-04 1.5281E-05 -1.5743E-04 1.0842E-04 1.5780E-05 -1.6857E-04 1.1772E-04

Correlation matrix of the 8 vectors
1 1.0000E+00 -7.0868E-01 7.1891E-01 8.7852E-01 -6.3497E-01 6.4626E-01 8.7771E-01 -6.3418E-01 6.4599E-01 8.7043E-01 -6.3403E-01 6.4551E-01 8.7556E-01 -6.3506E-01 6.4606E-01 8.8192E-01 -6.3707E-01 6.4792E-01 8.5732E-01 -6.3231E-01 6.4472E-01 8.8130E-01 -6.3655E-01 6.4708E-01
2 -7.0868E-01 1.0000E+00 -9.8357E-01 -6.3741E-01 9.1246E-01 -8.9889E-01 -6.3502E-01 9.1131E-01 -8.9840E-01 -6.4264E-01 9.1109E-01 -8.9797E-01 -6.4146E-01 9.1261E-01 -8.9872E-01 -6.2335E-01 9.1557E-01 -9.0093E-01 -6.4230E-01 9.0857E-01 -8.9681E-01 -6.3782E-01 9.1481E-01 -9.0004E-01
3 7.1891E-01 -9.8357E-01 1.0000E+00 6.4849E-01 -8.9885E-01 9.1460E-01 6.4621E-01 -8.9770E-01 9.1426E-01 6.5282E-01 -8.9744E-01 9.1346E-01 6.5206E-01 -8.9898E-01 9.1427E-01 6.3565E-01 -9.0213E-01 9.1710E-01 6.5165E-01 -8.9492E-01 9.1232E-01 6.4905E-01 -9.0126E-01 9.1580E-01
4 8.7852E-01 -6.3741E-01 6.4849E-01 1.0000E+00 -7.1238E-01 7.2243E-01 8.7710E-01 -6.3656E-01 6.4789E-01 8.7195E-01 -6.3677E-01 6.4808E-01 8.7631E-01 -6.3754E-01 6.4858E-01 8.7899E-01 -6.3812E-01 6.4950E-01 8.6031E-01 -6.3526E-01 6.4719E-01 8.8081E-01 -6.3838E-01 6.4934E-01

5 -6.3497E-01 9.1246E-01 -8.9885E-01 -7.1238E-01 1.0000E+00 -9.8361E-01 -6.3487E-01 9.1119E-01 -8.9818E-01 -6.4291E-01 9.1108E-01 -8.9791E-01 -6.4159E-01 9.1255E-01 -8.9865E-01 -6.2283E-01 9.1526E-01 -9.0070E-01 -6.4282E-01 9.0859E-01 -8.9673E-01 -6.3774E-01 9.1465E-01 -8.9994E-01

6 6.4626E-01 -8.9889E-01 9.1460E-01 7.2243E-01 -9.8361E-01 1.0000E+00 6.4608E-01 -8.9759E-01 9.1392E-01 6.5343E-01 -8.9748E-01 9.1339E-01 6.5241E-01 -8.9894E-01 9.1419E-01 6.3477E-01 -9.0159E-01 9.1669E-01 6.5274E-01 -8.9503E-01 9.1221E-01 6.4899E-01 -9.0100E-01 9.1563E-01

7 8.7771E-01 -6.3502E-01 6.4621E-01 8.7710E-01 -6.3487E-01 6.4608E-01 1.0000E+00 -7.1077E-01 7.2074E-01 8.6978E-01 -6.3410E-01 6.4548E-01 8.7454E-01 -6.3498E-01 6.4597E-01 8.7931E-01 -6.3629E-01 6.4735E-01 8.5736E-01 -6.3254E-01 6.4471E-01 8.7970E-01 -6.3612E-01 6.4681E-01

8 -6.3418E-01 9.1131E-01 -8.9770E-01 -6.3656E-01 9.1119E-01 -8.9759E-01 -7.1077E-01 1.0000E+00 -9.8339E-01 -6.4222E-01 9.0993E-01 -8.9677E-01 -6.4082E-01 9.1133E-01 -8.9746E-01 -6.2182E-01 9.1383E-01 -8.9935E-01 -6.4229E-01 9.0754E-01 -8.9566E-01 -6.3683E-01 9.1329E-01 -8.9863E-01

9 6.4599E-01 -8.9840E-01 9.1426E-01 6.4789E-01 -8.9818E-01 9.1392E-01 7.2074E-01 -9.8339E-01 1.0000E+00 6.5186E-01 -8.9671E-01 9.1272E-01 6.5123E-01 -8.9827E-01 9.1352E-01 6.3555E-01 -9.0164E-01 9.1646E-01 6.5045E-01 -8.9421E-01 9.1167E-01 6.4843E-01 -9.0063E-01 9.1503E-01

10 8.7043E-01 -6.4264E-01 6.5282E-01 8.7195E-01 -6.4291E-01 6.5343E-01 8.6978E-01 -6.4222E-01 6.5186E-01 1.0000E+00 -7.2558E-01 7.3467E-01 8.7349E-01 -6.4343E-01 6.5449E-01 8.6368E-01 -6.3905E-01 6.5216E-01 8.6529E-01 -6.4286E-01 6.5310E-01 8.7371E-01 -6.4200E-01 6.5429E-01

11 -6.3403E-01 9.1109E-01 -8.9744E-01 -6.3677E-01 9.1108E-01 -8.9748E-01 -6.3410E-01 9.0993E-01 -8.9671E-01 -7.2558E-01 1.0000E+00 -9.8387E-01 -6.4173E-01 9.1136E-01 -8.9762E-01 -6.2042E-01 9.1292E-01 -8.9888E-01 -6.4458E-01 9.0788E-01 -8.9580E-01 -6.3700E-01 9.1294E-01 -8.9865E-01

12 6.4551E-01 -8.9797E-01 9.1346E-01 6.4808E-01 -8.9791E-01 9.1339E-01 6.4548E-01 -8.9677E-01 9.1272E-01 7.3467E-01 -9.8387E-01 1.0000E+00 6.5270E-01 -8.9819E-01 9.1340E-01 6.3259E-01 -8.9972E-01 9.1514E-01 6.5461E-01 -8.9474E-01 9.1153E-01 6.4843E-01 -8.9975E-01 9.1461E-01

13 8.7556E-01 -6.4146E-01 6.5206E-01 8.7631E-01 -6.4159E-01 6.5241E-01 8.7454E-01 -6.4082E-01 6.5123E-01 8.7349E-01 -6.4173E-01 6.5270E-01 1.0000E+00 -7.1933E-01 7.2940E-01 8.7204E-01 -6.3986E-01 6.5224E-01 8.6464E-01 -6.4059E-01 6.5161E-01 8.7849E-01 -6.4163E-01 6.5335E-01

14 -6.3506E-01 9.1261E-01 -8.9898E-01 -6.3754E-01 9.1255E-01 -8.9894E-01 -6.3498E-01 9.1133E-01 -8.9827E-01 -6.4343E-01 9.1136E-01 -8.9819E-01 -7.1933E-01 1.0000E+00 -9.8379E-01 -6.2263E-01 9.1528E-01 -9.0084E-01 -6.4358E-01 9.0890E-01 -8.9699E-01 -6.3797E-01 9.1483E-01 -9.0021E-01

15 6.4606E-01 -8.9872E-01 9.1427E-01 6.4858E-01 -8.9865E-01 9.1419E-01 6.4597E-01 -8.9746E-01 9.1352E-01 6.5449E-01 -8.9762E-01 9.1340E-01 7.2940E-01 -9.8379E-01 1.0000E+00 6.3351E-01 -9.0080E-01 9.1617E-01 6.5456E-01 -8.9527E-01 9.1217E-01 6.4903E-01 -9.0067E-01 9.1549E-01

16 8.8192E-01 -6.2335E-01 6.3565E-01 8.7899E-01 -6.2283E-01 6.3477E-01 8.7931E-01 -6.2182E-01 6.3555E-01 8.6368E-01 -6.2042E-01 6.3259E-01 8.7204E-01 -6.2263E-01 6.3351E-01 1.0000E+00 -6.9004E-01 6.9929E-01 8.4455E-01 -6.1769E-01 6.3204E-01 8.8292E-01 -6.2696E-01 6.3581E-01

17 -6.3707E-01 9.1557E-01 -9.0213E-01 -6.3812E-01 9.1526E-01 -9.0159E-01 -6.3629E-01 9.1383E-01 -9.0164E-01 -6.3905E-01 9.1292E-01 -8.9972E-01 -6.3986E-01 9.1528E-01 -9.0080E-01 -6.9004E-01 1.0000E+00 -9.8274E-01 -6.3500E-01 9.0958E-01 -8.9857E-01 -6.3940E-01 9.1947E-01 -9.0311E-01
18 6.4792E-01 -9.0093E-01 9.1710E-01 6.4950E-01 -9.0070E-01 9.1669E-01 6.4735E-01 -8.9935E-01 9.1646E-01 6.5216E-01 -8.9888E-01 9.1514E-01 6.5224E-01 -9.0084E-01 9.1617E-01 6.9929E-01 -9.8274E-01 1.0000E+00 6.4941E-01 -8.9588E-01 9.1385E-01 6.5058E-01 -9.0406E-01 9.1824E-01
19 8.5732E-01 -6.4230E-01 6.5165E-01 8.6031E-01 -6.4282E-01 6.5274E-01 8.5736E-01 -6.4229E-01 6.5045E-01 8.6529E-01 -6.4458E-01 6.5461E-01 8.6464E-01 -6.4358E-01 6.5456E-01 8.4455E-01 -6.3500E-01 6.4941E-01 1.0000E+00 -7.3519E-01 7.4124E-01 8.6125E-01 -6.4017E-01 6.5345E-01
20 -6.3231E-01 9.0857E-01 -8.9492E-01 -6.3526E-01 9.0859E-01 -8.9503E-01 -6.3254E-01 9.0754E-01 -8.9421E-01 -6.4286E-01 9.0788E-01 -8.9474E-01 -6.4059E-01 9.0890E-01 -8.9527E-01 -6.1769E-01 9.0958E-01 -8.9588E-01 -7.3519E-01 1.0000E+00 -9.8376E-01 -6.3525E-01 9.1003E-01 -8.9605E-01
21 6.4472E-01 -8.9681E-01 9.1232E-01 6.4719E-01 -8.9673E-01 9.1221E-01 6.4471E-01 -8.9566E-01 9.1167E-01 6.5310E-01 -8.9580E-01 9.1153E-01 6.5161E-01 -8.9699E-01 9.1217E-01 6.3204E-01 -8.9857E-01 9.1385E-01 7.4124E-01 -9.8376E-01 1.0000E+00 6.4746E-01 -8.9853E-01 9.1329E-01
22 8.8130E-01 -6.3782E-01 6.4905E-01 8.8081E-01 -6.3774E-01 6.4899E-01 8.7970E-01 -6.3683E-01 6.4843E-01 8.7371E-01 -6.3700E-01 6.4843E-01 8.7849E-01 -6.3797E-01 6.4903E-01 8.8292E-01 -6.3940E-01 6.5058E-01 8.6125E-01 -6.3525E-01 6.4746E-01 1.0000E+00 -7.0891E-01 7.1960E-01
23 -6.3655E-01 9.1481E-01 -9.0126E-01 -6.3838E-01 9.1465E-01 -9.0100E-01 -6.3612E-01 9.1329E-01 -9.0063E-01 -6.4200E-01 9.1294E-01 -8.9975E-01 -6.4163E-01 9.1483E-01 -9.0067E-01 -6.2696E-01 9.1947E-01 -9.0406E-01 -6.4017E-01 9.1003E-01 -8.9853E-01 -7.0891E-01 1.0000E+00 -9.8327E-01
24 6.4708E-01 -9.0004E-01 9.1580E-01 6.4934E-01 -8.9994E-01 9.1563E-01 6.4681E-01 -8.9863E-01 9.1503E-01 6.5429E-01 -8.9865E-01 9.1461E-01 6.5335E-01 -9.0021E-01 9.1549E-01 6.3581E-01 -9.0311E-01 9.1824E-01 6.5345E-01 -8.9605E-01 9.1329E-01 7.1960E-01 -9.8327E-01 1.0000E+00

G-FILE for the vectors

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D 1 2 -7086757 1 3 7189052 1 4 8785213 1 5 -6349656 1 6 6462637 D 1 7 8777134 1 8 -6341841 1 9 6459875 1 10 8704262 1 11 -6340263 D 1 12 6455058 1 13 8755585 1 14 -6350553 1 15 6460589 1 16 8819203 D 1 17 -6370667 1 18 6479184 1 19 8573224 1 20 -6323103 1 21 6447222 D 1 22 8812957 1 23 -6365475 1 24 6470785 2 3 -9835691 2 4 -6374118 D 2 5 9124577 2 6 -8988925 2 7 -6350160 2 8 9113093 2 9 -8983961 D 2 10 -6426439 2 11 9110944 2 12 -8979680 2 13 -6414597 2 14 9126050 D 2 15 -8987180 2 16 -6233491 2 17 9155737 2 18 -9009331 2 19 -6423031 D 2 20 9085689 2 21 -8968093 2 22 -6378165 2 23 9148099 2 24 -9000351 D 3 4 6484872 3 5 -8988503 3 6 9146042 3 7 6462060 3 8 -8977044 D 3 9 9142567 3 10 6528200 3 11 -8974414 3 12 9134571 3 13 6520579 D 3 14 -8989776 3 15 9142700 3 16 6356458 3 17 -9021331 3 18 9171026 D 3 19 6516515 3 20 -8949153 3 21 9123168 3 22 6490461 3 23 -9012613 D 3 24 9158001 4 5 -7123823 4 6 7224317 4 7 8770985 4 8 -6365636 D 4 9 6478926 4 10 8719516 4 11 -6367710 4 12 6480836 4 13 8763052 D 4 14 -6375411 4 15 6485763 4 16 8789942 4 17 -6381154 4 18 6495007 D 4 19 8603077 4 20 -6352570 4 21 6471910 4 22 8808060 4 23 -6383842 D 4 24 6493375 5 6 -9836072 5 7 -6348678 5 8 9111865 5 9 -8981792 D 5 10 -6429069 5 11 9110757 5 12 -8979061 5 13 -6415893 5 14 9125480 D 5 15 -8986472 5 16 -6228278 5 17 9152595 5 18 -9007042 5 19 -6428183 D 5 20 9085891 5 21 -8967323 5 22 -6377412 5 23 9146505 5 24 -8999386 D 6 7 6460788 6 8 -8975894 6 9 9139235 6 10 6534273 6 11 -8974848 D 6 12 9133943 6 13 6524094 6 14 -8989363 6 15 9141857 6 16 6347718 D 6 17 -9015908 6 18 9166916 6 19 6527425 6 20 -8950326 6 21 9122148 D 6 22 6489947 6 23 -9010002 6 24 9156271 7 8 -7107722 7 9 7207396 D 7 10 8697767 7 11 -6340974 7 12 6454842 7 13 8745432 7 14 -6349785 D 7 15 6459742 7 16 8793141 7 17 -6362877 7 18 6473499 7 19 8573644 D 7 20 -6325352 7 21 6447128 7 22 8797022 7 23 -6361222 7 24 6468138 D 8 9 -9833867 8 10 -6422196 8 11 9099314 8 12 -8967726 8 13 -6408197 D 8 14 9113307 8 15 -8974622 8 16 -6218173 8 17 9138329 8 18 -8993457 D 8 19 -6422884 8 20 9075378 8 21 -8956637 8 22 -6368295 8 23 9132909 D 8 24 -8986340 9 10 6518619 9 11 -8967108 9 12 9127208 9 13 6512315 D 9 14 -8982666 9 15 9135154 9 16 6355493 9 17 -9016447 9 18 9164581 D 9 19 6504493 9 20 -8942058 9 21 9116652 9 22 6484304 9 23 -9006308 D 9 24 9150332 10 11 -7255800 10 12 7346710 10 13 8734882 10 14 -6434336 D 10 15 6544918 10 16 8636784 10 17 -6390543 10 18 6521633 10 19 8652856 D 10 20 -6428635 10 21 6531038 10 22 8737077 10 23 -6420006 10 24 6542914 D 11 12 -9838725 11 13 -6417253 11 14 9113593 11 15 -8976151 11 16 -6204194 D 11 17 9129194 11 18 -8988790 11 19 -6445814 11 20 9078815 11 21 -8957973 D 11 22 -6369957 11 23 9129386 11 24 -8986525 12 13 6527005 12 14 -8981854 D 12 15 9134012 12 16 6325866 12 17 -8997226 12 18 9151380 12 19 6546146 D 12 20 -8947445 12 21 9115309 12 22 6484313 12 23 -8997462 12 24 9146098 D 13 14 -7193268 13 15 7294046 13 16 8720359 13 17 -6398614 13 18 6522371 D 13 19 8646417 13 20 -6405927 13 21 6516068 13 22 8784934 13 23 -6416252 D 13 24 6533514 14 15 -9837914 14 16 -6226263 14 17 9152806 14 18 -9008383 D 14 19 -6435781 14 20 9088989 14 21 -8969894 14 22 -6379725 14 23 9148324 D 14 24 -9002075 15 16 6335117 15 17 -9008039 15 18 9161662 15 19 6545635 D 15 20 -8952734 15 21 9121667 15 22 6490329 15 23 -9006691 15 24 9154945 D 16 17 -6900390 16 18 6992870 16 19 8445542 16 20 -6176933 16 21 6320354 D 16 22 8829171 16 23 -6269564 16 24 6358128 17 18 -9827381 17 19 -6349953 D 17 20 9095772 17 21 -8985686 17 22 -6393984 17 23 9194733 17 24 -9031105 D 18 19 6494089 18 20 -8958777 18 21 9138533 18 22 6505756 18 23 -9040551 D 18 24 9182387 19 20 -7351856 19 21 7412374 19 22 8612528 19 23 -6401685 D 19 24 6534540 20 21 -9837649 20 22 -6352505 20 23 9100327 20 24 -8960453 D 21 22 6474623 21 23 -8985328 21 24 9132935 22 23 -7089085 22 24 7195958 D 23 24 -9832745

ITRF position of mob1 as determined by individual baselines

	X	Y	Z
al90	179771.380	-5483092.385	3242370.840
al92	179771.367	-5483092.377	3242370.839
aldi	179771.375	-5483092.390	3242370.856
aleb	179771.363	-5483092.385	3242370.846
alre	179771.367	-5483092.389	3242370.844
albu	179771.370	-5483092.408	3242370.865
fle5	179771.362	-5483092.399	3242370.851
mlf5	179771.368	-5483092.344	3242370.823

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
al90	0.012	-0.004	-0.003	0.012	-0.005	0.002
al92	-0.002	0.003	-0.004	-0.002	-0.002	-0.005
aldi	0.006	-0.009	0.013	0.006	0.007	0.015
aleb	-0.006	-0.005	0.003	-0.006	0.001	0.005
alre	-0.002	-0.008	0.001	-0.002	-0.003	0.007
albu	0.001	-0.027	0.022	0.000	0.005	0.035
fle5	-0.007	-0.018	0.008	-0.007	-0.002	0.019
mlf5	-0.001	0.036	-0.021	0.001	0.001	-0.042

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

dop from interpolation is 0.571
scatter (mean square distance from rover) is 12547.172
average edop for rover is 0.610
average ndop for rover is 0.860
average hdop for rover is 1.054
average vdop for rover is 1.500
average gdop for rover is 2.050

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.

FILE: MOB_01.14O OP1393352011368

NGS OPUS-RS SOLUTION REPORT
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All computed coordinate accuracies are listed as 1-sigma RMS values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: blkimbrough@theatlgrp.com DATE: February 25, 2014
RINEX FILE: mob_046u.14o TIME: 18:23:34 UTC

SOFTWARE: rsgps 1.37 RS94.prl 1.89 START: 2014/02/15 20:51:14
EPHEMERIS: igr17796.eph [rapid] STOP: 2014/02/15 21:19:05
NAV FILE: brdc0460.14n OBS USED: 2016 / 2205 : 91%
ANT NAME: TPSHIPER_V NONE QUALITY IND. 5.87/ 16.33
ARP HEIGHT: 2.000 NORMALIZED RMS: 0.286

REF FRAME:	NAD_83(2011)(EPOCH:2010.0000)		IGS08 (EPOCH:2014.12569)	
X:	160153.953(m)	0.005(m)	160153.181(m)	0.005(m)
Y:	-5490394.731(m)	0.033(m)	-5490393.231(m)	0.033(m)
Z:	3231162.995(m)	0.022(m)	3231162.824(m)	0.022(m)
LAT:	30 38 6.48250	0.006(m)	30 38 6.50290	0.006(m)
E LON:	271 40 15.00641	0.006(m)	271 40 14.97908	0.006(m)
W LON:	88 19 44.99359	0.006(m)	88 19 45.02092	0.006(m)
EL HGT:	17.971(m)	0.039(m)	16.574(m)	0.039(m)
ORTHO HGT:	46.506(m)	0.040(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES UTM (Zone 16)	STATE PLANE COORDINATES SPC (0102 AL W)
Northing (Y) [meters]	3389919.711	70697.963
Easting (X) [meters]	372623.774	520515.272
Convergence [degrees]	-0.67739271	-0.42253900
Point Scale	0.99980015	1.00001124
Combined Factor	0.99979733	1.00000842

US NATIONAL GRID DESIGNATOR: 16RCU7262389919(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI3826	AL90 ALDOT 9 DIV OFF CORS ARP	N304126.969	W0880154.137	29169.0
DH3836	MSSC STENNIS SPACE CTR CORS ARP	N302230.794	W0893649.903	126641.6
DN7498	MSEV ELLISVILLE CORS ARP	N313542.081	W0891213.274	135219.0
DM5367	ALBU CHOCTAW ELEM SCH CORS ARP	N320453.895	W0881359.331	160638.2

DO8512 MARY MARY_289 LSU C4G CORS ARP N300122.709 W0895446.801 166738.7
DL3065 FLE5 EGLIN 5 CORS ARP N303836.931 W0863306.887 170367.2
DI8426 MLF5 MILLERS FERRY 5 CORS ARP N320524.917 W0872330.503 184336.4
DH7121 GRIS GRAND ISLE CORS ARP N291555.883 W0895726.262 218507.5
DM3975 ALSE WALLACE COMM COLL CORS ARP N322650.689 W0870042.376 236684.2

NEAREST NGS PUBLISHED CONTROL POINT
AA2250 49 22 N303656.129 W0882039.399 2613.1

OPUS-RS Extended Output, Level 2

FINAL COORDINATES (ITRF at epoch of observations)

al90	188545.995	-5486311.733	3236456.343
mssc	37114.949	-5507204.512	3206321.893
msev	75572.354	-5437238.712	3322293.877
albu	166780.581	-5406697.797	3368114.565
mary	8391.521	-5526955.106	3172567.464
fle5	330327.627	-5482334.206	3231985.113
mlf5	246129.264	-5403152.421	3368920.102
gris	4149.666	-5568493.944	3099600.307
alse	280860.571	-5380301.801	3402419.972
mob_	160153.181	-5490393.231	3231162.824

Covariance matrix of the stations:

1 3.4140E-07 -6.5030E-07 3.9870E-07 -3.9530E-08 5.5750E-08 -4.7220E-08 -3.2330E-08 6.3880E-08 -2.8330E-08 -2.3230E-08 8.4390E-08 -3.2210E-08 -4.3300E-08 5.2170E-08 -5.2070E-08 -1.4870E-08 1.2140E-07 -8.0540E-08 -1.7180E-08 1.0300E-07 -4.4490E-08 -4.5870E-08 5.4770E-08 -6.7680E-08 -1.3960E-08 1.1500E-07 -4.6310E-08 1.5030E-08 1.3210E-07 -9.2810E-08

2 -6.5030E-07 1.2040E-05 -7.4320E-06 6.7680E-08 -1.4470E-06 8.8480E-07 7.3390E-08 -1.4700E-06 9.2660E-07 8.4400E-08 -1.5040E-06 9.6080E-07 6.4590E-08 -1.4340E-06 8.6990E-07 1.0260E-07 -1.5620E-06 9.6030E-07 9.4110E-08 -1.5340E-06 9.8010E-07 6.3630E-08 -1.4250E-06 8.5040E-07 9.9450E-08 -1.5490E-06 9.9920E-07 -3.2690E-09 -2.1040E-07 1.4360E-07

3 3.9870E-07 -7.4320E-06 5.0110E-06 -8.2470E-09 8.2530E-07 -4.8740E-07 -2.7930E-08 9.4240E-07 -6.5580E-07 -6.2820E-08 1.0240E-06 -7.5170E-07 1.5370E-09 7.8120E-07 -4.3620E-07 -1.0650E-07 9.8200E-07 -6.0550E-07 -9.1310E-08 1.0610E-06 -7.7740E-07 5.1970E-09 7.1550E-07 -3.4920E-07 -1.0830E-07 1.1000E-06 -8.3640E-07 6.1220E-09 -2.9160E-07 2.3260E-07

4 -3.9530E-08 6.7680E-08 -8.2470E-09 3.9790E-07 -3.9290E-07 3.1390E-07 -3.3670E-09 1.4370E-08 -5.3220E-08 -4.3430E-08 8.1110E-08 -1.4740E-07 3.2710E-08 -7.8050E-08 1.4410E-07 -9.9620E-08 1.4360E-07 -5.6160E-08 -7.6610E-08 1.2920E-07 -1.8320E-07

3.8400E-08 -1.1340E-07 2.2400E-07 -9.5090E-08 1.4810E-07 -2.3340E-07 1.6710E-08 -6.7320E-07 4.7390E-07

5 5.5750E-08 -1.4470E-06 8.2530E-07 -3.9290E-07 1.1480E-05 -7.0200E-06 -3.2880E-09 -1.3710E-06 9.0730E-07 6.3300E-08 -1.4640E-06 1.0490E-06 -6.5550E-08 -1.2390E-06 5.9690E-07 1.5430E-07 -1.5640E-06 8.9780E-07 1.1750E-07 -1.5330E-06 1.0990E-06 -7.6100E-08 -1.1880E-06 4.6890E-07 1.4770E-07 -1.5590E-06 1.1760E-06 -3.8470E-08 6.7570E-07 -5.0870E-07

6 -4.7220E-08 8.8480E-07 -4.8740E-07 3.1390E-07 -7.0200E-06 4.7880E-06 3.5340E-08 8.5700E-07 -6.5970E-07 -6.0320E-08 9.9990E-07 -8.7100E-07 1.2320E-07 5.9300E-07 -1.6360E-07 -1.8360E-07 9.9930E-07 -5.5750E-07 -1.3730E-07 1.0780E-06 -9.2920E-07 1.3730E-07 4.8030E-07 4.1950E-08 -1.8140E-07 1.1270E-06 -1.0500E-06 3.1760E-08 -1.2810E-06 9.4290E-07

7 -3.2330E-08 7.3390E-08 -2.7930E-08 -3.3670E-09 -3.2880E-09 3.5340E-08 3.4710E-07 -4.6610E-07 2.6890E-07 -3.3690E-08 8.1510E-08 -9.8230E-08 2.2000E-09 -2.4320E-08 6.2570E-08 -6.2950E-08 1.3250E-07 -6.4980E-08 -5.0480E-08 1.1700E-07 -1.2400E-07 4.4030E-09 -4.3830E-08 1.0250E-07 -5.9870E-08 1.3300E-07 -1.5390E-07 1.5820E-08 -3.3270E-07 2.3520E-07

8 6.3880E-08 -1.4700E-06 9.4240E-07 1.4370E-08 -1.3710E-06 8.5700E-07 -4.6610E-07 1.1700E-05 -7.6250E-06 6.7180E-08 -1.4720E-06 1.0490E-06 4.0910E-09 -1.3450E-06 8.1690E-07 1.1430E-07 -1.5580E-06 9.9630E-07 9.4410E-08 -1.5190E-06 1.0830E-06 -8.7190E-10 -1.3210E-06 7.5520E-07 1.0960E-07 -1.5370E-06 1.1240E-06 -1.7410E-08 1.1440E-07 -3.9330E-08

9 -2.8330E-08 9.2660E-07 -6.5580E-07 -5.3220E-08 9.0730E-07 -6.5970E-07 2.6890E-07 -7.6250E-06 5.4560E-06 -2.7810E-08 1.0090E-06 -6.6890E-07 -5.9440E-08 8.9310E-07 -6.6350E-07 -7.1630E-09 9.5130E-07 -6.6760E-07 -1.7140E-08 1.0200E-06 -6.7300E-07 -6.3910E-08 8.6650E-07 -6.7230E-07 -1.2500E-08 1.0520E-06 -6.8410E-07 8.0740E-09 5.4200E-07 -3.9070E-07

10 -2.3230E-08 8.4400E-08 -6.2820E-08 -4.3430E-08 6.3300E-08 -6.0320E-08 -3.3690E-08 6.7180E-08 -2.7810E-08 3.3650E-07 -6.7290E-07 4.6290E-07 -4.8470E-08 6.2240E-08 -6.9730E-08 -7.1970E-09 1.1760E-07 -8.3150E-08 -1.1470E-08 9.9510E-08 -3.4110E-08 -5.1750E-08 6.7920E-08 -9.3110E-08 -6.4770E-09 1.1080E-07 -3.1820E-08 1.2170E-08 2.0920E-07 -1.4690E-07

11 8.4390E-08 -1.5040E-06 1.0240E-06 8.1110E-08 -1.4640E-06 9.9990E-07 8.1510E-08 -1.4720E-06 1.0090E-06 -6.7290E-07 1.2090E-05 -8.1730E-06 8.0800E-08 -1.4580E-06 9.9530E-07 9.0410E-08 -1.5620E-06 1.0580E-06 8.6220E-08 -1.5220E-06 1.0420E-06 8.1080E-08 -1.4600E-06 9.9390E-07 8.7580E-08 -1.5330E-06 1.0510E-06 1.4500E-08 -4.2740E-07 3.7380E-07

12 -3.2210E-08 9.6080E-07 -7.5170E-07 -1.4740E-07 1.0490E-06 -8.7100E-07 -9.8230E-08 1.0490E-06 -6.6890E-07 4.6290E-07 -8.1730E-06 6.1650E-06 -1.7310E-07 1.0720E-06 -9.4290E-07 7.5060E-08 9.3250E-07 -7.2890E-07 3.4460E-08 9.9790E-07 -5.3580E-07 -1.8780E-07 1.0930E-06 -1.0690E-06 6.5790E-08 1.0200E-06 -4.8600E-07 -1.8730E-08 1.5560E-06 -1.1270E-06

13 -4.3300E-08 6.4590E-08 1.5370E-09 3.2710E-08 -6.5550E-08 1.2320E-07 2.2000E-09 4.0910E-09 -5.9440E-08 -4.8470E-08 8.0800E-08 -1.7310E-07 4.3440E-07 -3.7490E-07 3.6250E-07 -1.1860E-07 1.4890E-07 -5.1800E-08 -9.0110E-08 1.3530E-07 -2.1400E-07 5.5910E-08 -1.4920E-07 2.8620E-07 -1.1330E-07 1.5560E-07 -2.7470E-07 1.7130E-08 -8.4930E-07 5.9680E-07

14 5.2170E-08 -1.4340E-06 7.8120E-07 -7.8050E-08 -1.2390E-06 5.9300E-07 -2.4320E-08 -1.3450E-06 8.9310E-07 6.2240E-08 -1.4580E-06 1.0720E-06 -3.7490E-07 1.1370E-05 -6.8920E-06 1.7940E-07 -1.5680E-06 8.6490E-07 1.3240E-07 -1.5400E-06 1.1330E-06 -1.1960E-07 -1.1110E-06 3.2470E-07 1.7150E-07 -1.5690E-06 1.2300E-06 -4.9610E-08 1.0120E-06 -7.6480E-07

15 -5.2070E-08 8.6990E-07 -4.3620E-07 1.4410E-07 5.9690E-07 -1.6360E-07 6.2570E-08 8.1690E-07 -6.6350E-07 -6.9730E-08 9.9530E-07 -9.4290E-07 3.6250E-07 -6.8920E-06 4.7650E-06 -2.4100E-07 1.0150E-06 -5.2600E-07 -1.7600E-07 1.0960E-06 -1.0190E-06 2.0590E-07 3.5050E-07 2.7540E-07 -2.3630E-07 1.1510E-06 -1.1770E-06 4.1030E-08 -1.8920E-06 1.3840E-06

16 -1.4870E-08 1.0260E-07 -1.0650E-07 -9.9620E-08 1.5430E-07 -1.8360E-07 -6.2950E-08 1.1430E-07 -7.1630E-09 -7.1970E-09 9.0410E-08 7.5060E-08 -1.1860E-07 1.7940E-07 -2.4100E-07 4.4740E-07 -1.0250E-06 5.9440E-07 3.6070E-08 8.0590E-08 8.5530E-08 -1.2900E-07 2.1800E-07 -3.4740E-07 5.9920E-08 8.5770E-08 1.2990E-07 3.8890E-09 9.2720E-07 -6.4850E-07

17 1.2140E-07 -1.5620E-06 9.8200E-07 1.4360E-07 -1.5640E-06 9.9930E-07 1.3250E-07 -1.5580E-06 9.5130E-07 1.1760E-07 -1.5620E-06 9.3250E-07 1.4890E-07 -1.5680E-06 1.0150E-06 -1.0250E-06 1.2650E-05 -7.7850E-06 1.0660E-07 -1.5700E-06 9.3420E-07 1.5260E-07 -1.5790E-06 1.0460E-06 1.0010E-07 -1.5780E-06 9.2490E-07 5.6910E-08 -8.0600E-07 5.4180E-07

18 -8.0540E-08 9.6030E-07 -6.0550E-07 -5.6160E-08 8.9780E-07 -5.5750E-07 -6.4980E-08 9.9630E-07 -6.6760E-07 -8.3150E-08 1.0580E-06 -7.2890E-07 -5.1800E-08 8.6490E-07 -5.2600E-07 5.9440E-07 -7.7850E-06 5.1950E-06 -9.8250E-08 1.0810E-06 -7.4320E-07 -5.1170E-08 8.1200E-07 -4.7190E-07 -1.0760E-07 1.1150E-06 -7.8380E-07 -3.0600E-08 8.1800E-08 -1.7670E-08

19 -1.7180E-08 9.4110E-08 -9.1310E-08 -7.6610E-08 1.1750E-07 -1.3730E-07 -5.0480E-08 9.4410E-08 -1.7140E-08 -1.1470E-08 8.6220E-08 3.4460E-08 -9.0110E-08 1.3240E-07 -1.7600E-07 3.6070E-08 1.0660E-07 -9.8250E-08 3.8340E-07 -8.8290E-07 6.7020E-07 -9.7760E-08 1.5810E-07 -2.4990E-07 3.4900E-08 9.3880E-08 6.4900E-08 8.0620E-09 6.4300E-07 -4.5290E-07

20 1.0300E-07 -1.5340E-06 1.0610E-06 1.2920E-07 -1.5330E-06 1.0780E-06 1.1700E-07 -1.5190E-06 1.0200E-06 9.9510E-08 -1.5220E-06 9.9790E-07 1.3530E-07 -1.5400E-06 1.0960E-06 8.0590E-08 -1.5700E-06 1.0810E-06 -8.8290E-07 1.2430E-05 -8.4570E-06 1.3900E-07 -1.5570E-06 1.1330E-06 7.8910E-08 -1.5390E-06 9.9000E-07 4.0230E-08 -7.8860E-07 6.2810E-07

21 -4.4490E-08 9.8010E-07 -7.7740E-07 -1.8320E-07 1.0990E-06 -9.2920E-07 -1.2400E-07 1.0830E-06 -6.7300E-07 -3.4110E-08 1.0420E-06 -5.3580E-07 -2.1400E-07 1.1330E-06 -1.0190E-06 8.5530E-08 9.3420E-07 -7.4320E-07 6.7020E-07 -8.4570E-06 6.3980E-06 -2.3140E-07 1.1660E-06 -1.1760E-06 7.5360E-08 1.0200E-06 -4.3280E-07 -3.6790E-08 1.8390E-06 -1.3260E-06

22 -4.5870E-08 6.3630E-08 5.1970E-09 3.8400E-08 -7.6100E-08 1.3730E-07 4.4030E-09 -8.7190E-10 -6.3910E-08 -5.1750E-08 8.1080E-08 -1.8780E-07 5.5910E-08 -1.1960E-07 2.0590E-07 -1.2900E-07 1.5260E-07 -5.1170E-08 -9.7760E-08 1.3900E-07 -2.3140E-07 4.6070E-07 -4.0020E-07 4.8380E-07 -1.2340E-07 1.6010E-07 -2.9760E-07 1.6730E-08 -9.3960E-07 6.5890E-07

23 5.4770E-08 -1.4250E-06 7.1550E-07 -1.1340E-07 -1.1880E-06 4.8030E-07 -4.3830E-08 -1.3210E-06 8.6650E-07 6.7920E-08 -1.4600E-06 1.0930E-06 -1.4920E-07 -1.1110E-06 3.5050E-07 2.1800E-07 -1.5790E-06 8.1200E-07 1.5810E-07 -1.5570E-06 1.1660E-06 -

4.0020E-07 1.1340E-05 -6.7700E-06 2.0840E-07 -1.5900E-06 1.2880E-06 -5.6750E-08 1.4220E-06 -1.0930E-06
24 -6.7680E-08 8.5040E-07 -3.4920E-07 2.2400E-07 4.6890E-07 4.1950E-08 1.0250E-07 7.5520E-07 -6.7230E-07 -9.3110E-08 9.9390E-07 -1.0690E-06 2.8620E-07 3.2470E-07 2.7540E-07 -3.4740E-07 1.0460E-06 -4.7190E-07 -2.4990E-07 1.1330E-06 -1.1760E-06 4.8380E-07 -6.7700E-06 4.9290E-06 -3.3820E-07 1.1980E-06 -1.3960E-06 5.0020E-08 -2.9360E-06 2.1410E-06
25 -1.3960E-08 9.9450E-08 -1.0830E-07 -9.5090E-08 1.4770E-07 -1.8140E-07 -5.9870E-08 1.0960E-07 -1.2500E-08 -6.4770E-09 8.7580E-08 6.5790E-08 -1.1330E-07 1.7150E-07 -2.3630E-07 5.9920E-08 1.0010E-07 -1.0760E-07 3.4900E-08 7.8910E-08 7.5360E-08 -1.2340E-07 2.0840E-07 -3.3820E-07 4.2790E-07 -1.0030E-06 8.4270E-07 5.6530E-09 8.8310E-07 -6.2340E-07
26 1.1500E-07 -1.5490E-06 1.1000E-06 1.4810E-07 -1.5590E-06 1.1270E-06 1.3300E-07 -1.5370E-06 1.0520E-06 1.1080E-07 -1.5330E-06 1.0200E-06 1.5560E-07 -1.5690E-06 1.1510E-06 8.5770E-08 -1.5780E-06 1.1150E-06 9.3880E-08 -1.5390E-06 1.0200E-06 1.6010E-07 -1.5900E-06 1.1980E-06 -1.0030E-06 1.2560E-05 -8.7830E-06 5.3890E-08 -8.8070E-07 7.1790E-07
27 -4.6310E-08 9.9920E-07 -8.3640E-07 -2.3340E-07 1.1760E-06 -1.0500E-06 -1.5390E-07 1.1240E-06 -6.8410E-07 -3.1820E-08 1.0510E-06 -4.8600E-07 -2.7470E-07 1.2300E-06 -1.1770E-06 1.2990E-07 9.2490E-07 -7.8380E-07 6.4900E-08 9.9000E-07 -4.3280E-07 -2.9760E-07 1.2880E-06 -1.3960E-06 8.4270E-07 -8.7830E-06 6.9570E-06 -5.0980E-08 2.3820E-06 -1.7280E-06
28 1.5030E-08 -3.2690E-09 6.1220E-09 1.6710E-08 -3.8470E-08 3.1760E-08 1.5820E-08 -1.7410E-08 8.0740E-09 1.2170E-08 1.4500E-08 -1.8730E-08 1.7130E-08 -4.9610E-08 4.1030E-08 3.8890E-09 5.6910E-08 -3.0600E-08 8.0620E-09 4.0230E-08 -3.6790E-08 1.6730E-08 -5.6750E-08 5.0020E-08 5.6530E-09 5.3890E-08 -5.0980E-08 3.3880E-06 -5.8090E-06 3.6100E-06
29 1.3210E-07 -2.1040E-07 -2.9160E-07 -6.7320E-07 6.7570E-07 -1.2810E-06 -3.3270E-07 1.1440E-07 5.4200E-07 2.0920E-07 -4.2740E-07 1.5560E-06 -8.4930E-07 1.0120E-06 -1.8920E-06 9.2720E-07 -8.0600E-07 8.1800E-08 6.4300E-07 -7.8860E-07 1.8390E-06 -9.3960E-07 1.4220E-06 -2.9360E-06 8.8310E-07 -8.8070E-07 2.3820E-06 -5.8090E-06 1.2420E-04 -7.7000E-05
30 -9.2810E-08 1.4360E-07 2.3260E-07 4.7390E-07 -5.0870E-07 9.4290E-07 2.3520E-07 -3.9330E-08 -3.9070E-07 -1.4690E-07 3.7380E-07 -1.1270E-06 5.9680E-07 -7.6480E-07 1.3840E-06 -6.4850E-07 5.4180E-07 -1.7670E-08 -4.5290E-07 6.2810E-07 -1.3260E-06 6.5890E-07 -1.0930E-06 2.1410E-06 -6.2340E-07 7.1790E-07 -1.7280E-06 3.6100E-06 -7.7000E-05 5.1760E-05

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

0.0000033880	-0.0000058090	0.0000036100
-0.0000058090	0.0001242000	-0.0000770000
0.0000036100	-0.0000770000	0.0000517600

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

0.0000031521	0.0000000200	0.0000026548
0.0000000200	0.0000030784	0.0000056825
0.0000026548	0.0000056825	0.0001731175

Horizontal network accuracy = 0.00432 meters.
Vertical network accuracy = 0.02580 meters.

		Vectors		
To	From	X	Y	Z
al90	mob_	28392.815	4081.498	5293.519
mssc	mob_	-123038.231	-16811.282	-24840.930
msev	mob_	-84580.827	53154.519	91131.053
albu	mob_	6627.400	83695.433	136951.742
mary	mob_	-151761.660	-36561.875	-58595.359
fle5	mob_	170174.446	8059.025	822.289
mlf5	mob_	85976.083	87240.810	137757.279
gris	mob_	-156003.515	-78100.714	-131562.517
alse	mob_	120707.390	110091.430	171257.148

Covariance matrix of the 9 vectors

1 3.6993E-06 -6.5881E-06 4.0954E-06 3.3167E-06 -5.8469E-06 3.6238E-06 3.3248E-06 -5.8598E-06 3.6664E-06 3.3376E-06 -5.8712E-06 3.6893E-06 3.3125E-06 -5.8393E-06 3.6097E-06 3.3542E-06 -5.8766E-06 3.6529E-06 3.3477E-06 -5.8783E-06 3.6951E-06 3.3104E-06 -5.8296E-06 3.5851E-06 3.3534E-06 -5.8800E-06 3.7075E-06

2 -6.5881E-06 1.3666E-04 -8.4284E-05 -5.0649E-06 1.2229E-04 -7.4978E-05 -5.3996E-06 1.2283E-04 -7.6759E-05 -5.9305E-06 1.2333E-04 -7.7739E-05 -4.8918E-06 1.2196E-04 -7.4382E-05 -6.6303E-06 1.2365E-04 -7.6265E-05 -6.3546E-06 1.2367E-04 -7.8002E-05 -4.8025E-06 1.2156E-04 -7.3357E-05 -6.5894E-06 1.2374E-04 -7.8526E-05

3 4.0954E-06 -8.4284E-05 5.6306E-05 3.1217E-06 -7.5374E-05 5.0097E-05 3.3407E-06 -7.5727E-05 5.1262E-05 3.6880E-06 -7.6058E-05 5.1903E-05 3.0086E-06 -7.5162E-05 4.9707E-05 4.1459E-06 -7.6268E-05 5.0940E-05 3.9655E-06 -7.6276E-05 5.2076E-05 2.9502E-06 -7.4900E-05 4.9037E-05 4.1190E-06 -7.6326E-05 5.2419E-05

4 3.3167E-06 -5.0649E-06 3.1217E-06 3.7525E-06 -5.4902E-06 3.4182E-06 3.3521E-06 -5.1040E-06 3.0748E-06 3.3157E-06 -5.0692E-06 3.0074E-06 3.3869E-06 -5.1642E-06 3.2392E-06 3.2678E-06 -5.0491E-06 3.1105E-06 3.2866E-06 -5.0468E-06 2.9897E-06 3.3930E-06 -5.1924E-06 3.3101E-06 3.2705E-06 -5.0416E-06 2.9537E-06

5 -5.8469E-06 1.2229E-04 -7.5374E-05 -5.4902E-06 1.3433E-04 -8.2230E-05 -5.4411E-06 1.2204E-04 -7.6126E-05 -5.9164E-06 1.2249E-04 -7.6998E-05 -4.9868E-06 1.2127E-04 -7.4002E-05 -6.5434E-06 1.2277E-04 -7.5675E-05 -6.2960E-06 1.2278E-04 -7.7231E-05 -4.9070E-06 1.2091E-04 -7.3086E-05 -6.5059E-06 1.2285E-04 -7.7697E-05

6 3.6238E-06 -7.4978E-05 5.0097E-05 3.4182E-06 -8.2230E-05 5.4662E-05 3.3784E-06 -7.4823E-05 5.0548E-05 3.6648E-06 -7.5093E-05 5.1073E-05 3.1046E-06 -7.4361E-05 4.9269E-05 4.0431E-06 -7.5262E-05 5.0277E-05 3.8938E-06 -7.5269E-05 5.1214E-05 3.0566E-06 -7.4146E-05 4.8718E-05 4.0202E-06 -7.5310E-05 5.1495E-05

7 3.3248E-06 -5.3996E-06 3.3407E-06 3.3521E-06 -5.4411E-06 3.3784E-06 3.7035E-06 -5.9250E-06 3.6356E-06 3.3263E-06 -5.4093E-06 3.2953E-06 3.3572E-06 -5.4510E-06 3.3963E-06 3.3053E-06 -5.4007E-06 3.3404E-06 3.3136E-06 -5.3995E-06 3.2876E-06 3.3599E-06 -5.4634E-06 3.4273E-06 3.3067E-06 -5.3972E-06 3.2719E-06

8 -5.8598E-06 1.2283E-04 -7.5727E-05 -5.1040E-06 1.2204E-04 -7.4823E-05 -5.9250E-06 1.3567E-04 -8.5128E-05 -5.9336E-06 1.2304E-04 -7.7468E-05 -4.9382E-06 1.2173E-04 -

7.4252E-05 -6.6045E-06 1.2333E-04 -7.6046E-05 -6.3402E-06 1.2336E-04 -7.7717E-05 -4.8529E-06 1.2134E-04 -7.3269E-05 -6.5651E-06 1.2343E-04 -7.8219E-05

9 3.6664E-06 -7.6759E-05 5.1262E-05 3.0748E-06 -7.6126E-05 5.0548E-05 3.6356E-06 -8.5128E-05 5.7997E-05 3.7210E-06 -7.6907E-05 5.2609E-05 2.9457E-06 -7.5884E-05 5.0103E-05 4.2433E-06 -7.7133E-05 5.1501E-05 4.0377E-06 -7.7150E-05 5.2804E-05 2.8791E-06 -7.5583E-05 4.9337E-05 4.2128E-06 -7.7208E-05 5.3195E-05

10 3.3376E-06 -5.9305E-06 3.6880E-06 3.3157E-06 -5.9164E-06 3.6648E-06 3.3263E-06 -5.9336E-06 3.7210E-06 3.7002E-06 -6.7056E-06 4.2385E-06 3.3102E-06 -5.9063E-06 3.6461E-06 3.3647E-06 -5.9575E-06 3.7044E-06 3.3563E-06 -5.9589E-06 3.7596E-06 3.3074E-06 -5.8935E-06 3.6138E-06 3.3637E-06 -5.9613E-06 3.7761E-06

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Correlation matrix of the 9 vectors
1 1.0000E+00 -2.9301E-01 2.8376E-01 8.9020E-01 -2.6229E-01 2.5484E-01 8.9826E-01 -2.6156E-01 2.5031E-01 9.0211E-01 -2.6066E-01 2.4727E-01 8.8488E-01 -2.6271E-01 2.5597E-01 8.9138E-01 -2.5966E-01 2.5158E-01 8.9819E-01 -2.5997E-01 2.4636E-01 8.8116E-01 -2.6312E-01 2.5748E-01 8.9385E-01 -2.5975E-01 2.4446E-01
2 -2.9301E-01 1.0000E+00 -9.6083E-01 -2.2366E-01 9.0256E-01 -8.6750E-01 -2.4002E-01 9.0204E-01 -8.6219E-01 -2.6373E-01 9.0089E-01 -8.5722E-01 -2.1500E-01 9.0281E-01 -8.6781E-01 -2.8990E-01 8.9892E-01 -8.6418E-01 -2.8051E-01 8.9983E-01 -8.5566E-01 -2.1032E-01 9.0272E-01 -8.6681E-01 -2.8898E-01 8.9937E-01 -8.5191E-01
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4 8.9020E-01 -2.2366E-01 2.1476E-01 1.0000E+00 -2.4454E-01 2.3867E-01 8.9920E-01 -2.2621E-01 2.0843E-01 8.8982E-01 -2.2345E-01 2.0013E-01 8.9831E-01 -2.3069E-01 2.2806E-01 8.6224E-01 -2.2151E-01 2.1270E-01 8.7553E-01 -2.2161E-01 1.9792E-01 8.9672E-01 -2.3269E-01 2.3604E-01 8.6558E-01 -2.2113E-01 1.9338E-01

5 -2.6229E-01 9.0256E-01 -8.6669E-01 -2.4454E-01 1.0000E+00 -9.5963E-01 -2.4395E-01 9.0400E-01 -8.6247E-01 -2.6538E-01 9.0244E-01 -8.5640E-01 -2.2107E-01 9.0545E-01 -8.7085E-01 -2.8857E-01 9.0018E-01 -8.6491E-01 -2.8032E-01 9.0111E-01 -8.5452E-01 -2.1676E-01 9.0566E-01 -8.7108E-01 -2.8779E-01 9.0057E-01 -8.5020E-01

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22 8.8116E-01 -2.1032E-01 2.0128E-01 8.9672E-01 -2.1676E-01 2.1166E-01 8.9383E-01 -2.1330E-01 1.9355E-01 8.8026E-01 -2.0996E-01 1.8360E-01 8.9699E-01 -2.1883E-01 2.1758E-01 8.4743E-01 -2.0770E-01 1.9874E-01 8.6270E-01 -2.0775E-01 1.8097E-01 1.0000E+00 -2.3168E-01 2.3938E-01 8.5099E-01 -2.0719E-01 1.7560E-01

23 -2.6312E-01 9.0272E-01 -8.6651E-01 -2.3269E-01 9.0566E-01 -8.7059E-01 -2.4645E-01 9.0436E-01 -8.6157E-01 -2.6597E-01 9.0247E-01 -8.5462E-01 -2.2534E-01 9.0636E-01 -8.7219E-01 -2.8671E-01 9.0008E-01 -8.6448E-01 -2.7941E-01 9.0095E-01 -8.5251E-01 -2.3168E-01 1.0000E+00 -9.5622E-01 -2.8604E-01 9.0036E-01 -8.4775E-01

24 2.5748E-01 -8.6681E-01 9.0272E-01 2.3604E-01 -8.7108E-01 9.1023E-01 2.4601E-01 -8.6893E-01 8.9491E-01 2.5951E-01 -8.6631E-01 8.8458E-01 2.3062E-01 -8.7229E-01 9.1395E-01 2.7261E-01 -8.6354E-01 8.9962E-01 2.6824E-01 -8.6432E-01 8.8161E-01 2.3938E-01 -9.5622E-01 1.0000E+00 2.7231E-01 -8.6363E-01 8.7508E-01

25 8.9385E-01 -2.8898E-01 2.8142E-01 8.6558E-01 -2.8779E-01 2.7878E-01 8.8091E-01 -2.8896E-01 2.8361E-01 8.9651E-01 -2.8977E-01 2.8536E-01 8.5659E-01 -2.8708E-01 2.7663E-01 9.0102E-01 -2.8969E-01 2.8227E-01 9.0194E-01 -2.9015E-01 2.8570E-01 8.5099E-01 -2.8604E-01 2.7231E-01 1.0000E+00 -3.3755E-01 3.3336E-01

26 -2.5975E-01 8.9937E-01 -8.6425E-01 -2.2113E-01 9.0057E-01 -8.6547E-01 -2.3829E-01 9.0036E-01 -8.6139E-01 -2.6331E-01 8.9947E-01 -8.5709E-01 -2.1207E-01 9.0066E-01 -8.6536E-01 -2.9116E-01 8.9759E-01 -8.6308E-01 -2.8113E-01 8.9857E-01 -8.5571E-01 -2.0719E-01 9.0036E-01 -8.6363E-01 -3.3755E-01 1.0000E+00 -9.5776E-01

27 2.4446E-01 -8.5191E-01 8.8595E-01 1.9338E-01 -8.5020E-01 8.8333E-01 2.1562E-01 -8.5166E-01 8.8585E-01 2.4896E-01 -8.5234E-01 8.8493E-01 1.8176E-01 -8.4928E-01 8.8091E-01 2.8778E-01 -8.5144E-01 8.8571E-01 2.7348E-01 -8.5245E-01 8.8442E-01 1.7560E-01 -8.4775E-01 8.7508E-01 3.3336E-01 -9.5776E-01 1.0000E+00

G-FILE for the vectors

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ITRF position of mob_ as determined by individual baselines

	X	Y	Z
al90	160153.187	-5490393.229	3231162.810
mssc	160153.184	-5490393.237	3231162.822
msev	160153.182	-5490393.236	3231162.818
albu	160153.178	-5490393.238	3231162.830
mary	160153.182	-5490393.218	3231162.822
fle5	160153.172	-5490393.318	3231162.883
mlf5	160153.173	-5490393.228	3231162.829
gris	160153.182	-5490393.231	3231162.826
alse	160153.181	-5490393.256	3231162.837

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
al90	0.006	0.002	-0.013	0.006	-0.011	-0.008
mssc	0.003	-0.006	-0.002	0.003	-0.005	0.005
msev	0.001	-0.005	-0.006	0.001	-0.008	0.002
albu	-0.003	-0.008	0.006	-0.003	0.002	0.010
mary	0.001	0.012	-0.002	0.002	0.005	-0.011
fle5	-0.009	-0.087	0.059	-0.011	0.007	0.105
mlf5	-0.008	0.002	0.005	-0.008	0.006	0.001

gris	0.001	-0.001	0.003	0.001	0.002	0.002
alse	0.001	-0.025	0.014	0.000	-0.001	0.029

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

dop from interpolation is 0.385
scatter (mean square distance from rover) is 28387.063
average edop for rover is 1.150
average ndop for rover is 1.000
average hdop for rover is 1.524
average vdop for rover is 3.080
average gdop for rover is 4.140

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

FILE: MOB_02.14O OP1393267310472

NGS OPUS-RS SOLUTION REPORT
==========

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

USER: blkimbrough@theatlgrp.com DATE: February 24, 2014
RINEX FILE: mob_047p.14o TIME: 19:03:49 UTC

SOFTWARE: rsgps 1.37 RS53.prl 1.89 START: 2014/02/16 15:07:38
EPHEMERIS: igr17800.eph [rapid] STOP: 2014/02/16 15:28:00
NAV FILE: brdc0470.14n OBS USED: 1908 / 2070 : 92%
ANT NAME: TPSHIPER_V NONE QUALITY IND. 5.54/ 19.54
ARP HEIGHT: 2.00 NORMALIZED RMS: 0.267

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.12777)

X:	174003.569(m)	0.005(m)	174002.798(m)	0.005(m)
Y:	-5511641.979(m)	0.023(m)	-5511640.474(m)	0.023(m)
Z:	3194222.414(m)	0.011(m)	3194222.240(m)	0.011(m)

LAT:	30 14 55.92335	0.004(m)	30 14 55.94347	0.004(m)
E LON:	271 48 29.65644	0.005(m)	271 48 29.62940	0.005(m)
W LON:	88 11 30.34356	0.005(m)	88 11 30.37060	0.005(m)
EL HGT:	-26.376(m)	0.026(m)	-27.784(m)	0.026(m)
ORTHO HGT:	1.339(m)	0.028(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES UTM (Zone 16)	STATE PLANE COORDINATES SPC (0102 AL W)
Northing (Y) [meters]	3346963.187	27788.729
Easting (X) [meters]	385341.083	533425.253
Convergence [degrees]	-0.60042398	-0.34849276
Point Scale	0.99976219	0.99998799
Combined Factor	0.99976633	0.99999213

US NATIONAL GRID DESIGNATOR: 16RCU8534146963(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL3486	ALDI DAUPHIN ISLAND CORS ARP	N301456.987	W0880440.688	10952.0
DI3826	AL90 ALDOT 9 DIV OFF CORS ARP	N304126.969	W0880154.137	51349.5
DM2660	AL92 ALDOT 9 DIV DIS 2 CORS ARP	N305458.985	W0874632.462	84077.5
DN8737	MSIN INFINITY CENTER CORS ARP	N301842.205	W0893615.507	136081.2

DM5371 ALEB WS NEAL SCHOOL CORS ARP N310529.223 W0870320.306 143451.6
DE8091 BVHS BOOTHVILLE CORS ARP N292012.489 W0892423.010 154955.1
DL9796 AL84 ALDOT 8 DIV DIS 4 CORS ARP N314201.327 W0874720.982 165454.6
DK3577 ENG5 ENGLISH TURN 5 CORS ARP N295244.246 W0895630.197 173641.7
DN7498 MSEV ELLISVILLE CORS ARP N313542.081 W0891213.274 177838.5

NEAREST NGS PUBLISHED CONTROL POINT
BH2150 MID N301450.092 W0881131.002 181.2

OPUS-RS Extended Output, Level 2

FINAL COORDINATES (ITRF at epoch of observations)

aldi	184948.620	-5511274.929	3194254.873
al90	188546.000	-5486311.745	3236456.340
al92	212564.685	-5472685.332	3257975.722
msin	38057.833	-5510749.358	3200244.184
aleb	280806.416	-5459556.666	3274587.861
bvhs	57650.125	-5564331.446	3106490.826
al84	209536.475	-5427642.096	3332268.817
eng5	5629.114	-5534934.112	3158737.871
msev	75572.358	-5437238.711	3322293.869
mob_	174002.798	-5511640.474	3194222.240

Covariance matrix of the stations:
1 2.2510E-07 -2.2420E-08 -7.8040E-09 4.5010E-09 1.0640E-07 -5.2000E-08 1.0620E-08 1.5160E-07 -6.9110E-08 -4.3240E-08 -1.7960E-07 8.5050E-08 2.6070E-08 2.5410E-07 -1.1960E-07 -3.6910E-08 -1.8440E-07 5.1800E-08 9.9070E-09 1.7650E-07 -5.7870E-08 -5.6530E-08 -2.7000E-07 1.1490E-07 -2.8320E-08 -3.2070E-08 5.4490E-08 2.6900E-08 2.6350E-07 -1.5030E-07
2 -2.2420E-08 1.1190E-05 -5.7100E-06 8.9790E-08 -8.7940E-07 4.5740E-07 1.1750E-07 -6.5140E-07 3.6870E-07 -1.3040E-07 -2.2770E-06 1.1270E-06 1.8780E-07 -1.5700E-07 1.2580E-07 -1.0200E-07 -2.3850E-06 1.0150E-06 1.1340E-07 -4.9160E-07 3.9630E-07 -1.9310E-07 -2.7530E-06 1.2940E-06 -6.0660E-08 -1.4800E-06 9.2630E-07 5.4490E-08 1.2240E-06 -6.8180E-07
3 -7.8040E-09 -5.7100E-06 3.1880E-06 -5.7950E-08 3.9140E-07 -2.2010E-07 -7.7150E-08 2.4860E-07 -1.6680E-07 9.2120E-08 1.2840E-06 -6.4550E-07 -1.2600E-07 -7.4390E-08 -8.9110E-09 7.1530E-08 1.3070E-06 -5.4320E-07 -7.4380E-08 1.6760E-07 -2.0300E-07 1.3340E-07 1.5670E-06 -7.3740E-07 4.6210E-08 8.1960E-07 -5.5230E-07 -3.6840E-08 -8.2250E-07 4.8100E-07
4 4.5010E-09 8.9790E-08 -5.7950E-08 2.2630E-07 -5.0100E-09 -2.7550E-09 1.2040E-08 1.5950E-07 -7.2700E-08 -4.4960E-08 -1.8810E-07 8.8900E-08 2.8440E-08 2.6730E-07 -1.2580E-07 -3.8280E-08 -1.9360E-07 5.3980E-08 1.1280E-08 1.8600E-07 -6.0860E-08 -

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8 1.5160E-07 -6.5140E-07 2.4860E-07 1.5950E-07 -4.4890E-07 2.6170E-07 4.9330E-08 1.0950E-05 -5.6130E-06 -2.4350E-07 -2.7770E-06 1.3690E-06 3.4350E-07 7.8400E-07 -2.9750E-07 -1.9040E-07 -2.9290E-06 1.1450E-06 2.0360E-07 1.9850E-07 1.8520E-07 -3.5490E-07 -3.5440E-06 1.6230E-06 -1.1890E-07 -1.4700E-06 1.0780E-06 1.0960E-07 2.1440E-06 -1.2000E-06

9 -6.9110E-08 3.6870E-07 -1.6680E-07 -7.2700E-08 2.8820E-07 -1.7950E-07 -1.9960E-08 -5.6130E-06 3.1570E-06 1.1040E-07 1.3500E-06 -6.8440E-07 -1.5640E-07 -2.7030E-07 7.3020E-08 8.5490E-08 1.3830E-06 -5.6300E-07 -9.2890E-08 1.6140E-08 -1.5880E-07 1.6060E-07 1.6870E-06 -7.9270E-07 5.4490E-08 7.9070E-07 -5.7350E-07 -5.0580E-08 -9.5660E-07 5.4950E-07

10 -4.3240E-08 -1.3040E-07 9.2120E-08 -4.4960E-08 -1.6890E-07 8.4600E-08 -5.7300E-08 -2.4350E-07 1.1040E-07 2.7410E-07 5.6230E-07 -2.8160E-07 -8.9520E-08 -4.1240E-07 1.9170E-07 3.4790E-08 2.8070E-07 -5.7890E-08 -5.5190E-08 -2.9480E-07 8.8840E-08 7.1660E-08 3.8710E-07 -1.4920E-07 2.0720E-08 1.9530E-08 -7.8720E-08 -1.0990E-08 -5.2790E-07 3.0130E-07

11 -1.7960E-07 -2.2770E-06 1.2840E-06 -1.8810E-07 -2.4350E-06 1.2340E-06 -2.4780E-07 -2.7770E-06 1.3500E-06 5.6230E-07 1.5900E-05 -8.0150E-06 -4.0340E-07 -3.5730E-06 1.7340E-06 1.9460E-07 -4.1430E-07 6.1670E-07 -2.3840E-07 -2.9770E-06 1.2210E-06 3.7190E-07 1.3890E-07 1.5760E-07 1.2880E-07 -1.4730E-06 4.1710E-07 -1.4890E-07 -2.9630E-06 1.6770E-06

12 8.5050E-08 1.1270E-06 -6.4550E-07 8.8900E-08 1.2100E-06 -6.2950E-07 1.1600E-07 1.3690E-06 -6.8440E-07 -2.8160E-07 -8.0150E-06 4.3100E-06 1.8680E-07 1.7300E-06 -8.5830E-07 -8.6000E-08 2.5920E-07 -3.3050E-07 1.1160E-07 1.4790E-06 -6.3740E-07 -1.6630E-07 3.0450E-08 -1.3370E-07 -5.4680E-08 8.0970E-07 -2.7960E-07 7.0610E-08 1.3820E-06 -7.6500E-07

13 2.6070E-08 1.8780E-07 -1.2600E-07 2.8440E-08 2.3840E-07 -1.1780E-07 4.3800E-08 3.4350E-07 -1.5640E-07 -8.9520E-08 -4.0340E-07 1.8680E-07 3.0940E-07 3.1680E-07 -1.4000E-07 -7.3630E-08 -4.2260E-07 1.0910E-07 4.1700E-08 4.0680E-07 -1.2880E-07 -1.2150E-07 -6.0380E-07 2.4920E-07 -5.3630E-08 -6.2930E-08 1.2330E-07 4.0310E-08 6.6270E-07 -3.7830E-07

14 2.5410E-07 -1.5700E-07 -7.4390E-08 2.6730E-07 1.6250E-07 -4.0530E-08 3.5550E-07 7.8400E-07 -2.7030E-07 -4.1240E-07 -3.5730E-06 1.7300E-06 3.1680E-07 1.1760E-05 -5.9580E-06 -3.2140E-07 -3.7800E-06 1.3300E-06 3.4230E-07 1.1970E-06 -1.3710E-07 -5.9720E-07 -4.7750E-06 2.1120E-06 -2.0520E-07 -1.5040E-06 1.3090E-06 1.8850E-07 3.7730E-06 -2.1230E-06

15 -1.1960E-07 1.2580E-07 -8.9110E-09 -1.2580E-07 -1.1300E-08 -3.1760E-08 -1.6700E-07 -2.9750E-07 7.3020E-08 1.9170E-07 1.7340E-06 -8.5830E-07 -1.4000E-07 -5.9580E-06 3.3030E-06 1.4830E-07 1.7930E-06 -6.5120E-07 -1.6090E-07 -4.7070E-07 -1.5520E-09 2.7750E-07 2.2810E-06 -1.0290E-06 9.5700E-08 8.0510E-07 -6.8450E-07 -8.9590E-08 -1.7490E-06 9.9810E-07

16 -3.6910E-08 -1.0200E-07 7.1530E-08 -3.8280E-08 -1.3240E-07 6.5610E-08 -4.8050E-08 -1.9040E-07 8.5490E-08 3.4790E-08 1.9460E-07 -8.6000E-08 -7.3630E-08 -3.2140E-07 1.4830E-07 2.5240E-07 4.7950E-07 -1.8140E-07 -4.6360E-08 -2.3150E-07 6.8670E-08 5.3590E-08 2.9380E-07 -1.1240E-07 1.3610E-08 9.5550E-09 -5.9590E-08 -6.3100E-09 -4.1900E-07 2.3810E-07

17 -1.8440E-07 -2.3850E-06 1.3070E-06 -1.9360E-07 -2.5610E-06 1.2580E-06 -2.5720E-07 -2.9290E-06 1.3830E-06 2.8070E-07 -4.1430E-07 2.5920E-07 -4.2260E-07 -3.7800E-06 1.7930E-06 4.7950E-07 1.6670E-05 -7.7440E-06 -2.4760E-07 -3.1530E-06 1.2520E-06 4.0300E-07 2.1180E-07 9.6400E-08 1.4250E-07 -1.5490E-06 3.9600E-07 -1.5100E-07 -3.1930E-06 1.7640E-06

18 5.1800E-08 1.0150E-06 -5.4320E-07 5.3980E-08 1.0630E-06 -5.3550E-07 6.9210E-08 1.1450E-06 -5.6300E-07 -5.7890E-08 6.1670E-07 -3.3050E-07 1.0910E-07 1.3300E-06 -6.5120E-07 -1.8140E-07 -7.7440E-06 3.9370E-06 6.6780E-08 1.2090E-06 -5.3960E-07 -8.6360E-08 4.8230E-07 -2.9770E-07 -2.5360E-08 8.8250E-07 -3.6570E-07 4.4990E-08 8.9360E-07 -4.6380E-07

19 9.9070E-09 1.1340E-07 -7.4380E-08 1.1280E-08 1.4240E-07 -7.0030E-08 1.9870E-08 2.0360E-07 -9.2890E-08 -5.5190E-08 -2.3840E-07 1.1160E-07 4.1700E-08 3.4230E-07 -1.6090E-07 -4.6360E-08 -2.4760E-07 6.6780E-08 2.3800E-07 8.1940E-08 -2.7170E-09 -7.3480E-08 -3.5830E-07 1.5020E-07 -3.4640E-08 -3.9000E-08 7.2050E-08 2.8530E-08 3.7470E-07 -2.1370E-07

20 1.7650E-07 -4.9160E-07 1.6760E-07 1.8600E-07 -2.5380E-07 1.8530E-07 2.4810E-07 1.9850E-07 1.6140E-08 -2.9480E-07 -2.9770E-06 1.4790E-06 4.0680E-07 1.1970E-06 -4.7070E-07 -2.3150E-07 -3.1530E-06 1.2090E-06 8.1940E-08 1.0910E-05 -5.5030E-06 -4.2700E-07 -3.8690E-06 1.7690E-06 -1.4650E-07 -1.4480E-06 1.1470E-06 1.2780E-07 2.6250E-06 -1.4510E-06

21 -5.7870E-08 3.9630E-07 -2.0300E-07 -6.0860E-08 3.2860E-07 -2.1250E-07 -8.0040E-08 1.8520E-07 -1.5880E-07 8.8840E-08 1.2210E-06 -6.3740E-07 -1.2880E-07 -1.3710E-07 -1.5520E-09 6.8670E-08 1.2520E-06 -5.3960E-07 -2.7170E-09 -5.5030E-06 3.1350E-06 1.3030E-07 1.5080E-06 -7.3110E-07 4.2650E-08 7.4920E-07 -5.3960E-07 -4.2130E-08 -7.8840E-07 4.3900E-07

22 -5.6530E-08 -1.9310E-07 1.3340E-07 -5.9000E-08 -2.4770E-07 1.2310E-07 -7.6340E-08 -3.5490E-07 1.6060E-07 7.1660E-08 3.7190E-07 -1.6630E-07 -1.2150E-07 -5.9720E-07 2.7750E-07 5.3590E-08 4.0300E-07 -8.6360E-08 -7.3480E-08 -4.2700E-07 1.3030E-07 3.3930E-07 1.0160E-06 -4.5890E-07 3.3340E-08 2.8920E-08 -1.1310E-07 -2.1020E-08 -7.4770E-07 4.2570E-07

23 -2.7000E-07 -2.7530E-06 1.5670E-06 -2.8290E-07 -3.0090E-06 1.5020E-06 -3.7210E-07 -3.5440E-06 1.6870E-06 3.8710E-07 1.3890E-07 3.0450E-08 -6.0380E-07 -4.7750E-06 2.2810E-06 2.9380E-07 2.1180E-07 4.8230E-07 -3.5830E-07 -3.8690E-06 1.5080E-06

1.0160E-06 1.9240E-05 -9.3110E-06 1.9100E-07 -1.5270E-06 2.5550E-07 -2.2000E-07 -4.3620E-06 2.4480E-06
24 1.1490E-07 1.2940E-06 -7.3740E-07 1.2000E-07 1.4060E-06 -7.1710E-07 1.5590E-07 1.6230E-06 -7.9270E-07 -1.4920E-07 1.5760E-07 -1.3370E-07 2.4920E-07 2.1120E-06 -1.0290E-06 -1.1240E-07 9.6400E-08 -2.9770E-07 1.5020E-07 1.7690E-06 -7.3110E-07 -4.5890E-07 -9.3110E-06 4.7900E-06 -6.9980E-08 8.5220E-07 -2.4060E-07 9.4700E-08 1.8200E-06 -1.0000E-06
25 -2.8320E-08 -6.0660E-08 4.6210E-08 -2.9200E-08 -8.0790E-08 4.1760E-08 -3.5920E-08 -1.1890E-07 5.4490E-08 2.0720E-08 1.2880E-07 -5.4680E-08 -5.3630E-08 -2.0520E-07 9.5700E-08 1.3610E-08 1.4250E-07 -2.5360E-08 -3.4640E-08 -1.4650E-07 4.2650E-08 3.3340E-08 1.9100E-07 -6.9980E-08 2.2500E-07 1.4950E-07 -1.3060E-07 2.4070E-10 -2.8130E-07 1.6180E-07
26 -3.2070E-08 -1.4800E-06 8.1960E-07 -3.2800E-08 -1.4660E-06 7.9650E-07 -4.0760E-08 -1.4700E-06 7.9070E-07 1.9530E-08 -1.4730E-06 8.0970E-07 -6.2930E-08 -1.5040E-06 8.0510E-07 9.5550E-09 -1.5490E-06 8.8250E-07 -3.9000E-08 -1.4480E-06 7.4920E-07 2.8920E-08 -1.5270E-06 8.5220E-07 1.4950E-07 1.2030E-05 -6.5060E-06 -3.5340E-08 -5.4960E-07 3.5750E-07
27 5.4490E-08 9.2630E-07 -5.5230E-07 5.6950E-08 9.7800E-07 -5.3980E-07 7.5260E-08 1.0780E-06 -5.7350E-07 -7.8720E-08 4.1710E-07 -2.7960E-07 1.2330E-07 1.3090E-06 -6.8450E-07 -5.9590E-08 3.9600E-07 -3.6570E-07 7.2050E-08 1.1470E-06 -5.3960E-07 -1.1310E-07 2.5550E-07 -2.4060E-07 -1.3060E-07 -6.5060E-06 3.8870E-06 4.5950E-08 9.1090E-07 -5.2890E-07
28 2.6900E-08 5.4490E-08 -3.6840E-08 2.4510E-08 7.4900E-08 -3.7220E-08 2.9010E-08 1.0960E-07 -5.0580E-08 -1.0990E-08 -1.4890E-07 7.0610E-08 4.0310E-08 1.8850E-07 -8.9590E-08 -6.3100E-09 -1.5100E-07 4.4990E-08 2.8530E-08 1.2780E-07 -4.2130E-08 -2.1020E-08 -2.2000E-07 9.4700E-08 2.4070E-10 -3.5340E-08 4.5950E-08 2.0130E-06 -6.3930E-07 2.3900E-07
29 2.6350E-07 1.2240E-06 -8.2250E-07 2.8460E-07 1.4140E-06 -6.8930E-07 3.9050E-07 2.1440E-06 -9.5660E-07 -5.2790E-07 -2.9630E-06 1.3820E-06 6.6270E-07 3.7730E-06 -1.7490E-06 -4.1900E-07 -3.1930E-06 8.9360E-07 3.7470E-07 2.6250E-06 -7.8840E-07 -7.4770E-07 -4.3620E-06 1.8200E-06 -2.8130E-07 -5.4960E-07 9.1090E-07 -6.3930E-07 1.1980E-04 -6.0890E-05
30 -1.5030E-07 -6.8180E-07 4.8100E-07 -1.6210E-07 -7.9170E-07 4.0160E-07 -2.2260E-07 -1.2000E-06 5.4950E-07 3.0130E-07 1.6770E-06 -7.6500E-07 -3.7830E-07 -2.1230E-06 9.9810E-07 2.3810E-07 1.7640E-06 -4.6380E-07 -2.1370E-07 -1.4510E-06 4.3900E-07 4.2570E-07 2.4480E-06 -1.0000E-06 1.6180E-07 3.5750E-07 -5.2890E-07 2.3900E-07 -6.0890E-05 3.3480E-05

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

0.0000020130	-0.0000006393	0.0000002390
-0.0000006393	0.0001198000	-0.0000608900
0.0000002390	-0.0000608900	0.0000334800

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

0.0000020900	0.0000000863	-0.0000035057
0.0000000863	0.0000023482	-0.0000071225
-0.0000035057	-0.0000071225	0.0001508548

Horizontal network accuracy = 0.00364 meters.
Vertical network accuracy = 0.02408 meters.

		Vectors		
To	From	X	Y	Z
aldi	mob_	10945.822	365.545	32.633
al90	mob_	14543.201	25328.729	42234.100
al92	mob_	38561.887	38955.142	63753.482
msin	mob_	-135944.965	891.116	6021.944
aleb	mob_	106803.618	52083.807	80365.621
bvhs	mob_	-116352.673	-52690.973	-87731.414
al84	mob_	35533.677	83998.377	138046.578
eng5	mob_	-168373.684	-23293.638	-35484.369
msev	mob_	-98430.440	74401.763	128071.629

Covariance matrix of the 9 vectors

1 2.1843E-06 -9.7971E-07 4.1834E-07 1.9661E-06 -8.7130E-07 3.7452E-07 1.9677E-06 -8.6080E-07 3.7077E-07 1.9538E-06 -9.3350E-07 4.0374E-07 1.9719E-06 -8.3720E-07 3.5929E-07 1.9555E-06 -9.3620E-07 3.9611E-07 1.9675E-06 -8.5410E-07 3.7356E-07 1.9506E-06 -9.5280E-07 4.0950E-07 1.9575E-06 -8.9953E-07 3.9784E-07

2 -9.7971E-07 1.2854E-04 -6.5096E-05 -8.8860E-07 1.1628E-04 -5.9062E-05 -9.6679E-07 1.1578E-04 -5.8883E-05 -2.9629E-07 1.1926E-04 -6.0463E-05 -1.1687E-06 1.1465E-04 -5.8333E-05 -3.7679E-07 1.1938E-04 -6.0087E-05 -9.5509E-07 1.1546E-04 -5.9024E-05 -1.3919E-07 1.2019E-04 -6.0734E-05 -4.7315E-07 1.1765E-04 -6.0193E-05

3 4.1834E-07 -6.5096E-05 3.5706E-05 3.7999E-07 -5.8884E-05 3.2377E-05 4.2129E-07 -5.8619E-05 3.2283E-05 6.6660E-08 -6.0461E-05 3.3118E-05 5.2814E-07 -5.8019E-05 3.1992E-05 1.0927E-07 -6.0524E-05 3.2920E-05 4.1516E-07 -5.8449E-05 3.2357E-05 -1.6460E-08 -6.0949E-05 3.3262E-05 1.6025E-07 -5.9605E-05 3.2976E-05

4 1.9661E-06 -8.8860E-07 3.7999E-07 2.1903E-06 -1.0038E-06 4.3556E-07 1.9715E-06 -8.7400E-07 3.7898E-07 1.9545E-06 -9.6310E-07 4.1939E-07 1.9766E-06 -8.4510E-07 3.6489E-07 1.9565E-06 -9.6650E-07 4.1009E-07 1.9712E-06 -8.6570E-07 3.8237E-07 1.9505E-06 -9.8680E-07 4.2640E-07 1.9590E-06 -9.2136E-07 4.1210E-07

5 -8.7130E-07 1.1628E-04 -5.8884E-05 -1.0038E-06 1.2797E-04 -6.5063E-05 -9.5710E-07 1.1579E-04 -5.8854E-05 -3.5520E-07 1.1891E-04 -6.0270E-05 -1.1385E-06 1.1478E-04 -5.8361E-05 -4.2760E-07 1.1902E-04 -5.9929E-05 -9.4650E-07 1.1551E-04 -5.8981E-05 -2.1420E-07 1.1974E-04 -6.0512E-05 -5.1369E-07 1.1747E-04 -6.0031E-05

6 3.7452E-07 -5.9062E-05 3.2377E-05 4.3556E-07 -6.5063E-05 3.5854E-05 4.2628E-07 -5.8739E-05 3.2349E-05 5.9520E-08 -6.0644E-05 3.3214E-05 5.3672E-07 -5.8118E-05 3.2049E-05 1.0373E-07 -6.0707E-05 3.3007E-05 4.1989E-07 -5.8564E-05 3.2427E-05 -2.6380E-08 -6.1147E-05 3.3361E-05 1.5618E-07 -5.9762E-05 3.3067E-05

7 1.9677E-06 -9.6679E-07 4.2129E-07 1.9715E-06 -9.5710E-07 4.2628E-07 2.1974E-06 -1.0901E-06 4.9222E-07 1.9377E-06 -1.1287E-06 5.0699E-07 1.9875E-06 -8.6280E-07 3.8419E-07 1.9422E-06 -1.1360E-06 4.8582E-07 1.9753E-06 -9.0950E-07 4.2369E-07 1.9287E-06 -1.1819E-06 5.2280E-07 1.9478E-06 -1.0352E-06 4.9091E-07

8 -8.6080E-07 1.1578E-04 -5.8619E-05 -8.7400E-07 1.1579E-04 -5.8739E-05 -1.0901E-06 1.2646E-04 -6.4346E-05 -4.6450E-07 1.1784E-04 -5.9703E-05 -1.0681E-06 1.1467E-04 -

5.8239E-05 -5.2030E-07 1.1792E-04 -5.9439E-05 -9.2000E-07 1.1523E-04 -5.8716E-05 -3.5610E-07 1.1847E-04 -5.9887E-05 -5.8650E-07 1.1674E-04 -5.9523E-05
9 3.7077E-07 -5.8883E-05 3.2283E-05 3.7898E-07 -5.8854E-05 3.2349E-05 4.9222E-07 -6.4346E-05 3.5538E-05 9.8680E-08 -6.0260E-05 3.3011E-05 5.1148E-07 -5.8081E-05 3.2005E-05 1.3697E-07 -6.0314E-05 3.2831E-05 4.1039E-07 -5.8466E-05 3.2333E-05 2.4480E-08 -6.0694E-05 3.3138E-05 1.8227E-07 -5.9500E-05 3.2886E-05
10 1.9538E-06 -2.9629E-07 6.6660E-08 1.9545E-06 -3.5520E-07 5.9520E-08 1.9377E-06 -4.6450E-07 9.8680E-08 2.3091E-06 5.9980E-07 -4.1451E-07 1.8942E-06 -7.1230E-07 2.1899E-07 2.0651E-06 3.2030E-07 -1.6518E-07 1.9403E-06 -5.3400E-07 6.8670E-08 2.1167E-06 4.9570E-07 -3.0620E-07 2.0445E-06 -5.6530E-08 -1.8697E-07
11 -9.3350E-07 1.1926E-04 -6.0461E-05 -9.6310E-07 1.1891E-04 -6.0644E-05 -1.1287E-06 1.1784E-04 -6.0260E-05 5.9980E-07 1.4163E-04 -7.1964E-05 -1.5565E-06 1.1542E-04 -5.9084E-05 1.2320E-07 1.2554E-04 -6.2844E-05 -1.1035E-06 1.1716E-04 -6.0558E-05 6.2920E-07 1.2726E-04 -6.4229E-05 -8.0300E-08 1.2184E-04 -6.3061E-05
12 4.0374E-07 -6.0463E-05 3.3118E-05 4.1939E-07 -6.0270E-05 3.3214E-05 5.0699E-07 -5.9703E-05 3.3011E-05 -4.1451E-07 -7.1964E-05 3.9320E-05 7.3349E-07 -5.8419E-05 3.2389E-05 -1.5571E-07 -6.3777E-05 3.4378E-05 4.9369E-07 -5.9342E-05 3.3169E-05 -4.2361E-07 -6.4690E-05 3.5111E-05 -4.8090E-08 -6.1820E-05 3.4494E-05
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15 3.5929E-07 -5.8333E-05 3.1992E-05 3.6489E-07 -5.8361E-05 3.2049E-05 3.8419E-07 -5.8239E-05 3.2005E-05 2.1899E-07 -5.9084E-05 3.2389E-05 5.6689E-07 -6.2976E-05 3.4787E-05 2.3879E-07 -5.9112E-05 3.2295E-05 3.8139E-07 -5.8161E-05 3.2041E-05 1.8039E-07 -5.9308E-05 3.2453E-05 2.6249E-07 -5.8693E-05 3.2326E-05
16 1.9555E-06 -3.7679E-07 1.0927E-07 1.9565E-06 -4.2760E-07 1.0373E-07 1.9422E-06 -5.2030E-07 1.3697E-07 2.0651E-06 1.2320E-07 -1.5571E-07 1.9054E-06 -7.3020E-07 2.3879E-07 2.2780E-06 4.1020E-07 -2.2549E-07 1.9444E-06 -5.7960E-07 1.1170E-07 2.0939E-06 2.9350E-07 -2.0620E-07 2.0327E-06 -1.7540E-07 -1.0464E-07
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23 -9.5280E-07 1.2019E-04 -6.0949E-05 -9.8680E-07 1.1974E-04 -6.1147E-05 -1.1819E-06 1.1847E-04 -6.0694E-05 4.9570E-07 1.2726E-04 -6.4690E-05 -1.6858E-06 1.1561E-04 -5.9308E-05 2.9350E-07 1.2757E-04 -6.3749E-05 -1.1523E-06 1.1767E-04 -6.1042E-05 1.3444E-06 1.4776E-04 -7.4469E-05 5.3000E-08 1.2318E-04 -6.3993E-05
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25 1.9575E-06 -4.7315E-07 1.6025E-07 1.9590E-06 -5.1369E-07 1.5618E-07 1.9478E-06 -5.8650E-07 1.8227E-07 2.0445E-06 -8.0300E-08 -4.8090E-08 1.9188E-06 -7.5170E-07 2.6249E-07 2.0327E-06 -6.4500E-08 6.8500E-09 1.9496E-06 -6.3230E-07 1.6198E-07 2.0671E-06 5.3000E-08 -8.7480E-08 2.2375E-06 -1.7316E-07 -9.9350E-08
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27 3.9784E-07 -6.0193E-05 3.2976E-05 4.1210E-07 -6.0031E-05 3.3067E-05 4.9091E-07 -5.9523E-05 3.2886E-05 -1.8697E-07 -6.3061E-05 3.4494E-05 6.9465E-07 -5.8369E-05 3.2326E-05 -1.0464E-07 -6.3169E-05 3.4107E-05 4.7880E-07 -5.9203E-05 3.3030E-05 -3.4575E-07 -6.3993E-05 3.4768E-05 -9.9350E-08 -6.8664E-05 3.8425E-05

Correlation matrix of the 9 vectors
1 1.0000E+00 -5.8468E-02 4.7369E-02 8.9887E-01 -5.2114E-02 4.2321E-02 8.9816E-01 -5.1792E-02 4.2083E-02 8.6999E-01 -5.3075E-02 4.3565E-02 8.9109E-01 -5.0867E-02 4.1218E-02 8.7664E-01 -5.2998E-02 4.3282E-02 8.9875E-01 -5.1594E-02 4.2281E-02 8.5294E-01 -5.3035E-02 4.3662E-02 8.8546E-01 -5.2790E-02 4.3426E-02
2 -5.8468E-02 1.0000E+00 -9.6086E-01 -5.2958E-02 9.0664E-01 -8.6999E-01 -5.7525E-02 9.0810E-01 -8.7120E-01 -1.7198E-02 8.8391E-01 -8.5048E-01 -6.8846E-02 9.0803E-01 -8.7234E-01 -2.2019E-02 8.8100E-01 -8.5586E-01 -5.6873E-02 9.0919E-01 -8.7085E-01 -7.9340E-03 8.7205E-01 -8.4415E-01 -2.7899E-02 9.0000E-01 -8.5648E-01
3 4.7369E-02 -9.6086E-01 1.0000E+00 4.2969E-02 -8.7111E-01 9.0490E-01 4.7562E-02 -8.7234E-01 9.0626E-01 7.3413E-03 -8.5022E-01 8.8388E-01 5.9031E-02 -8.7189E-01 9.0774E-01 1.2116E-02 -8.4744E-01 8.8968E-01 4.6906E-02 -8.7328E-01 9.0581E-01 -1.7802E-03 -8.3909E-01 8.7717E-01 1.7929E-02 -8.6518E-01 8.9026E-01
4 8.9887E-01 -5.2958E-02 4.2969E-02 1.0000E+00 -5.9958E-02 4.9151E-02 8.9867E-01 -5.2515E-02 4.2956E-02 8.6910E-01 -5.4683E-02 4.5192E-02 8.9202E-01 -5.1277E-02 4.1803E-02 8.7590E-01 -5.4639E-02 4.4748E-02 8.9924E-01 -5.2223E-02 4.3219E-02 8.5174E-01 -5.4852E-02 4.5402E-02 8.8494E-01 -5.3997E-02 4.4921E-02

5 -5.2114E-02 9.0664E-01 -8.7111E-01 -5.9958E-02 1.0000E+00 -9.6053E-01 -5.7075E-02 9.1022E-01 -8.7271E-01 -2.0663E-02 8.8329E-01 -8.4965E-01 -6.7217E-02 9.1108E-01 -8.7469E-01 -2.5044E-02 8.8025E-01 -8.5551E-01 -5.6487E-02 9.1159E-01 -8.7216E-01 -1.2237E-02 8.7075E-01 -8.4294E-01 -3.0357E-02 9.0065E-01 -8.5608E-01

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7 8.9816E-01 -5.7525E-02 4.7562E-02 8.9867E-01 -5.7075E-02 4.8026E-02 1.0000E+00 -6.5392E-02 5.5701E-02 8.6022E-01 -6.3982E-02 5.4543E-02 8.9548E-01 -5.2266E-02 4.3943E-02 8.6811E-01 -6.4117E-02 5.2926E-02 8.9965E-01 -5.4777E-02 4.7812E-02 8.4084E-01 -6.5591E-02 5.5577E-02 8.7845E-01 -6.0572E-02 5.3425E-02

8 -5.1792E-02 9.0810E-01 -8.7234E-01 -5.2515E-02 9.1022E-01 -8.7233E-01 -6.5392E-02 1.0000E+00 -9.5984E-01 -2.7182E-02 8.8054E-01 -8.4666E-01 -6.3436E-02 9.1564E-01 -8.7806E-01 -3.0655E-02 8.7732E-01 -8.5356E-01 -5.5233E-02 9.1481E-01 -8.7341E-01 -2.0464E-02 8.6668E-01 -8.3919E-01 -3.4866E-02 9.0035E-01 -8.5388E-01

9 4.2083E-02 -8.7120E-01 9.0626E-01 4.2956E-02 -8.7271E-01 9.0626E-01 5.5701E-02 -9.5984E-01 1.0000E+00 1.0893E-02 -8.4940E-01 8.8309E-01 5.7304E-02 -8.7488E-01 9.1027E-01 1.5223E-02 -8.4650E-01 8.8938E-01 4.6477E-02 -8.7560E-01 9.0727E-01 2.6538E-03 -8.3756E-01 8.7596E-01 2.0440E-02 -8.6569E-01 8.8993E-01

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11 -5.3075E-02 8.8391E-01 -8.5022E-01 -5.4683E-02 8.8329E-01 -8.5103E-01 -6.3982E-02 8.8054E-01 -8.4940E-01 3.3168E-02 1.0000E+00 -9.6436E-01 -8.7354E-02 8.7089E-01 -8.4177E-01 6.8590E-03 8.8261E-01 -8.5278E-01 -6.2602E-02 8.7894E-01 -8.5121E-01 3.4168E-02 8.7973E-01 -8.5049E-01 -4.5109E-03 8.8799E-01 -8.5483E-01

12 4.3565E-02 -8.5048E-01 8.8388E-01 4.5192E-02 -8.4965E-01 8.8460E-01 5.4543E-02 -8.4666E-01 8.8309E-01 -4.3502E-02 -9.6436E-01 1.0000E+00 7.8125E-02 -8.3659E-01 8.7575E-01 -1.6452E-02 -8.5096E-01 8.8537E-01 5.3154E-02 -8.4490E-01 8.8483E-01 -4.3658E-02 -8.4868E-01 8.8237E-01 -5.1270E-03 -8.5509E-01 8.8743E-01

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16 8.7664E-01 -2.2019E-02 1.2116E-02 8.7590E-01 -2.5044E-02 1.1478E-02 8.6811E-01 -3.0655E-02 1.5223E-02 9.0041E-01 6.8590E-03 -1.6452E-02 8.4315E-01 -4.3444E-02 2.6824E-02 1.0000E+00 2.2739E-02 -2.4127E-02 8.6976E-01 -3.4284E-02 1.2380E-02 8.9658E-01 1.5997E-02 -2.1529E-02 9.0034E-01 -1.0080E-02 -1.1184E-02

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21 4.2281E-02 -8.7085E-01 9.0581E-01 4.3219E-02 -8.7216E-01 9.0590E-01 4.7812E-02 -8.7341E-01 9.0727E-01 7.5594E-03 -8.5121E-01 8.8483E-01 5.9284E-02 -8.7297E-01 9.0875E-01 1.2380E-02 -8.4832E-01 8.9052E-01 5.5577E-02 -9.5810E-01 1.0000E+00 -1.5427E-03 -8.4001E-01 8.7806E-01 1.8114E-02 -8.6632E-01 8.9135E-01

22 8.5294E-01 -7.9340E-03 -1.7802E-03 8.5174E-01 -1.2237E-02 -2.8472E-03 8.4084E-01 -2.0464E-02 2.6538E-03 9.0020E-01 3.4168E-02 -4.3658E-02 8.0810E-01 -3.9305E-02 1.9766E-02 8.9658E-01 3.5816E-02 -3.3193E-02 8.4295E-01 -2.5756E-02 -1.5427E-03 1.0000E+00 7.1475E-02 -7.5392E-02 8.9308E-01 9.6781E-03 -3.6047E-02

23 -5.3035E-02 8.7205E-01 -8.3909E-01 -5.4852E-02 8.7075E-01 -8.4008E-01 -6.5591E-02 8.6668E-01 -8.3756E-01 2.6836E-02 8.7973E-01 -8.4868E-01 -9.2624E-02 8.5406E-01 -8.2722E-01 1.5997E-02 8.7802E-01 -8.4691E-01 -6.3998E-02 8.6421E-01 -8.4001E-01 7.1475E-02 1.0000E+00 -9.6538E-01 2.9148E-03 8.7895E-01 -8.4927E-01

24 4.3662E-02 -8.4415E-01 8.7717E-01 4.5402E-02 -8.4294E-01 8.7798E-01 5.5577E-02 -8.3919E-01 8.7596E-01 -3.1754E-02 -8.5049E-01 8.8237E-01 8.1230E-02 -8.2745E-01 8.6707E-01 -2.1529E-02 -8.4878E-01 8.8168E-01 5.4067E-02 -8.3695E-01 8.7806E-01 -7.5392E-02 -9.6538E-01 1.0000E+00 -9.2158E-03 -8.5035E-01 8.8387E-01

25 8.8546E-01 -2.7899E-02 1.7929E-02 8.8494E-01 -3.0357E-02 1.7437E-02 8.7845E-01 -3.4866E-02 2.0440E-02 8.9945E-01 -4.5109E-03 -5.1270E-03 8.5675E-01 -4.5126E-02 2.9752E-02 9.0034E-01 -3.6077E-03 7.3953E-04 8.7993E-01 -3.7739E-02 1.8114E-02 8.9308E-01 2.9148E-03 -9.2158E-03 1.0000E+00 -1.0040E-02 -1.0715E-02

26 -5.2790E-02 9.0000E-01 -8.6518E-01 -5.3997E-02 9.0065E-01 -8.6566E-01 -6.0572E-02 9.0035E-01 -8.6569E-01 -3.2266E-03 8.8799E-01 -8.5509E-01 -7.7021E-02 8.9624E-01 -8.6312E-01 -1.0080E-02 8.8527E-01 -8.5803E-01 -5.9591E-02 9.0039E-01 -8.6632E-01 9.6781E-03 8.7895E-01 -8.5035E-01 -1.0040E-02 1.0000E+00 -9.6076E-01

27 4.3426E-02 -8.5648E-01 8.9026E-01 4.4921E-02 -8.5608E-01 8.9090E-01 5.3425E-02 -8.5388E-01 8.8993E-01 -1.9849E-02 -8.5483E-01 8.8743E-01 7.4845E-02 -8.4555E-01 8.8418E-01 -1.1184E-02 -8.5261E-01 8.8856E-01 5.2148E-02 -8.5268E-01 8.9135E-01 -3.6047E-02 -8.4927E-01 8.8387E-01 -1.0715E-02 -9.6076E-01 1.0000E+00

G-FILE for the vectors

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C00100003 385618871 14 389551422 112 637534819 59
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C00100005 1068036180 14 520838073 111 803656209 58
C00100006-1163526733 15 -526909726 119 -877314140 61
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C00100008-1683736839 15 -232936377 121 -354843688 63
C00100009 -984304398 14 744017625 115 1280716292 61
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D 1 7 8981572 1 8 -517924 1 9 420825 1 10 8699926 1 11 -530745
D 1 12 435651 1 13 8910938 1 14 -508671 1 15 412175 1 16 8766432
D 1 17 -529984 1 18 432820 1 19 8987546 1 20 -515940 1 21 422809
D 1 22 8529369 1 23 -530348 1 24 436623 1 25 8854642 1 26 -527897
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D 10 18 -175543 10 19 8620457 10 20 -313739 10 21   75594 10 22 9002036
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D 14 15 -9588098 14 16 -434437 14 17 8673047 14 18 -8458804 14 19 -521496 D 14 20
9187404 14 21 -8729694 14 22 -393054 14 23 8540646 14 24 -8274543
D 14 25 -451258 14 26 8962442 14 27 -8455520 15 16   268244 15 17 -8385310
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D 15 23 -8272213 15 24 8670725 15 25   297524 15 26 -8631212 15 27 8841846
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D 16 22 8965786 16 23   159972 16 24 -215287 16 25 9003404 16 26 -100798
D 16 27 -111844 17 18 -9632455 17 19 -627329 17 20 8755507 17 21 -8483240
D 17 22   358160 17 23 8780193 17 24 -8487791 17 25   -36076 17 26 8852737
D 17 27 -8526057 18 19   517323 18 20 -8524248 18 21 8905218 18 22 -331932
D 18 23 -8469133 18 24 8816809 18 25   7395 18 26 -8580345 18 27 8885576
D 19 20 -638827 19 21   555767 19 22 8429544 19 23 -639983 19 24   540669
D 19 25 8799285 19 26 -595909 19 27   521477 20 21 -9580966 20 22 -257560
D 20 23 8642142 20 24 -8369519 20 25 -377387 20 26 9003875 20 27 -8526769
D 21 22   -15426 21 23 -8400062 21 24 8780585 21 25   181141 21 26 -8663175
D 21 27 8913487 22 23   714745 22 24 -753917 22 25 8930778 22 26   96780
D 22 27 -360465 23 24 -9653846 23 25   29147 23 26 8789454 23 27 -8492685
D 24 25   -92158 24 26 -8503470 24 27 8838668 25 26 -100404 25 27 -107146
D 26 27 -9607615

ITRF position of mob_ as determined by individual baselines

	X	Y	Z
aldi	174002.800	-5511640.469	3194222.238
al90	174002.801	-5511640.456	3194222.231
al92	174002.802	-5511640.454	3194222.230
msin	174002.793	-5511640.500	3194222.253
aleb	174002.794	-5511640.427	3194222.223
bvhs	174002.792	-5511640.468	3194222.239
al84	174002.805	-5511640.459	3194222.232
eng5	174002.792	-5511640.492	3194222.253
msev	174002.794	-5511640.486	3194222.251

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
aldi	0.002	0.005	-0.001	0.002	0.001	-0.005
al90	0.003	0.018	-0.009	0.003	0.001	-0.020
al92	0.004	0.020	-0.010	0.005	0.001	-0.022
msin	-0.005	-0.026	0.013	-0.006	-0.001	0.029
aleb	-0.004	0.046	-0.017	-0.002	0.008	-0.049
bvhs	-0.006	0.006	-0.000	-0.005	0.003	-0.005
al84	0.007	0.015	-0.007	0.007	0.001	-0.016
eng5	-0.006	-0.018	0.013	-0.006	0.002	0.022
msev	-0.004	-0.012	0.011	-0.004	0.003	0.016

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

dop from interpolation is 0.464
scatter (mean square distance from rover) is 18006.501
average edop for rover is 0.740
average ndop for rover is 0.790
average hdop for rover is 1.082
average vdop for rover is 1.960
average gdop for rover is 2.600

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.

FILE: MOB_03.14O OP1393267324296

NGS OPUS-RS SOLUTION REPORT
==========

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

USER: blkimbrough@theatlgrp.com DATE: February 24, 2014
RINEX FILE: mob_047t.14o TIME: 19:10:09 UTC

SOFTWARE: rsgps 1.37 RS52.prl 1.89 START: 2014/02/16 19:08:50
EPHEMERIS: igr17800.eph [rapid] STOP: 2014/02/16 19:31:45
NAV FILE: brdc0470.14n OBS USED: 1840 / 1864 : 99%
ANT NAME: TPSHIPER_V NONE QUALITY IND. 8.00/ 20.92
ARP HEIGHT: 2.00 NORMALIZED RMS: 0.280

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.12823)

X:	183926.467(m)	0.004(m)	183925.695(m)	0.004(m)
Y:	-5494816.028(m)	0.023(m)	-5494814.526(m)	0.023(m)
Z:	3222342.705(m)	0.011(m)	3222342.533(m)	0.011(m)

LAT:	30 32 34.59959	0.007(m)	30 32 34.61998	0.007(m)
E LON:	271 55 1.66835	0.004(m)	271 55 1.64129	0.004(m)
W LON:	88 4 58.33165	0.004(m)	88 4 58.35871	0.004(m)
EL HGT:	-25.647(m)	0.025(m)	-27.049(m)	0.025(m)
ORTHO HGT:	2.679(m)	0.027(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES UTM (Zone 16)	STATE PLANE COORDINATES SPC (0102 AL W)
Northing (Y) [meters]	3379449.323	60329.753
Easting (X) [meters]	396129.899	544072.970
Convergence [degrees]	-0.55034653	-0.29621287
Point Scale	0.99973309	0.99997191
Combined Factor	0.99973712	0.99997594

US NATIONAL GRID DESIGNATOR: 16RCU9612979449(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI3826	AL90 ALDOT 9 DIV OFF CORS ARP	N304126.969	W0880154.137	17112.7
DL3486	ALDI DAUPHIN ISLAND CORS ARP	N301456.987	W0880440.688	32571.6
DM2660	AL92 ALDOT 9 DIV DIS 2 CORS ARP	N305458.985	W0874632.462	50789.9
DM5371	ALEB WS NEAL SCHOOL CORS ARP	N310529.223	W0870320.306	115579.3

DM3973 ALRE REPTON JR HGH SCH CORS ARP N312440.664 W0871403.268 125856.1
DL9796 AL84 ALDOT 8 DIV DIS 4 CORS ARP N314201.327 W0874720.982 131346.2
DL3065 FLE5 EGLIN 5 CORS ARP N303836.931 W0863306.887 147249.0
DN7498 MSEV ELLISVILLE CORS ARP N313542.081 W0891213.274 158258.3

NEAREST NGS PUBLISHED CONTROL POINT
BH2002 ISLAND N303114.719 W0880504.386 2475.3

OPUS-RS Extended Output, Level 2

FINAL COORDINATES (ITRF at epoch of observations)

al90	188545.996	-5486311.757	3236456.347
aldi	184948.619	-5511274.941	3194254.874
al92	212564.694	-5472685.315	3257975.717
aleb	280806.415	-5459556.642	3274587.850
alre	262901.924	-5442090.355	3304942.053
al84	209536.483	-5427642.084	3332268.821
fle5	330327.626	-5482334.211	3231985.113
msev	75572.356	-5437238.727	3322293.880
mob_	183925.695	-5494814.526	3222342.533

Covariance matrix of the stations:
1 2.8590E-07 -9.0470E-08 2.4690E-08 -1.7200E-08 -4.2590E-08 4.7000E-08 -2.0730E-08 -3.8470E-10 8.4630E-09 -3.2450E-08 4.5330E-08 -2.5000E-08 -2.9220E-08 4.9620E-08 -3.3820E-08 -1.9750E-08 3.1810E-08 -2.7010E-08 -4.1600E-08 5.2860E-08 -2.1680E-08 5.2030E-12 -4.6350E-08 2.7300E-08 1.9540E-08 -2.3750E-07 1.3350E-07
2 -9.0470E-08 9.7240E-06 -4.7780E-06 -1.8900E-08 -9.4660E-07 3.1950E-07 3.1170E-10 -1.2740E-06 5.9790E-07 8.2120E-08 -1.5120E-06 7.8280E-07 5.6400E-08 -1.6030E-06 8.7480E-07 -1.4940E-08 -1.5940E-06 8.9090E-07 1.4900E-07 -1.4500E-06 7.0070E-07 -1.6370E-07 -1.2200E-06 6.1190E-07 -8.8270E-09 1.5230E-06 -8.5460E-07
3 2.4690E-08 -4.7780E-06 2.6410E-06 2.4180E-08 3.2890E-07 -5.6890E-08 7.2330E-09 6.0130E-07 -2.8890E-07 -6.1470E-08 8.0330E-07 -4.4480E-07 -4.0310E-08 8.7740E-07 -5.2080E-07 1.9060E-08 8.6670E-07 -5.3210E-07 -1.1700E-07 7.5370E-07 -3.7760E-07 1.4370E-07 5.4690E-07 -2.9520E-07 2.7990E-09 -1.2650E-06 7.3640E-07
4 -1.7200E-08 -1.8900E-08 2.4180E-08 2.8340E-07 -1.2250E-07 4.9940E-08 -2.0530E-08 2.4370E-09 6.7150E-09 -3.1410E-08 4.5910E-08 -2.4960E-08 -2.8430E-08 4.9540E-08 -3.2980E-08 -1.9670E-08 3.2020E-08 -2.6140E-08 -3.9900E-08 5.3750E-08 -2.2310E-08 -1.4140E-09 -4.2480E-08 2.5420E-08 1.5110E-08 -2.1200E-07 1.2070E-07
5 -4.2590E-08 -9.4660E-07 3.2890E-07 -1.2250E-07 9.7490E-06 -4.8770E-06 -3.1880E-09 -1.1860E-06 5.2720E-07 1.3280E-07 -1.5700E-06 8.2810E-07 9.0970E-08 -1.7010E-06 9.7080E-07 -2.6180E-08 -1.6710E-06 9.8830E-07 2.4280E-07 -1.4890E-06 7.0380E-07 -2.7260E-07 -1.0610E-06 5.3000E-07 2.7990E-09 2.3470E-06 -1.3430E-06

6 4.7000E-08 3.1950E-07 -5.6890E-08 4.9940E-08 -4.8770E-06 2.7990E-06 1.1610E-08 5.3060E-07 -2.3220E-07 -1.0960E-07 8.7290E-07 -5.0060E-07 -7.2850E-08 9.8690E-07 -6.2570E-07 3.0910E-08 9.5510E-07 -6.3830E-07 -2.0690E-07 8.0520E-07 -3.9260E-07 2.5020E-07 4.0610E-07 -2.2750E-07 -2.5650E-09 -2.1470E-06 1.2440E-06

7 -2.0730E-08 3.1170E-10 7.2330E-09 -2.0530E-08 -3.1880E-09 1.1610E-08 2.8060E-07 -8.2210E-08 1.1250E-08 -2.4140E-08 2.9750E-08 -1.2710E-08 -2.3630E-08 2.7140E-08 -1.3000E-08 -2.1900E-08 1.3020E-08 -5.9930E-09 -2.6020E-08 4.0390E-08 -1.6450E-08 -1.8630E-08 -2.5260E-08 1.8040E-08 1.5150E-08 -5.9470E-08 3.3980E-08

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9 8.4630E-09 5.9790E-07 -2.8890E-07 6.7150E-09 5.2720E-07 -2.3220E-07 1.1250E-08 -4.8260E-06 2.6400E-06 -2.5100E-08 7.4620E-07 -3.9890E-07 -1.6540E-08 7.8820E-07 -4.3530E-07 6.9720E-09 7.9470E-07 -4.4560E-07 -4.6860E-08 7.1120E-07 -3.6450E-07 5.5130E-08 6.6010E-07 -3.4930E-07 -4.8260E-10 -3.5410E-07 2.1900E-07

10 -3.2450E-08 8.2120E-08 -6.1470E-08 -3.1410E-08 1.3280E-07 -1.0960E-07 -2.4140E-08 4.1040E-08 -2.5100E-08 3.0050E-07 -2.1150E-07 9.2330E-08 -4.4340E-09 -4.6160E-08 5.5730E-08 -2.8830E-08 -4.7790E-08 6.3440E-08 2.6950E-08 1.0490E-09 -4.5260E-10 -8.1290E-08 4.8740E-08 -1.4860E-08 1.6630E-08 5.1760E-07 -2.9400E-07

11 4.5330E-08 -1.5120E-06 8.0330E-07 4.5910E-08 -1.5700E-06 8.7290E-07 2.9750E-08 -1.4550E-06 7.4620E-07 -2.1150E-07 1.0270E-05 -5.1280E-06 -6.7010E-09 -1.3320E-06 6.1790E-07 3.3260E-08 -1.3770E-06 6.3100E-07 -5.8040E-08 -1.3240E-06 6.6860E-07 1.2180E-07 -1.5790E-06 7.8870E-07 1.1030E-08 -1.1800E-06 6.8270E-07

12 -2.5000E-08 7.8280E-07 -4.4480E-07 -2.4960E-08 8.2810E-07 -5.0060E-07 -1.2710E-08 7.3720E-07 -3.9890E-07 9.2330E-08 -5.1280E-06 2.8390E-06 1.6090E-08 6.4080E-07 -2.9690E-07 -1.6300E-08 6.7420E-07 -3.0590E-07 5.8060E-08 6.3630E-07 -3.3890E-07 -8.7330E-08 8.2880E-07 -4.2870E-07 -5.5910E-09 8.8470E-07 -4.8900E-07

13 -2.9220E-08 5.6400E-08 -4.0310E-08 -2.8430E-08 9.0970E-08 -7.2850E-08 -2.3630E-08 2.9960E-08 -1.6540E-08 -4.4340E-09 -6.7010E-09 1.6090E-08 2.8970E-07 -1.7610E-07 7.8940E-08 -2.7010E-08 -3.1050E-08 4.3530E-08 1.0980E-08 1.1330E-08 -4.4370E-09 -6.2920E-08 2.5420E-08 -4.3710E-09 1.5950E-08 3.4470E-07 -1.9580E-07

14 4.9620E-08 -1.6030E-06 8.7740E-07 4.9540E-08 -1.7010E-06 9.8690E-07 2.7140E-08 -1.5080E-06 7.8820E-07 -4.6160E-08 -1.3320E-06 6.4080E-07 -1.7610E-07 1.0610E-05 -5.4080E-06 3.4040E-08 -1.3590E-06 6.0020E-07 -1.0270E-07 -1.3230E-06 6.7890E-07 1.6470E-07 -1.6630E-06 8.3520E-07 5.3600E-09 -1.6420E-06 9.5160E-07

15 -3.3820E-08 8.7480E-07 -5.2080E-07 -3.2980E-08 9.7080E-07 -6.2570E-07 -1.3000E-08 7.8320E-07 -4.3530E-07 5.5730E-08 6.1790E-07 -2.9690E-07 7.8940E-08 -5.4080E-06 3.0640E-06 -2.0720E-08 6.3270E-07 -2.5280E-07 1.0950E-07 6.1540E-07 -3.3610E-07 -1.4370E-07 9.1300E-07 -4.7100E-07 -2.1160E-09 1.4370E-06 -8.0620E-07

16 -1.9750E-08 -1.4940E-08 1.9060E-08 -1.9670E-08 -2.6180E-08 3.0910E-08 -2.1900E-08 2.0520E-10 6.9720E-09 -2.8830E-08 3.3260E-08 -1.6300E-08 -2.7010E-08 3.4040E-08 -2.0720E-08 2.8690E-07 -2.9440E-08 -2.7850E-08 -3.4200E-08 4.2330E-08 -1.6610E-08 -1.0420E-08 -3.9230E-08 2.4690E-08 1.4290E-08 -1.4510E-07 8.2700E-08

17 3.1810E-08 -1.5940E-06 8.6670E-07 3.2020E-08 -1.6710E-06 9.5510E-07 1.3020E-08 -1.5200E-06 7.9470E-07 -4.7790E-08 -1.3770E-06 6.7420E-07 -3.1050E-08 -1.3590E-06 6.3270E-07 -2.9440E-08 1.0670E-05 -5.4650E-06 -9.4420E-08 -1.3650E-06 7.0300E-07 1.2640E-07 -1.6560E-06 8.3820E-07 -7.0130E-09 -1.4340E-06 8.3600E-07

18 -2.7010E-08 8.9090E-07 -5.3210E-07 -2.6140E-08 9.8830E-07 -6.3830E-07 -5.9930E-09 7.9810E-07 -4.4560E-07 6.3440E-08 6.3100E-07 -3.0590E-07 4.3530E-08 6.0020E-07 -2.5280E-07 -2.7850E-08 -5.4650E-06 3.1270E-06 1.1780E-07 6.2910E-07 -3.4580E-07 -1.3810E-07 9.2800E-07 -4.8100E-07 4.9310E-09 1.4660E-06 -8.2420E-07

19 -4.1600E-08 1.4900E-07 -1.1700E-07 -3.9900E-08 2.4280E-07 -2.0690E-07 -2.6020E-08 6.8780E-08 -4.6860E-08 2.6950E-08 -5.8040E-08 5.8060E-08 1.0980E-08 -1.0270E-07 1.0950E-07 -3.4200E-08 -9.4420E-08 1.1780E-07 3.5950E-07 -3.1430E-07 1.2700E-07 -1.3100E-07 1.0930E-07 -4.1850E-08 1.7940E-08 9.7840E-07 -5.5580E-07

20 5.2860E-08 -1.4500E-06 7.5370E-07 5.3750E-08 -1.4890E-06 8.0520E-07 4.0390E-08 -1.4100E-06 7.1120E-07 1.0490E-09 -1.3240E-06 6.3630E-07 1.1330E-08 -1.3230E-06 6.1540E-07 4.2330E-08 -1.3650E-06 6.2910E-07 -3.1430E-07 1.0010E-05 -4.9020E-06 1.1170E-07 -1.5210E-06 7.5220E-07 2.2960E-08 -9.5160E-07 5.4600E-07

21 -2.1680E-08 7.0070E-07 -3.7760E-07 -2.2310E-08 7.0380E-07 -3.9260E-07 -1.6450E-08 6.9310E-07 -3.6450E-07 -4.5260E-10 6.6860E-07 -3.3890E-07 -4.4370E-09 6.7890E-07 -3.3610E-07 -1.6610E-08 7.0300E-07 -3.4580E-07 1.2700E-07 -4.9020E-06 2.6700E-06 -4.4550E-08 7.5340E-07 -3.8970E-07 -1.2420E-08 4.1980E-07 -2.2150E-07

22 5.2030E-12 -1.6370E-07 1.4370E-07 -1.4140E-09 -2.7260E-07 2.5020E-07 -1.8630E-08 -5.9900E-08 5.5130E-08 -8.1290E-08 1.2180E-07 -8.7330E-08 -6.2920E-08 1.6470E-07 -1.4370E-07 -1.0420E-08 1.2640E-07 -1.3810E-07 -1.3100E-07 1.1170E-07 -4.4550E-08 4.3100E-07 -2.9100E-08 -3.5060E-08 1.0320E-08 -1.1870E-06 6.7480E-07

23 -4.6350E-08 -1.2200E-06 5.4690E-07 -4.2480E-08 -1.0610E-06 4.0610E-07 -2.5260E-08 -1.3610E-06 6.6010E-07 4.8740E-08 -1.5790E-06 8.2880E-07 2.5420E-08 -1.6630E-06 9.1300E-07 -3.9230E-08 -1.6560E-06 9.2800E-07 1.0930E-07 -1.5210E-06 7.5340E-07 -2.9100E-08 1.0190E-05 -5.0380E-06 -2.7250E-08 1.0900E-06 -6.1040E-07

24 2.7300E-08 6.1190E-07 -2.9520E-07 2.5420E-08 5.3000E-07 -2.2750E-07 1.8040E-08 6.8220E-07 -3.4930E-07 -1.4860E-08 7.8870E-07 -4.2870E-07 -4.3710E-09 8.3520E-07 -4.7100E-07 2.4690E-08 8.3820E-07 -4.8100E-07 -4.1850E-08 7.5220E-07 -3.8970E-07 -3.5060E-08 -5.0380E-06 2.7680E-06 1.5370E-08 -4.4190E-07 2.6620E-07

25 1.9540E-08 -8.8270E-09 2.7990E-09 1.5110E-08 2.7990E-09 -2.5650E-09 1.5150E-08 7.2720E-10 -4.8260E-10 1.6630E-08 1.1030E-08 -5.5910E-09 1.5950E-08 5.3600E-09 -2.1160E-09 1.4290E-08 -7.0130E-09 4.9310E-09 1.7940E-08 2.2960E-08 -1.2420E-08 1.0320E-08 -2.7250E-08 1.5370E-08 2.7980E-06 -1.8360E-07 -2.2810E-07

26 -2.3750E-07 1.5230E-06 -1.2650E-06 -2.1200E-07 2.3470E-06 -2.1470E-06 -5.9470E-08 3.7340E-07 -3.5410E-07 5.1760E-07 -1.1800E-06 8.8470E-07 3.4470E-07 -1.6420E-06 1.4370E-06 -1.4510E-07 -1.4340E-06 1.4660E-06 9.7840E-07 -9.5160E-07 4.1980E-07 -1.1870E-06 1.0900E-06 -4.4190E-07 -1.8360E-07 1.1610E-04 -5.6850E-05

27 1.3350E-07 -8.5460E-07 7.3640E-07 1.2070E-07 -1.3430E-06 1.2440E-06 3.3980E-08 -2.0830E-07 2.1900E-07 -2.9400E-07 6.8270E-07 -4.8900E-07 -1.9580E-07 9.5160E-07 -8.0620E-07 8.2700E-08 8.3600E-07 -8.2420E-07 -5.5580E-07 5.4600E-07 -2.2150E-07 6.7480E-07 -6.1040E-07 2.6620E-07 -2.2810E-07 -5.6850E-05 3.0510E-05

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

0.0000027980	-0.0000001836	-0.0000002281
-0.0000001836	0.0001161000	-0.0000568500
-0.0000002281	-0.0000568500	0.0000305100

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

0.0000029125	-0.0000000146	-0.0000041872

-0.0000000146 0.0000027981 -0.0000095291
-0.0000041872 -0.0000095291 0.0001436974

Horizontal network accuracy = 0.00414 meters.
Vertical network accuracy = 0.02350 meters.

		Vectors		
To	From	X	Y	Z
al90	mob_	4620.302	8502.769	14113.813
aldi	mob_	1022.924	-16460.414	-28087.660
al92	mob_	28638.999	22129.211	35633.183
aleb	mob_	96880.720	35257.885	52245.317
alre	mob_	78976.229	52724.172	82599.520
al84	mob_	25610.788	67172.442	109926.287
fle5	mob_	146401.931	12480.315	9642.579
msev	mob_	-108353.338	57575.799	99951.347

Covariance matrix of the 8 vectors

1 3.0448E-06 -2.7743E-08 -3.3971E-07 2.7461E-06 8.5110E-09 -3.1204E-07 2.7426E-06 5.2788E-08 -3.5265E-07 2.7294E-06 8.8200E-08 -3.8101E-07 2.7333E-06 9.8160E-08 -3.9330E-07 2.7444E-06 9.2723E-08 -3.9354E-07 2.7189E-06 8.3800E-08 -3.7086E-07 2.7681E-06 3.4800E-08 -3.4967E-07

2 -2.7743E-08 1.2278E-04 -5.9508E-05 1.8327E-08 1.1128E-04 -5.3529E-05 -1.1499E-07 1.1293E-04 -5.5043E-05 -6.1025E-07 1.1425E-04 -5.6097E-05 -4.6307E-07 1.1462E-04 -5.6558E-05 -4.4613E-08 1.1442E-04 -5.6570E-05 -1.0042E-06 1.1408E-04 -5.5714E-05 8.4853E-07 1.1227E-04 -5.4942E-05

3 -3.3971E-07 -5.9508E-05 3.1678E-05 -3.2742E-07 -5.3913E-05 2.8473E-05 -2.5765E-07 -5.4775E-05 2.9266E-05 1.6310E-09 -5.5464E-05 2.9818E-05 -7.5409E-08 -5.5659E-05 3.0059E-05 -2.9454E-07 -5.5554E-05 3.0066E-05 2.0790E-07 -5.5377E-05 2.9618E-05 -7.6200E-07 -5.4428E-05 2.9212E-05

4 2.7461E-06 1.8327E-08 -3.2742E-07 3.0512E-06 -9.6899E-08 -2.9629E-07 2.7472E-06 3.0110E-08 -3.4160E-07 2.7349E-06 6.3280E-08 -3.6817E-07 2.7385E-06 7.2580E-08 -3.7966E-07 2.7489E-06 6.7433E-08 -3.7987E-07 2.7251E-06 5.9190E-08 -3.5869E-07 2.7712E-06 1.3170E-08 -3.3875E-07

5 8.5110E-09 1.1128E-04 -5.3913E-05 -9.6899E-08 1.2116E-04 -5.8237E-05 -1.3012E-07 1.1219E-04 -5.4626E-05 -5.7120E-07 1.1336E-04 -5.5564E-05 -4.4013E-07 1.1369E-04 -5.5973E-05 -6.7479E-08 1.1352E-04 -5.5985E-05 -9.2200E-07 1.1322E-04 -5.5223E-05 7.2800E-07 1.1160E-04 -5.4535E-05

6 -3.1204E-07 -5.3529E-05 2.8473E-05 -2.9629E-07 -5.8237E-05 3.0821E-05 -2.4791E-07 -5.3964E-05 2.8815E-05 -4.1135E-08 -5.4513E-05 2.9254E-05 -1.0259E-07 -5.4668E-05 2.9447E-05 -2.7733E-07 -5.4584E-05 2.9452E-05 1.2337E-07 -5.4444E-05 2.9095E-05 -6.5013E-07 -5.3687E-05 2.8772E-05

7 2.7426E-06 -1.1499E-07 -2.5765E-07 2.7472E-06 -1.3012E-07 -2.4791E-07 3.0483E-06 -2.0707E-07 -2.5035E-07 2.7421E-06 -1.0541E-07 -2.6920E-07 2.7433E-06 -1.0235E-07 -2.7296E-07 2.7467E-06 -1.0410E-07 -2.7300E-07 2.7389E-06 -1.0670E-07 -2.6611E-07 2.7539E-06 -1.2214E-07 -2.5941E-07

8 5.2788E-08 1.1293E-04 -5.4775E-05 3.0110E-08 1.1219E-04 -5.3964E-05 -2.0707E-07 1.2519E-04 -6.1114E-05 -6.6089E-07 1.1545E-04 -5.6789E-05 -4.9907E-07 1.1586E-04 -5.7296E-05 -3.9022E-08 1.1564E-04 -5.7310E-05 -1.0939E-06 1.1527E-04 -5.6368E-05 9.4277E-07 1.1328E-04 -5.5518E-05

9 -3.5265E-07 -5.5043E-05 2.9266E-05 -3.4160E-07 -5.4626E-05 2.8815E-05 -2.5035E-07 -6.1114E-05 3.2712E-05 4.1283E-08 -5.6432E-05 3.0381E-05 -4.8357E-08 -5.6659E-05 3.0662E-05 -3.0335E-07 -5.6537E-05 3.0670E-05 2.8132E-07 -5.6331E-05 3.0148E-05 -8.4729E-07 -5.5225E-05 2.9676E-05

10 2.7294E-06 -6.1025E-07 1.6310E-09 2.7349E-06 -5.7120E-07 -4.1135E-08 2.7421E-06 -6.6089E-07 4.1283E-08 3.0652E-06 -9.2373E-07 1.6382E-07 2.7610E-06 -7.5272E-07 1.2375E-07 2.7382E-06 -7.4198E-07 1.2441E-07 2.7904E-06 -7.2311E-07 7.7867E-08 2.6898E-06 -6.2521E-07 3.5670E-08

11 8.8200E-08 1.1425E-04 -5.5464E-05 6.3280E-08 1.1336E-04 -5.4513E-05 -1.0541E-07 1.1545E-04 -5.6432E-05 -9.2373E-07 1.2873E-04 -6.3545E-05 -5.4603E-07 1.1759E-04 -5.8352E-05 -1.6270E-08 1.1734E-04 -5.8368E-05 -1.2311E-06 1.1691E-04 -5.7284E-05 1.1142E-06 1.1461E-04 -5.6302E-05

12 -3.8101E-07 -5.6097E-05 2.9818E-05 -3.6817E-07 -5.5564E-05 2.9254E-05 -2.6920E-07 -5.6789E-05 3.0381E-05 1.6382E-07 -6.3545E-05 3.4327E-05 -1.0619E-08 -5.8045E-05 3.1508E-05 -3.2151E-07 -5.7896E-05 3.1517E-05 3.9135E-07 -5.7644E-05 3.0882E-05 -9.8464E-07 -5.6295E-05 3.0304E-05

13 2.7333E-06 -4.6307E-07 -7.5409E-08 2.7385E-06 -4.4013E-07 -1.0259E-07 2.7433E-06 -4.9907E-07 -4.8357E-08 2.7610E-06 -5.4603E-07 -1.0619E-08 3.0558E-06 -7.0976E-07 4.8756E-08 2.7407E-06 -5.5234E-07 6.2990E-09 2.7751E-06 -5.3993E-07 -2.4317E-08 2.7088E-06 -4.7563E-07 -5.2041E-08

14 9.8160E-08 1.1462E-04 -5.5659E-05 7.2580E-08 1.1369E-04 -5.4668E-05 -1.0235E-07 1.1586E-04 -5.6659E-05 -7.5272E-07 1.1759E-04 -5.8045E-05 -7.0976E-07 1.2999E-04 -6.4647E-05 -9.8200E-09 1.1782E-04 -5.8667E-05 -1.2701E-06 1.1737E-04 -5.7543E-05 1.1627E-06 1.1499E-04 -5.6524E-05

15 -3.9330E-07 -5.6558E-05 3.0059E-05 -3.7966E-07 -5.5973E-05 2.9447E-05 -2.7296E-07 -5.7296E-05 3.0662E-05 1.2375E-07 -5.8352E-05 3.1508E-05 4.8756E-08 -6.4647E-05 3.5186E-05 -3.2940E-07 -5.8490E-05 3.1888E-05 4.3932E-07 -5.8218E-05 3.1202E-05 -1.0445E-06 -5.6764E-05 3.0579E-05

16 2.7444E-06 -4.4613E-08 -2.9454E-07 2.7489E-06 -6.7479E-08 -2.7733E-07 2.7467E-06 -3.9022E-08 -3.0335E-07 2.7382E-06 -1.6270E-08 -3.2151E-07 2.7407E-06 -9.8200E-09 -3.2940E-07 3.0563E-06 -6.0927E-08 -3.4358E-07 2.7316E-06 -1.9130E-08 -3.1499E-07 2.7630E-06 -5.0480E-08 -3.0148E-07

17 9.2723E-08 1.1442E-04 -5.5554E-05 6.7433E-08 1.1352E-04 -5.4584E-05 -1.0410E-07 1.1564E-04 -5.6537E-05 -7.4198E-07 1.1734E-04 -5.7896E-05 -5.5234E-07 1.1782E-04 -5.8490E-05 -6.0927E-08 1.2964E-04 -6.4617E-05 -1.2494E-06 1.1712E-04 -5.7403E-05 1.1368E-06 1.1479E-04 -5.6406E-05

18 -3.9354E-07 -5.6570E-05 3.0066E-05 -3.7987E-07 -5.5985E-05 2.9452E-05 -2.7300E-07 -5.7310E-05 3.0670E-05 1.2441E-07 -5.8368E-05 3.1517E-05 6.2990E-09 -5.8667E-05 3.1888E-05 -3.4358E-07 -6.4617E-05 3.5285E-05 4.4057E-07 -5.8233E-05 3.1210E-05 -1.0459E-06 -5.6778E-05 3.0587E-05

19 2.7189E-06 -1.0042E-06 2.0790E-07 2.7251E-06 -9.2200E-07 1.2337E-07 2.7389E-06 -1.0939E-06 2.8132E-07 2.7904E-06 -1.2311E-06 3.9135E-07 2.7751E-06 -1.2701E-06 4.3932E-07 2.7316E-06 -1.2494E-06 4.4057E-07 3.1216E-06 -1.4993E-06 4.6712E-07 2.6387E-06 -1.0255E-06 2.7048E-07

20 8.3800E-08 1.1408E-04 -5.5377E-05 5.9190E-08 1.1322E-04 -5.4444E-05 -1.0670E-07 1.1527E-04 -5.6331E-05 -7.2311E-07 1.1691E-04 -5.7644E-05 -5.3993E-07 1.1737E-04 -5.8218E-05 -1.9130E-08 1.1712E-04 -5.8233E-05 -1.4993E-06 1.2801E-04 -6.2718E-05 1.0921E-06 1.1444E-04 -5.6202E-05

21 -3.7086E-07 -5.5714E-05 2.9618E-05 -3.5869E-07 -5.5223E-05 2.9095E-05 -2.6611E-07 -5.6368E-05 3.0148E-05 7.7867E-08 -5.7284E-05 3.0882E-05 -2.4317E-08 -5.7543E-05 3.1202E-05 -3.1499E-07 -5.7403E-05 3.1210E-05 4.6712E-07 -6.2718E-05 3.3623E-05 -9.3503E-07 -5.5906E-05 3.0076E-05

22 2.7681E-06 8.4853E-07 -7.6200E-07 2.7712E-06 7.2800E-07 -6.5013E-07 2.7539E-06 9.4277E-07 -8.4729E-07 2.6898E-06 1.1142E-06 -9.8464E-07 2.7088E-06 1.1627E-06 -1.0445E-06 2.7630E-06 1.1368E-06 -1.0459E-06 2.6387E-06 1.0921E-06 -9.3503E-07 3.2084E-06 1.0015E-06 -9.5333E-07

23 3.4800E-08 1.1227E-04 -5.4428E-05 1.3170E-08 1.1160E-04 -5.3687E-05 -1.2214E-07 1.1328E-04 -5.5225E-05 -6.2521E-07 1.1461E-04 -5.6295E-05 -4.7563E-07 1.1499E-04 -5.6764E-05 -5.0480E-08 1.1479E-04 -5.6778E-05 -1.0255E-06 1.1444E-04 -5.5906E-05 1.0015E-06 1.2411E-04 -6.0836E-05

24 -3.4967E-07 -5.4942E-05 2.9212E-05 -3.3875E-07 -5.4535E-05 2.8772E-05 -2.5941E-07 -5.5518E-05 2.9676E-05 3.5670E-08 -5.6302E-05 3.0304E-05 -5.2041E-08 -5.6524E-05 3.0579E-05 -3.0148E-07 -5.6406E-05 3.0587E-05 2.7048E-07 -5.6202E-05 3.0076E-05 -9.5333E-07 -6.0836E-05 3.2746E-05

Correlation matrix of the 8 vectors

1 1.0000E+00 -1.4349E-03 -3.4590E-02 9.0097E-01 4.4313E-04 -3.2211E-02 9.0022E-01 2.7037E-03 -3.5336E-02 8.9341E-01 4.4550E-03 -3.7268E-02 8.9607E-01 4.9339E-03 -3.7998E-02 8.9964E-01 4.6670E-03 -3.7967E-02 8.8191E-01 4.2446E-03 -3.6653E-02 8.8566E-01 1.7902E-03 -3.5019E-02

2 -1.4349E-03 1.0000E+00 -9.5420E-01 9.4688E-04 9.1243E-01 -8.7017E-01 -5.9440E-03 9.1087E-01 -8.6854E-01 -3.1457E-02 9.0873E-01 -8.6410E-01 -2.3907E-02 9.0724E-01 -8.6048E-01 -2.3030E-03 9.0691E-01 -8.5947E-01 -5.1293E-02 9.0995E-01 -8.6714E-01 4.2753E-02 9.0947E-01 -8.6649E-01

3 -3.4590E-02 -9.5420E-01 1.0000E+00 -3.3303E-02 -8.7025E-01 9.1122E-01 -2.6219E-02 -8.6979E-01 9.0913E-01 1.6552E-04 -8.6855E-01 9.0423E-01 -7.6644E-03 -8.6735E-01 9.0034E-01 -2.9934E-02 -8.6690E-01 8.9928E-01 2.0907E-02 -8.6961E-01 9.0751E-01 -7.5584E-02 -8.6803E-01 9.0700E-01

4 9.0097E-01 9.4688E-04 -3.3303E-02 1.0000E+00 -5.0398E-03 -3.0554E-02 9.0080E-01 1.5406E-03 -3.4193E-02 8.9427E-01 3.1930E-03 -3.5975E-02 8.9685E-01 3.6444E-03 -3.6642E-02 9.0018E-01 3.3906E-03 -3.6610E-02 8.8298E-01 2.9949E-03 -3.5413E-02 8.8570E-01 6.7678E-04 -3.3890E-02

5 4.4313E-04 9.1243E-01 -8.7025E-01 -5.0398E-03 1.0000E+00 -9.5303E-01 -6.7707E-03 9.1098E-01 -8.6771E-01 -2.9640E-02 9.0774E-01 -8.6159E-01 -2.2874E-02 9.0595E-01 -8.5728E-01 -3.5067E-03 9.0577E-01 -8.5625E-01 -4.7410E-02 9.0909E-01 -8.6523E-01 3.6925E-02 9.1012E-01 -8.6582E-01

6 -3.2211E-02 -8.7017E-01 9.1122E-01 -3.0554E-02 -9.5303E-01 1.0000E+00 -2.5576E-02 -8.6874E-01 9.0748E-01 -4.2321E-03 -8.6544E-01 8.9939E-01 -1.0571E-02 -8.6367E-01 8.9418E-01 -2.8574E-02 -8.6353E-01 8.9308E-01 1.2577E-02 -8.6676E-01 9.0381E-01 -6.5379E-02 -8.6804E-01 9.0568E-01

7 9.0022E-01 -5.9440E-03 -2.6219E-02 9.0080E-01 -6.7707E-03 -2.5576E-02 1.0000E+00 -1.0600E-02 -2.5070E-02 8.9705E-01 -5.3212E-03 -2.6316E-02 8.9883E-01 -5.1416E-03 -

2.6357E-02 8.9986E-01 -5.2365E-03 -2.6323E-02 8.8788E-01 -5.4014E-03 -2.6285E-02 8.8060E-01 -6.2795E-03 -2.5965E-02
8 2.7037E-03 9.1087E-01 -8.6979E-01 1.5406E-03 9.1098E-01 -8.6874E-01 -1.0600E-02 1.0000E+00 -9.5498E-01 -3.3737E-02 9.0943E-01 -8.6628E-01 -2.5516E-02 9.0820E-01 -8.6326E-01 -1.9949E-03 9.0772E-01 -8.6226E-01 -5.5337E-02 9.1052E-01 -8.6881E-01 4.7041E-02 9.0875E-01 -8.6709E-01
9 -3.5336E-02 -8.6854E-01 9.0913E-01 -3.4193E-02 -8.6771E-01 9.0748E-01 -2.5070E-02 -9.5498E-01 1.0000E+00 4.1227E-03 -8.6963E-01 9.0663E-01 -4.8367E-03 -8.6887E-01 9.0377E-01 -3.0338E-02 -8.6819E-01 9.0273E-01 2.7839E-02 -8.7049E-01 9.0905E-01 -8.2706E-02 -8.6673E-01 9.0671E-01
10 8.9341E-01 -3.1457E-02 1.6552E-04 8.9427E-01 -2.9640E-02 -4.2321E-03 8.9705E-01 -3.3737E-02 4.1227E-03 1.0000E+00 -4.6502E-02 1.5971E-02 9.0213E-01 -3.7709E-02 1.1915E-02 8.9463E-01 -3.7221E-02 1.1963E-02 9.0207E-01 -3.6504E-02 7.6702E-03 8.5771E-01 -3.2055E-02 3.5604E-03
11 4.4550E-03 9.0873E-01 -8.6855E-01 3.1930E-03 9.0774E-01 -8.6544E-01 -5.3212E-03 9.0943E-01 -8.6963E-01 -4.6502E-02 1.0000E+00 -9.5593E-01 -2.7531E-02 9.0901E-01 -8.6702E-01 -8.2025E-04 9.0830E-01 -8.6603E-01 -6.1412E-02 9.1070E-01 -8.7071E-01 5.4824E-02 9.0674E-01 -8.6718E-01
12 -3.7268E-02 -8.6410E-01 9.0423E-01 -3.5975E-02 -8.6159E-01 8.9939E-01 -2.6316E-02 -8.6628E-01 9.0663E-01 1.5971E-02 -9.5593E-01 1.0000E+00 -1.0368E-03 -8.6894E-01 9.0661E-01 -3.1389E-02 -8.6790E-01 9.0559E-01 3.7806E-02 -8.6958E-01 9.0900E-01 -9.3825E-02 -8.6249E-01 9.0387E-01
13 8.9607E-01 -2.3907E-02 -7.6644E-03 8.9685E-01 -2.2874E-02 -1.0571E-02 8.9883E-01 -2.5516E-02 -4.8367E-03 9.0213E-01 -2.7531E-02 -1.0368E-03 1.0000E+00 -3.5611E-02 4.7020E-03 8.9682E-01 -2.7751E-02 6.0661E-04 8.9851E-01 -2.7299E-02 -2.3990E-03 8.6512E-01 -2.4423E-02 -5.2024E-03
14 4.9339E-03 9.0724E-01 -8.6735E-01 3.6444E-03 9.0595E-01 -8.6367E-01 -5.1416E-03 9.0820E-01 -8.6887E-01 -3.7709E-02 9.0901E-01 -8.6894E-01 -3.5611E-02 1.0000E+00 -9.5587E-01 -4.9266E-04 9.0757E-01 -8.6624E-01 -6.3048E-02 9.0985E-01 -8.7038E-01 5.6935E-02 9.0530E-01 -8.6636E-01
15 -3.7998E-02 -8.6048E-01 9.0034E-01 -3.6642E-02 -8.5728E-01 8.9418E-01 -2.6357E-02 -8.6326E-01 9.0377E-01 1.1915E-02 -8.6702E-01 9.0661E-01 4.7020E-03 -9.5587E-01 1.0000E+00 -3.1765E-02 -8.6602E-01 9.0498E-01 4.1918E-02 -8.6744E-01 9.0713E-01 -9.8304E-02 -8.5897E-01 9.0086E-01
16 8.9964E-01 -2.3030E-03 -2.9934E-02 9.0018E-01 -3.5067E-03 -2.8574E-02 8.9986E-01 -1.9949E-03 -3.0338E-02 8.9463E-01 -8.2025E-04 -3.1389E-02 8.9682E-01 -4.9266E-04 -3.1765E-02 1.0000E+00 -3.0609E-03 -3.3085E-02 8.8435E-01 -9.6714E-04 -3.1073E-02 8.8234E-01 -2.5919E-03 -3.0136E-02
17 4.6670E-03 9.0691E-01 -8.6690E-01 3.3906E-03 9.0577E-01 -8.6353E-01 -5.2365E-03 9.0772E-01 -8.6819E-01 -3.7221E-02 9.0830E-01 -8.6790E-01 -2.7751E-02 9.0757E-01 -8.6602E-01 -3.0609E-03 1.0000E+00 -9.5540E-01 -6.2108E-02 9.0916E-01 -8.6946E-01 5.5742E-02 9.0495E-01 -8.6573E-01
18 -3.7967E-02 -8.5947E-01 8.9928E-01 -3.6610E-02 -8.5625E-01 8.9308E-01 -2.6323E-02 -8.6226E-01 9.0273E-01 1.1963E-02 -8.6603E-01 9.0559E-01 6.0661E-04 -8.6624E-01 9.0498E-01 -3.3085E-02 -9.5540E-01 1.0000E+00 4.1978E-02 -8.6645E-01 9.0610E-01 -9.8302E-02 -8.5798E-01 8.9984E-01
19 8.8191E-01 -5.1293E-02 2.0907E-02 8.8298E-01 -4.7410E-02 1.2577E-02 8.8788E-01 -5.5337E-02 2.7839E-02 9.0207E-01 -6.1412E-02 3.7806E-02 8.9851E-01 -6.3048E-02

4.1918E-02 8.8435E-01 -6.2108E-02 4.1978E-02 1.0000E+00 -7.5000E-02 4.5595E-02 8.3381E-01 -5.2098E-02 2.6753E-02
  20 4.2446E-03 9.0995E-01 -8.6961E-01 2.9949E-03 9.0909E-01 -8.6676E-01 -5.4014E-03 9.1052E-01 -8.7049E-01 -3.6504E-02 9.1070E-01 -8.6958E-01 -2.7299E-02 9.0985E-01 -8.6744E-01 -9.6714E-04 9.0916E-01 -8.6645E-01 -7.5000E-02 1.0000E+00 -9.5597E-01 5.3890E-02 9.0792E-01 -8.6805E-01
  21 -3.6653E-02 -8.6714E-01 9.0751E-01 -3.5413E-02 -8.6523E-01 9.0381E-01 -2.6285E-02 -8.6881E-01 9.0905E-01 7.6702E-03 -8.7071E-01 9.0900E-01 -2.3990E-03 -8.7038E-01 9.0713E-01 -3.1073E-02 -8.6946E-01 9.0610E-01 4.5595E-02 -9.5597E-01 1.0000E+00 -9.0026E-02 -8.6544E-01 9.0640E-01
  22 8.8566E-01 4.2753E-02 -7.5584E-02 8.8570E-01 3.6925E-02 -6.5379E-02 8.8060E-01 4.7041E-02 -8.2706E-02 8.5771E-01 5.4824E-02 -9.3825E-02 8.6512E-01 5.6935E-02 -9.8304E-02 8.8234E-01 5.5742E-02 -9.8302E-02 8.3381E-01 5.3890E-02 -9.0026E-02 1.0000E+00 5.0191E-02 -9.3009E-02
  23 1.7902E-03 9.0947E-01 -8.6803E-01 6.7678E-04 9.1012E-01 -8.6804E-01 -6.2795E-03 9.0875E-01 -8.6673E-01 -3.2055E-02 9.0674E-01 -8.6249E-01 -2.4423E-02 9.0530E-01 -8.5897E-01 -2.5919E-03 9.0495E-01 -8.5798E-01 -5.2098E-02 9.0792E-01 -8.6544E-01 5.0191E-02 1.0000E+00 -9.5429E-01
  24 -3.5019E-02 -8.6649E-01 9.0700E-01 -3.3890E-02 -8.6582E-01 9.0568E-01 -2.5965E-02 -8.6709E-01 9.0671E-01 3.5604E-03 -8.6718E-01 9.0387E-01 -5.2024E-03 -8.6636E-01 9.0086E-01 -3.0136E-02 -8.6573E-01 8.9984E-01 2.6753E-02 -8.6805E-01 9.0640E-01 -9.3009E-02 -9.5429E-01 1.0000E+00

G-FILE for the vectors

Axx2014 2162014 216
B20140216190020140216190 8 rsgps 1.37IGS
Iant_info.003 NGS
C00090001 46203015 17 85027694 110 141138132 56
C00090002 10229239 17 -164604144 110 -280876597 55
C00090003 286389988 17 221292110 111 356331834 57
C00090004 968807203 17 352578846 113 522453166 58
C00090005 789762289 17 527241717 114 825995196 59
C00090006 256107878 17 671724418 113 1099262874 59
C00090007 1464019311 17 124803151 113 96425793 57
C00090008-1083533383 17 575757992 111 999513466 57
D 1 2 -14348 1 3 -345896 1 4 9009683 1 5 4431 1 6 -322106
D 1 7 9002220 1 8 27037 1 9 -353358 1 10 8934102 1 11 44550
D 1 12 -372680 1 13 8960710 1 14 49339 1 15 -379979 1 16 8996433
D 1 17 46670 1 18 -379674 1 19 8819127 1 20 42445 1 21 -366531
D 1 22 8856589 1 23 17901 1 24 -350187 2 3 -9541963 2 4 9468
D 2 5 9124297 2 6 -8701711 2 7 -59439 2 8 9108715 2 9 -8685432
D 2 10 -314570 2 11 9087345 2 12 -8640995 2 13 -239070 2 14 9072423
D 2 15 -8604849 2 16 -23030 2 17 9069098 2 18 -8594729 2 19 -512930
D 2 20 9099479 2 21 -8671410 2 22 427527 2 23 9094701 2 24 -8664919
D 3 4 -333034 3 5 -8702487 3 6 9112240 3 7 -262188 3 8 -8697910
D 3 9 9091281 3 10 1655 3 11 -8685487 3 12 9042269 3 13 -76644

D 3 14 -8673513 3 15 9003406 3 16 -299338 3 17 -8669045 3 18 8992771
D 3 19 209067 3 20 -8696092 3 21 9075068 3 22 -755844 3 23 -8680332
D 3 24 9070005 4 5 -50398 4 6 -305539 4 7 9008014 4 8 15405
D 4 9 -341927 4 10 8942673 4 11 31929 4 12 -359745 4 13 8968461
D 4 14 36443 4 15 -366419 4 16 9001820 4 17 33905 4 18 -366104
D 4 19 8829793 4 20 29949 4 21 -354133 4 22 8856976 4 23 6767
D 4 24 -338897 5 6 -9530264 5 7 -67707 5 8 9109762 5 9 -8677063
D 5 10 -296404 5 11 9077385 5 12 -8615922 5 13 -228742 5 14 9059520
D 5 15 -8572787 5 16 -35066 5 17 9057748 5 18 -8562511 5 19 -474099
D 5 20 9090928 5 21 -8652290 5 22 369249 5 23 9101184 5 24 -8658226
D 6 7 -255760 6 8 -8687427 6 9 9074834 6 10 -42320 6 11 -8654365
D 6 12 8993938 6 13 -105705 6 14 -8636659 6 15 8941757 6 16 -285736
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D 6 22 -653790 6 23 -8680372 6 24 9056799 7 8 -105996 7 9 -250703
D 7 10 8970549 7 11 -53212 7 12 -263164 7 13 8988293 7 14 -51415
D 7 15 -263565 7 16 8998635 7 17 -52365 7 18 -263234 7 19 8878829
D 7 20 -54014 7 21 -262853 7 22 8805981 7 23 -62795 7 24 -259645
D 8 9 -9549792 8 10 -337368 8 11 9094308 8 12 -8662783 8 13 -255156
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D 12 20 -8695845 12 21 9089994 12 22 -938247 12 23 -8624866 12 24 9038721
D 13 14 -356112 13 15 47019 13 16 8968246 13 17 -277508 13 18 6066
D 13 19 8985134 13 20 -272990 13 21 -23989 13 22 8651163 13 23 -244232
D 13 24 -52024 14 15 -9558651 14 16 -4926 14 17 9075700 14 18 -8662388
D 14 19 -630481 14 20 9098510 14 21 -8703798 14 22 569350 14 23 9052973
D 14 24 -8663604 15 16 -317645 15 17 -8660246 15 18 9049756 15 19 419179
D 15 20 -8674401 15 21 9071335 15 22 -983043 15 23 -8589722 15 24 9008643
D 16 17 -30608 16 18 -330850 16 19 8843474 16 20 -9671 16 21 -310727
D 16 22 8823384 16 23 -25918 16 24 -301357 17 18 -9553953 17 19 -621080
D 17 20 9091588 17 21 -8694581 17 22 557418 17 23 9049549 17 24 -8657288
D 18 19 419784 18 20 -8664500 18 21 9061010 18 22 -983023 18 23 -8579779
D 18 24 8998350 19 20 -749997 19 21 455953 19 22 8338060 19 23 -520980
D 19 24 267527 20 21 -9559720 20 22 538901 20 23 9079237 20 24 -8680548
D 21 22 -900255 21 23 -8654396 21 24 9063993 22 23 501912 22 24 -930090
D 23 24 -9542862

ITRF position of mob_ as determined by individual baselines

X Y Z

al90	183925.702	-5494814.486	3222342.510
aldi	183925.697	-5494814.517	3222342.536
al92	183925.690	-5494814.545	3222342.536
aleb	183925.692	-5494814.547	3222342.544
alre	183925.693	-5494814.533	3222342.542
al84	183925.697	-5494814.543	3222342.531
fle5	183925.692	-5494814.502	3222342.530
msev	183925.695	-5494814.506	3222342.523

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
al90	0.007	0.040	-0.024	0.009	-0.000	-0.046
aldi	0.002	0.009	0.003	0.003	0.007	-0.006
al92	-0.005	-0.019	0.003	-0.006	-0.007	0.018
aleb	-0.003	-0.020	0.011	-0.004	-0.001	0.023
alre	-0.002	-0.006	0.008	-0.002	0.004	0.010
al84	0.003	-0.017	-0.003	0.002	-0.011	0.013
fle5	-0.003	0.024	-0.003	-0.002	0.010	-0.023
msev	0.001	0.021	-0.010	0.001	0.001	-0.023

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

dop from interpolation is 0.581
scatter (mean square distance from rover) is 12137.226
average edop for rover is 1.130
average ndop for rover is 1.060
average hdop for rover is 1.549
average vdop for rover is 2.560
average gdop for rover is 3.620

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.

FILE: MOB_04.14O OP1393352116640

NGS OPUS-RS SOLUTION REPORT
==========

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

USER: blkimbrough@theatlgrp.com DATE: February 25, 2014
RINEX FILE: mob_048p.14o TIME: 18:30:40 UTC

SOFTWARE: rsgps 1.37 RS92.prl 1.89 START: 2014/02/17 15:45:20
EPHEMERIS: igr17801.eph [rapid] STOP: 2014/02/17 16:07:05
NAV FILE: brdc0480.14n OBS USED: 1680 / 2248 : 75%
ANT NAME: TPSHIPER_V NONE QUALITY IND. 5.59/ 25.34
ARP HEIGHT: 2.000 NORMALIZED RMS: 0.263

REF FRAME:	NAD_83(2011)(EPOCH:2010.0000)		IGS08 (EPOCH:2014.13059)	
X:	189726.193(m)	0.004(m)	189725.419(m)	0.004(m)
Y:	-5459831.018(m)	0.022(m)	-5459829.523(m)	0.022(m)
Z:	3280578.033(m)	0.015(m)	3280577.867(m)	0.015(m)
LAT:	31 9 16.95521	0.004(m)	31 9 16.97615	0.004(m)
E LON:	271 59 24.70821	0.004(m)	271 59 24.68097	0.004(m)
W LON:	88 0 35.29179	0.004(m)	88 0 35.31903	0.004(m)
EL HGT:	-12.283(m)	0.026(m)	-13.671(m)	0.026(m)
ORTHO HGT:	16.043(m)	0.028(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES UTM (Zone 16)	STATE PLANE COORDINATES SPC (0102 AL W)
Northing (Y) [meters]	3447186.693	128117.064
Easting (X) [meters]	403751.713	551393.337
Convergence [degrees]	-0.52246265	-0.26375226
Point Scale	0.99971426	0.99996246
Combined Factor	0.99971619	0.99996439

US NATIONAL GRID DESIGNATOR: 16RDV0375147186(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI3826	AL90 ALDOT 9 DIV OFF CORS ARP	N304126.969	W0880154.137	51472.4
DL9796	AL84 ALDOT 8 DIV DIS 4 CORS ARP	N314201.327	W0874720.982	64034.9
DL3486	ALDI DAUPHIN ISLAND CORS ARP	N301456.987	W0880440.688	100603.7
DM3483	AL82 ALDOT 8 DIV DIS 2 CORS ARP	N321526.784	W0873732.930	127573.2

DM2680 ALAN ANDALUSIA POL DEP CORS ARP N311826.549 W0862902.227 146351.3
DL3065 FLE5 EGLIN 5 CORS ARP N303836.931 W0863306.887 150455.0
DN9085 AL81 ALDOT 8 DIV DIS 1 CORS ARP N323432.544 W0881054.297 158400.4
DM3975 ALSE WALLACE COMM COLL CORS ARP N322650.689 W0870042.376 171685.1

NEAREST NGS PUBLISHED CONTROL POINT
AA8480 65 22 N310944.843 W0880213.099 2728.0

OPUS-RS Extended Output, Level 2

FINAL COORDINATES (ITRF at epoch of observations)

al90	188545.999	-5486311.731	3236456.334
al84	209536.484	-5427642.097	3332268.814
aldi	184948.619	-5511274.918	3194254.862
al82	223651.348	-5394263.144	3384621.183
alan	334509.359	-5444166.193	3295102.815
fle5	330327.631	-5482334.211	3231985.115
al81	170701.181	-5377264.766	3414412.919
alse	280860.568	-5380301.822	3402419.988
mob_	189725.419	-5459829.523	3280577.867

Covariance matrix of the stations:
1 3.7940E-07 -1.0990E-06 9.2910E-07 -3.2020E-08 1.7360E-07 -1.5020E-07 -2.3830E-08 1.8800E-07 -1.1180E-07 -3.3640E-08 1.5480E-07 -1.5370E-07 -5.0840E-08 1.4480E-07 -1.1180E-07 -4.8220E-08 1.4820E-07 -9.3510E-08 -2.3500E-08 1.5520E-07 -1.6660E-07 -4.2150E-08 1.3430E-07 -1.4120E-07 5.7220E-08 -1.7930E-07 1.5460E-07
2 -1.0990E-06 8.6000E-06 -5.8700E-06 1.6780E-07 -1.1600E-06 7.8920E-07 1.9920E-07 -1.1420E-06 9.1500E-07 1.5990E-07 -1.2040E-06 7.7160E-07 1.1930E-07 -1.2540E-06 8.9880E-07 1.3150E-07 -1.2580E-06 9.6000E-07 1.8610E-07 -1.1980E-06 7.3490E-07 1.3500E-07 -1.2600E-06 8.0080E-07 1.9080E-07 -9.3930E-07 7.7090E-07
3 9.2910E-07 -5.8700E-06 4.6330E-06 -1.3390E-07 8.7370E-07 -6.7500E-07 -1.2460E-07 8.5120E-07 -6.2150E-07 -1.3580E-07 8.6840E-07 -6.8460E-07 -1.3330E-07 7.7520E-07 -5.8230E-07 -1.2950E-07 7.6200E-07 -5.5880E-07 -1.3470E-07 9.1430E-07 -7.3510E-07 -1.3690E-07 8.2540E-07 -6.5060E-07 -6.2320E-09 7.3870E-08 -1.9620E-08
4 -3.2020E-08 1.6780E-07 -1.3390E-07 3.7980E-07 -1.1150E-06 9.6080E-07 -3.1260E-08 1.6850E-07 -1.2800E-07 -3.4480E-08 1.5330E-07 -1.4440E-07 -4.4890E-08 1.6320E-07 -1.3700E-07 -4.4320E-08 1.6640E-07 -1.3030E-07 -2.8950E-08 1.4630E-07 -1.4420E-07 -3.8950E-08 1.4970E-07 -1.4290E-07 2.7110E-08 -5.0330E-08 3.9240E-08
5 1.7360E-07 -1.1600E-06 8.7370E-07 -1.1150E-06 8.0560E-06 -5.8440E-06 1.7930E-07 -1.1830E-06 8.9870E-07 1.5480E-07 -1.1110E-06 8.0290E-07 1.4700E-07 -1.1190E-06 8.2360E-07 1.5500E-07 -1.1420E-06 8.5410E-07 1.6120E-07 -1.1190E-06 8.0500E-07 1.4470E-07 -1.0990E-06 7.8630E-07 8.7710E-08 -4.4770E-07 3.9320E-07

6 -1.5020E-07 7.8920E-07 -6.7500E-07 9.6080E-07 -5.8440E-06 4.8540E-06 -1.5390E-07 7.8510E-07 -6.9170E-07 -1.4060E-07 8.5640E-07 -6.5790E-07 -1.1500E-07 8.3920E-07 -6.8170E-07 -1.1880E-07 8.2770E-07 -7.0090E-07 -1.5540E-07 8.7400E-07 -6.5990E-07 -1.2730E-07 8.7300E-07 -6.6220E-07 -1.1170E-07 5.6890E-07 -4.6290E-07

7 -2.3830E-08 1.9920E-07 -1.2460E-07 -3.1260E-08 1.7930E-07 -1.5390E-07 3.8350E-07 -1.0920E-06 9.2950E-07 -3.3440E-08 1.5490E-07 -1.5830E-07 -5.4170E-08 1.3520E-07 -9.9230E-08 -5.0550E-08 1.3910E-07 -7.5320E-08 -2.0940E-08 1.5880E-07 -1.7770E-07 -4.3980E-08 1.2570E-07 -1.4020E-07 6.8140E-08 -2.3660E-07 2.0460E-07

8 1.8800E-07 -1.1420E-06 8.5120E-07 1.6850E-07 -1.1830E-06 7.8510E-07 -1.0920E-06 8.7450E-06 -5.7880E-06 1.6130E-07 -1.2320E-06 7.7130E-07 1.1910E-07 -1.2740E-06 8.9220E-07 1.3040E-07 -1.2730E-06 9.5020E-07 1.8810E-07 -1.2290E-06 7.3740E-07 1.3660E-07 -1.2890E-06 8.0130E-07 2.0060E-07 -1.0810E-06 8.4260E-07

9 -1.1180E-07 9.1500E-07 -6.2150E-07 -1.2800E-07 8.9870E-07 -6.9170E-07 9.2950E-07 -5.7880E-06 4.5400E-06 -1.3290E-07 8.6100E-07 -7.0640E-07 -1.5070E-07 7.1420E-07 -5.0780E-07 -1.4140E-07 7.0390E-07 -4.5290E-07 -1.1840E-07 9.2650E-07 -7.9340E-07 -1.4550E-07 7.6890E-07 -6.4050E-07 6.6890E-08 -2.3350E-07 2.5640E-07

10 -3.3640E-08 1.5990E-07 -1.3580E-07 -3.4480E-08 1.5480E-07 -1.4060E-07 -3.3440E-08 1.6130E-07 -1.3290E-07 3.8080E-07 -1.1010E-06 9.7190E-07 -4.3170E-08 1.6580E-07 -1.4370E-07 -4.3290E-08 1.6940E-07 -1.4070E-07 -3.0170E-08 1.3940E-07 -1.3620E-07 -3.7780E-08 1.5010E-07 -1.4200E-07 1.9720E-08 -2.0080E-08 1.0070E-08

11 1.5480E-07 -1.2040E-06 8.6840E-07 1.5330E-07 -1.1110E-06 8.5640E-07 1.5490E-07 -1.2320E-06 8.6100E-07 -1.1010E-06 7.7200E-06 -5.6870E-06 1.7320E-07 -9.9340E-07 7.3200E-07 1.7560E-07 -1.0310E-06 7.2640E-07 1.3540E-07 -1.0660E-06 8.7590E-07 1.5440E-07 -9.5740E-07 7.6690E-07 -2.6630E-08 1.4080E-07 -6.8430E-08

12 -1.5370E-07 7.7160E-07 -6.8460E-07 -1.4440E-07 8.0290E-07 -6.5790E-07 -1.5830E-07 7.7130E-07 -7.0640E-07 9.7190E-07 -5.6870E-06 4.8910E-06 -1.1470E-07 8.2820E-07 -6.9290E-07 -1.2000E-07 8.2160E-07 -7.1890E-07 -1.5610E-07 8.4140E-07 -6.4670E-07 -1.2580E-07 8.5070E-07 -6.5830E-07 -1.1870E-07 5.7510E-07 -4.8890E-07

13 -5.0840E-08 1.1930E-07 -1.3330E-07 -4.4890E-08 1.4700E-07 -1.1500E-07 -5.4170E-08 1.1910E-07 -1.5070E-07 -4.3170E-08 1.7320E-07 -1.1470E-07 4.4240E-07 -1.1480E-06 9.5150E-07 -3.6520E-08 2.2200E-07 -2.1170E-07 -5.0860E-08 1.5100E-07 -8.2860E-08 -3.6910E-08 2.1620E-07 -1.4370E-07 -5.4530E-08 3.1720E-07 -2.5980E-07

14 1.4480E-07 -1.2540E-06 7.7520E-07 1.6320E-07 -1.1190E-06 8.3920E-07 1.3520E-07 -1.2740E-06 7.1420E-07 1.6580E-07 -9.9340E-07 8.2820E-07 -1.1480E-06 7.5130E-06 -5.2760E-06 2.1680E-07 -8.6600E-07 4.6560E-07 1.2770E-07 -1.0650E-06 9.4960E-07 1.9300E-07 -8.1760E-07 7.0480E-07 -1.5770E-07 8.8930E-07 -7.3550E-07

15 -1.1180E-07 8.9880E-07 -5.8230E-07 -1.3700E-07 8.2360E-07 -6.8170E-07 -9.9230E-08 8.9220E-07 -5.0780E-07 -1.4370E-07 7.3200E-07 -6.9290E-07 9.5150E-07 -5.2760E-06 4.2900E-06 -1.7790E-07 5.4100E-07 -2.9740E-07 -1.1050E-07 8.1520E-07 -8.2090E-07 -1.7050E-07 5.7330E-07 -5.8240E-07 1.5990E-07 -8.6290E-07 7.3930E-07

16 -4.8220E-08 1.3150E-07 -1.2950E-07 -4.4320E-08 1.5500E-07 -1.1880E-07 -5.0550E-08 1.3040E-07 -1.4140E-07 -4.3290E-08 1.7560E-07 -1.2000E-07 -3.6520E-08 2.1680E-07 -1.7790E-07 4.3580E-07 -1.1760E-06 9.2580E-07 -4.8520E-08 1.5770E-07 -9.5490E-08 -3.9230E-08 2.0950E-07 -1.4310E-07 -4.0320E-08 2.5260E-07 -2.0100E-07

17 1.4820E-07 -1.2580E-06 7.6200E-07 1.6640E-07 -1.1420E-06 8.2770E-07 1.3910E-07 -1.2730E-06 7.0390E-07 1.6940E-07 -1.0310E-06 8.2160E-07 2.2200E-07 -8.6600E-07 5.4100E-07 -1.1760E-06 7.6670E-06 -5.3010E-06 1.3530E-07 -1.1040E-06 9.3900E-07 1.9430E-07 -8.6830E-07 7.0700E-07 -1.3470E-07 7.5670E-07 -6.5460E-07

18 -9.3510E-08 9.6000E-07 -5.5880E-07 -1.3030E-07 8.5410E-07 -7.0090E-07 -7.5320E-08 9.5020E-07 -4.5290E-07 -1.4070E-07 7.2640E-07 -7.1890E-07 -2.1170E-07 4.6560E-07 -2.9740E-07 9.2580E-07 -5.3010E-06 4.3150E-06 -9.2120E-08 8.3320E-07 -8.8990E-07 -1.8080E-07 5.1130E-07 -5.7190E-07 2.5150E-07 -1.2870E-06 1.1110E-06

19 -2.3500E-08 1.8610E-07 -1.3470E-07 -2.8950E-08 1.6120E-07 -1.5540E-07 -2.0940E-08 1.8810E-07 -1.1840E-07 -3.0170E-08 1.3540E-07 -1.5610E-07 -5.0860E-08 1.2770E-07 -1.1050E-07 -4.8520E-08 1.3530E-07 -9.2120E-08 3.6740E-07 -1.0440E-06 9.0730E-07 -3.9670E-08 1.0960E-07 -1.3990E-07 6.6190E-08 -2.3450E-07 1.8450E-07

20 1.5520E-07 -1.1980E-06 9.1430E-07 1.4630E-07 -1.1190E-06 8.7400E-07 1.5880E-07 -1.2290E-06 9.2650E-07 1.3940E-07 -1.0660E-06 8.4140E-07 1.5100E-07 -1.0650E-06 8.1520E-07 1.5770E-07 -1.1040E-06 8.3320E-07 -1.0440E-06 7.9230E-06 -6.0050E-06 1.3690E-07 -1.0180E-06 8.0020E-07 1.7760E-08 -1.4300E-07 1.8610E-07

21 -1.6660E-07 7.3490E-07 -7.3510E-07 -1.4420E-07 8.0500E-07 -6.5990E-07 -1.7770E-07 7.3740E-07 -7.9340E-07 -1.3620E-07 8.7590E-07 -6.4670E-07 -8.2860E-08 9.4960E-07 -8.2090E-07 -9.5490E-08 9.3900E-07 -8.8990E-07 9.0730E-07 -6.0050E-06 5.3680E-06 -1.0590E-07 9.6430E-07 -6.9730E-07 -2.2110E-07 1.1290E-06 -9.6440E-07

22 -4.2150E-08 1.3500E-07 -1.3690E-07 -3.8950E-08 1.4470E-07 -1.2730E-07 -4.3980E-08 1.3660E-07 -1.4550E-07 -3.7780E-08 1.5440E-07 -1.2580E-07 -3.6910E-08 1.9300E-07 -1.7050E-07 -3.9230E-08 1.9430E-07 -1.8080E-07 -3.9670E-08 1.3690E-07 -1.0590E-07 4.0340E-07 -1.0950E-06 9.9240E-07 -1.8160E-08 1.4960E-07 -1.3090E-07

23 1.3430E-07 -1.2600E-06 8.2540E-07 1.4970E-07 -1.0990E-06 8.7300E-07 1.2570E-07 -1.2890E-06 7.6890E-07 1.5010E-07 -9.5740E-07 8.5070E-07 2.1620E-07 -8.1760E-07 5.7330E-07 2.0950E-07 -8.6830E-07 5.1130E-07 1.0960E-07 -1.0180E-06 9.6430E-07 -1.0950E-06 7.4330E-06 -5.3670E-06 -1.7790E-07 9.4930E-07 -7.3420E-07

24 -1.4120E-07 8.0080E-07 -6.5060E-07 -1.4290E-07 7.8630E-07 -6.6220E-07 -1.4020E-07 8.0130E-07 -6.4050E-07 -1.4200E-07 7.6690E-07 -6.5830E-07 -1.4370E-07 7.0480E-07 -5.8240E-07 -1.4310E-07 7.0700E-07 -5.7190E-07 -1.3990E-07 8.0020E-07 -6.9730E-07 9.9240E-07 -5.3670E-06 4.5880E-06 -2.0120E-08 3.4880E-08 -4.4580E-08

25 5.7220E-08 1.9080E-07 -6.2320E-09 2.7110E-08 8.7710E-08 -1.1170E-07 6.8140E-08 2.0060E-07 6.6890E-08 1.9720E-08 -2.6630E-08 -1.1870E-07 -5.4530E-08 -1.5770E-07 1.5990E-07 -4.0320E-08 -1.3470E-07 2.5150E-07 6.6190E-08 1.7760E-08 -2.2110E-07 -1.8160E-08 -1.7790E-07 -2.0120E-08 4.6500E-06 -1.6890E-05 1.3980E-05

26 -1.7930E-07 -9.3930E-07 7.3870E-08 -5.0330E-08 -4.4770E-07 5.6890E-07 -2.3660E-07 -1.0810E-06 -2.3350E-07 -2.0080E-08 1.4080E-07 5.7510E-07 3.1720E-07 8.8930E-07 -8.6290E-07 2.5260E-07 7.5670E-07 -1.2870E-06 -2.3450E-07 -1.4300E-07 1.1290E-06 1.4960E-07 9.4930E-07 3.4880E-08 -1.6890E-05 1.1730E-04 -8.5860E-05

27 1.5460E-07 7.7090E-07 -1.9620E-08 3.9240E-08 3.9320E-07 -4.6290E-07 2.0460E-07 8.4260E-07 2.5640E-07 1.0070E-08 -6.8430E-08 -4.8890E-07 -2.5980E-07 -7.3550E-07 7.3930E-07 -2.0100E-07 -6.5460E-07 1.1110E-06 1.8450E-07 1.8610E-07 -9.6440E-07 -1.3090E-07 -7.3420E-07 -4.4580E-08 1.3980E-05 -8.5860E-05 6.8890E-05

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

0.0000046500	-0.0000168900	0.0000139800
-0.0000168900	0.0001173000	-0.0000858600
0.0000139800	-0.0000858600	0.0000688900

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

0.0000036134	0.0000027603	0.0000167507

0.0000027603 0.0000058236 0.0000187303
0.0000167507 0.0000187303 0.0001814029

Horizontal network accuracy = 0.00563 meters.
Vertical network accuracy = 0.02641 meters.

		Vectors		
To	From	X	Y	Z
al90	mob_	-1179.420	-26482.208	-44121.533
al84	mob_	19811.065	32187.426	51690.947
aldi	mob_	-4776.799	-51445.396	-86323.005
al82	mob_	33925.930	65566.379	104043.316
alan	mob_	144783.941	15663.330	14524.948
fle5	mob_	140602.212	-22504.688	-48592.752
al81	mob_	-19024.237	82564.756	133835.051
alse	mob_	91135.149	79527.700	121842.120

Covariance matrix of the 8 vectors

1 4.9150E-06 -1.8000E-05 1.4761E-05 4.5337E-06 -1.6625E-05 1.3787E-05 4.5008E-06 -1.6723E-05 1.3647E-05 4.5394E-06 -1.6529E-05 1.3790E-05 4.5965E-06 -1.6408E-05 1.3554E-05 4.5849E-06 -1.6428E-05 1.3480E-05 4.5031E-06 -1.6573E-05 1.3880E-05 4.5688E-06 -1.6398E-05 1.3704E-05

2 -1.8000E-05 1.2778E-04 -9.2575E-05 -1.6863E-05 1.1753E-04 -8.6411E-05 -1.6645E-05 1.1818E-04 -8.5482E-05 -1.6901E-05 1.1689E-04 -8.6434E-05 -1.7279E-05 1.1610E-04 -8.4869E-05 -1.7202E-05 1.1622E-04 -8.4384E-05 -1.6660E-05 1.1718E-04 -8.7025E-05 -1.7095E-05 1.1603E-04 -8.5865E-05

3 1.4761E-05 -9.2575E-05 7.3562E-05 1.3813E-05 -8.5453E-05 6.8698E-05 1.3657E-05 -8.5925E-05 6.8032E-05 1.3840E-05 -8.4997E-05 6.8714E-05 1.4113E-05 -8.4423E-05 6.7588E-05 1.4058E-05 -8.4517E-05 6.7240E-05 1.3667E-05 -8.5206E-05 6.9139E-05 1.3980E-05 -8.4374E-05 6.8304E-05

4 4.5337E-06 -1.6863E-05 1.3813E-05 4.9756E-06 -1.8042E-05 1.5013E-05 4.5235E-06 -1.6872E-05 1.3746E-05 4.5687E-06 -1.6660E-05 1.3915E-05 4.6325E-06 -1.6519E-05 1.3644E-05 4.6189E-06 -1.6539E-05 1.3559E-05 4.5277E-06 -1.6711E-05 1.4018E-05 4.6021E-06 -1.6512E-05 1.3818E-05

5 -1.6625E-05 1.1753E-04 -8.5453E-05 -1.8042E-05 1.2625E-04 -9.2666E-05 -1.6562E-05 1.1765E-04 -8.5121E-05 -1.6803E-05 1.1650E-04 -8.6025E-05 -1.7148E-05 1.1574E-04 -8.4567E-05 -1.7075E-05 1.1585E-04 -8.4112E-05 -1.6582E-05 1.1677E-04 -8.6577E-05 -1.6983E-05 1.1570E-04 -8.5502E-05

6 1.3787E-05 -8.6411E-05 6.8698E-05 1.5013E-05 -9.2666E-05 7.4670E-05 1.3733E-05 -8.6486E-05 6.8405E-05 1.3941E-05 -8.5504E-05 6.9184E-05 1.4236E-05 -8.4854E-05 6.7932E-05 1.4174E-05 -8.4947E-05 6.7541E-05 1.3752E-05 -8.5741E-05 6.9657E-05 1.4095E-05 -8.4822E-05 6.8735E-05

7 4.5008E-06 -1.6645E-05 1.3657E-05 4.5235E-06 -1.6562E-05 1.3733E-05 4.8972E-06 -1.7946E-05 1.4638E-05 4.5287E-06 -1.6472E-05 1.3736E-05 4.5822E-06 -1.6361E-05 1.3516E-05 4.5716E-06 -1.6380E-05 1.3449E-05 4.4947E-06 -1.6512E-05 1.3819E-05 4.5560E-06 -1.6350E-05 1.3655E-05

8 -1.6723E-05 1.1818E-04 -8.5925E-05 -1.6872E-05 1.1765E-04 -8.6486E-05 -1.7946E-05 1.2821E-04 -9.2257E-05 -1.6909E-05 1.1701E-04 -8.6506E-05 -1.7289E-05 1.1622E-04 -8.4947E-05 -1.7213E-05 1.1635E-04 -8.4465E-05 -1.6668E-05 1.1730E-04 -8.7094E-05 -1.7104E-05 1.1614E-04 -8.5936E-05

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22 4.5688E-06 -1.7095E-05 1.3980E-05 4.6021E-06 -1.6983E-05 1.4095E-05 4.5560E-06 -1.7104E-05 1.3899E-05 4.6107E-06 -1.6859E-05 1.4104E-05 4.6858E-06 -1.6689E-05 1.3780E-05 4.6693E-06 -1.6711E-05 1.3679E-05 4.5623E-06 -1.6920E-05 1.4226E-05 5.0897E-06 -1.7957E-05 1.5123E-05

23 -1.6398E-05 1.1603E-04 -8.4374E-05 -1.6512E-05 1.1570E-04 -8.4822E-05 -1.6350E-05 1.1614E-04 -8.4123E-05 -1.6542E-05 1.1525E-04 -8.4850E-05 -1.6813E-05 1.1464E-04 -8.3690E-05 -1.6755E-05 1.1473E-04 -8.3327E-05 -1.6368E-05 1.1548E-04 -8.5290E-05 -1.7957E-05 1.2283E-04 -9.0528E-05

24 1.3704E-05 -8.5865E-05 6.8304E-05 1.3818E-05 -8.5502E-05 6.8735E-05 1.3655E-05 -8.5936E-05 6.8038E-05 1.3848E-05 -8.5060E-05 6.8765E-05 1.4116E-05 -8.4455E-05 6.7613E-05 1.4058E-05 -8.4533E-05 6.7252E-05 1.3676E-05 -8.5281E-05 6.9202E-05 1.5123E-05 -9.0528E-05 7.3567E-05

Correlation matrix of the 8 vectors

1 1.0000E+00 -7.1828E-01 7.7628E-01 9.1678E-01 -6.6739E-01 7.1967E-01 9.1739E-01 -6.6620E-01 7.2086E-01 9.1650E-01 -6.6757E-01 7.1943E-01 9.0908E-01 -6.6725E-01 7.2199E-01 9.0986E-01 -6.6691E-01 7.2171E-01 9.1900E-01 -6.6728E-01 7.1728E-01 9.1347E-01 -6.6740E-01 7.2070E-01

2 -7.1828E-01 1.0000E+00 -9.5485E-01 -6.6877E-01 9.2532E-01 -8.8464E-01 -6.6540E-01 9.2332E-01 -8.8559E-01 -6.6922E-01 9.2590E-01 -8.8435E-01 -6.7022E-01 9.2592E-01 -8.8666E-01 -6.6950E-01 9.2537E-01 -8.8604E-01 -6.6683E-01 9.2534E-01 -8.8201E-01 -6.7035E-01 9.2615E-01 -8.8562E-01

3 7.7628E-01 -9.5485E-01 1.0000E+00 7.2201E-01 -8.8671E-01 9.2692E-01 7.1954E-01 -8.8478E-01 9.2890E-01 7.2229E-01 -8.8731E-01 9.2659E-01 7.2147E-01 -8.8740E-01 9.3063E-01 7.2109E-01 -8.8688E-01 9.3051E-01 7.2096E-01 -8.8675E-01 9.2354E-01 7.2250E-01 -8.8761E-01 9.2848E-01

4 9.1678E-01 -6.6877E-01 7.2201E-01 1.0000E+00 -7.1987E-01 7.7890E-01 9.1638E-01 -6.6801E-01 7.2166E-01 9.1677E-01 -6.6872E-01 7.2149E-01 9.1061E-01 -6.6764E-01 7.2236E-01 9.1100E-01 -6.6730E-01 7.2149E-01 9.1839E-01 -6.6872E-01 7.1997E-01 9.1451E-01 -6.6791E-01 7.2224E-01

5 -6.6739E-01 9.2532E-01 -8.8671E-01 -7.1987E-01 1.0000E+00 -9.5440E-01 -6.6606E-01 9.2470E-01 -8.8716E-01 -6.6935E-01 9.2831E-01 -8.8548E-01 -6.6916E-01 9.2865E-01 -8.8883E-01 -6.6858E-01 9.2795E-01 -8.8851E-01 -6.6771E-01 9.2765E-01 -8.8277E-01 -6.6995E-01 9.2908E-01 -8.8719E-01

6 7.1967E-01 -8.8464E-01 9.2692E-01 7.7890E-01 -9.5440E-01 1.0000E+00 7.1817E-01 -8.8393E-01 9.2704E-01 7.2213E-01 -8.8596E-01 9.2598E-01 7.2238E-01 -8.8529E-01 9.2840E-01 7.2164E-01 -8.8475E-01 9.2772E-01 7.2004E-01 -8.8568E-01 9.2354E-01 7.2303E-01 -8.8568E-01 9.2740E-01

7 9.1739E-01 -6.6540E-01 7.1954E-01 9.1638E-01 -6.6606E-01 7.1817E-01 1.0000E+00 -7.1620E-01 7.7463E-01 9.1599E-01 -6.6645E-01 7.1787E-01 9.0790E-01 -6.6651E-01

7.2130E-01 9.0887E-01 -6.6616E-01 7.2131E-01 9.1896E-01 -6.6603E-01 7.1541E-01 9.1257E-01 -6.6662E-01 7.1942E-01

8 -6.6620E-01 9.2332E-01 -8.8478E-01 -6.6801E-01 9.2470E-01 -8.8393E-01 -7.1620E-01 1.0000E+00 -9.5418E-01 -6.6843E-01 9.2525E-01 -8.8361E-01 -6.6949E-01 9.2534E-01 -8.8599E-01 -6.6881E-01 9.2483E-01 -8.8541E-01 -6.6603E-01 9.2467E-01 -8.8124E-01 -6.6955E-01 9.2550E-01 -8.8487E-01

9 7.2086E-01 -8.8559E-01 9.2890E-01 7.2166E-01 -8.8716E-01 9.2704E-01 7.7463E-01 -9.5418E-01 1.0000E+00 7.2180E-01 -8.8808E-01 9.2664E-01 7.2001E-01 -8.8872E-01 9.3195E-01 7.1990E-01 -8.8817E-01 9.3225E-01 7.2114E-01 -8.8733E-01 9.2313E-01 7.2145E-01 -8.8888E-01 9.2895E-01

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16 9.0986E-01 -6.6950E-01 7.2109E-01 9.1100E-01 -6.6858E-01 7.2164E-01 9.0887E-01 -6.6881E-01 7.1990E-01 9.1122E-01 -6.6731E-01 7.2151E-01 9.0826E-01 -6.6508E-01 7.1925E-01 1.0000E+00 -7.2001E-01 7.7573E-01 9.1079E-01 -6.6770E-01 7.2111E-01 9.1055E-01 -6.6511E-01 7.2109E-01

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18 7.2171E-01 -8.8604E-01 9.3051E-01 7.2149E-01 -8.8851E-01 9.2772E-01 7.2131E-01 -8.8541E-01 9.3225E-01 7.2134E-01 -8.9034E-01 9.2728E-01 7.1697E-01 -8.9213E-01 9.3554E-01 7.7573E-01 -9.5308E-01 1.0000E+00 7.2239E-01 -8.8916E-01 9.2269E-01 7.1964E-01 -8.9238E-01 9.3064E-01

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24 7.2070E-01 -8.8562E-01 9.2848E-01 7.2224E-01 -8.8719E-01 9.2740E-01 7.1942E-01 -8.8487E-01 9.2895E-01 7.2267E-01 -8.8793E-01 9.2725E-01 7.2163E-01 -8.8770E-01 9.3094E-01 7.2109E-01 -8.8702E-01 9.3064E-01 7.2140E-01 -8.8751E-01 9.2435E-01 7.8156E-01 -9.5231E-01 1.0000E+00

G-FILE for the vectors

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C00090007 -190242374 22 825647563 112 1338350513 87
C00090008 911351493 22 795277002 110 1218421203 85
D 1 2 -7182828 1 3 7762836 1 4 9167821 1 5 -6673883 1 6 7196712 D 1 7 9173939 1 8 -6662022 1 9 7208634 1 10 9164967 1 11 -6675650 D 1 12 7194253 1 13 9090793 1 14 -6672485 1 15 7219947 1 16 9098552 D 1 17 -6669104 1 18 7217142 1 19 9190041 1 20 -6672836 1 21 7172762 D 1 22 9134699 1 23 -6673968 1 24 7207016 2 3 -9548520 2 4 -6687679 D 2 5 9253168 2 6 -8846377 2 7 -6653956 2 8 9233211 2 9 -8855898 D 2 10 -6692205 2 11 9259018 2 12 -8843545 2 13 -6702230 2 14 9259230 D 2 15 -8866602 2 16 -6695016 2 17 9253736 2 18 -8860400 2 19 -6668343 D 2 20 9253434 2 21 -8820132 2 22 -6703525 2 23 9261497 2 24 -8856151 D 3 4 7220072 3 5 -8867141 3 6 9269175 3 7 7195385 3 8 -8847846 D 3 9 9289000 3 10 7222882 3 11 -8873117 3 12 9265867 3 13 7214745 D 3 14 -8874030 3 15 9306329 3 16 7210943 3 17 -8868825 3 18 9305118 D 3 19 7209639 3 20 -8867548 3 21 9235390 3 22 7225035 3 23 -8876107 D 3 24 9284833

4 5 -7198696 4 6 7788981 4 7 9163828 4 8 -6680099 D 4 9 7216645 4 10 9167699 4 11 -6687230 4 12 7214929 4 13 9106128 D 4 14 -6676403 4 15 7223564 4 16 9110035 4 17 -6673047 4 18 7214850 D 4 19 9183905 4 20 -6687234 4 21 7199690 4 22 9145074 4 23 -6679126 D 4 24 7222386 5 6 -9543996 5 7 -6660623 5 8 9247026 5 9 -8871634 D 5 10 -6693524 5 11 9283087 5 12 -8854773 5 13 -6691607 5 14 9286452 D 5 15 -8888274 5 16 -6685821 5 17 9279451 5 18 -8885117 5 19 -6677069 D 5 20 9276455 5 21 -8827659 5 22 -6699453 5 23 9290797 5 24 -8871867 D 6 7 7181653 6 8 -8839332 6 9 9270413 6 10 7221258 6 11 -8859601 D 6 12 9259795 6 13 7223839 6 14 -8852941 6 15 9284049 6 16 7216409 D 6 17 -8847521 6 18 9277219 6 19 7200354 6 20 -8856836 6 21 9235382 D 6 22 7230276 6 23 -8856751 6 24 9273959 7 8 -7162044 7 9 7746263 D 7 10 9159869 7 11 -6664506 7 12 7178736 7 13 9079010 7 14 -6665127 D 7 15 7213038 7 16 9088674 7 17 -6661570 7 18 7213141 7 19 9189579 D 7 20 -6660347 7 21 7154110 7 22 9125691 7 23 -6666189 7 24 7194242 D 8 9 -9541769 8 10 -6684335 8 11 9252526 8 12 -8836111 8 13 -6694896 D 8 14 9253438 8 15 -8859942 8 16 -6688056 8 17 9248333 8 18 -8854128 D 8 19 -6660310 8 20 9246687 8 21 -8812385 8 22 -6695526 8 23 9254991 D 8 24 -8848673 9 10 7217950 9 11 -8880824 9 12 9266423 9 13 7200105 D 9 14 -8887183 9 15 9319531 9 16 7198963 9 17 -8881694 9 18 9322538 D 9 19 7211351 9 20 -8873279 9 21 9231294 9 22 7214501 9 23 -8888773 D 9 24 9289503 10 11 -7191454 10 12 7796499 10 13 9109601 10 14 -6676999 D 10 15 7224014 10 16 9112204 10 17 -6673468 10 18 7213408 10 19 9181871 D 10 20 -6691497 10 21 7207361 10 22 9147590 10 23 -6680615 10 24 7226652 D 11 12 -9532566 11 13 -6676893 11 14 9305236 11 15 -8902890 11 16 -6673091 D 11 17 9297080 11 18 -8903353 11 19 -6681573 11 20 9289746 11 21 -8826408 D 11 22 -6690733 11 23 9310870 11 24 -8879346 12 13 7223240 12 14 -8849463 D 12 15 9280543 12 16 7215063 12 17 -8843533 12 18 9272793 12 19 7199363 D 12 20 -8855568 12 21 9235077 12 22 7230328 12 23 -8854452 12 24 9272469 D 13 14 -7193426 13 15 7783465 13 16 9082566 13 17 -6649642 13 18 7169720 D 13 19 9100775 13 20 -6682426 13 21 7222660 13 22 9106936 13 23 -6651585 D 13 24 7216286 14 15 -9532972 14 16 -6650815 14 17 9313894 14 18 -8921322 D 14 19 -6677361 14 20 9293702 14 21 -8810808 14 22 -6669103 14 23 9325610 D 14 24 -8877035 15 16 7192452 15 17 -8907095 15 18 9355352 15 19 7226757 D 15 20 -8893577 15 21 9240173 15 22 7213635 15 23 -8917593 15 24 9309441 D 16 17 -7200115 16 18 7757263 16 19 9107939 16 20 -6677036 16 21 7211094 D 16 22 9105514 16 23 -6651106 16 24 7210850 17 18 -9530819 17 19 -6672285 D 17 20 9285429 17 21 -8805271 17 22 -6666428 17 23 9316415 17 24 -8870208 D 18 19 7223915 18 20 -8891630 18 21 9226887 18 22 7196437 18 23 -8923827 D 18 24 9306448 19 20 -7155268 19 21 7735872 19 22 9149633 19 23 -6681937 D 19 24 7213981 20 21 -9528968 20 22 -6694648 20 23 9300218 20 24 -8875068 D 21 22 7224354 21 23 -8816592 21 24 9243464 22 23 -7181572 22 24 7815577 D 23 24 -9523122

ITRF position of mob_ as determined by individual baselines

	X	Y	Z
al90	189725.422	-5459829.527	3280577.863
al84	189725.418	-5459829.516	3280577.868
aldi	189725.422	-5459829.557	3280577.890
al82	189725.418	-5459829.494	3280577.843
alan	189725.415	-5459829.530	3280577.873
fle5	189725.411	-5459829.551	3280577.885
al81	189725.420	-5459829.525	3280577.873
alse	189725.425	-5459829.540	3280577.872

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
al90	0.003	-0.004	-0.005	0.003	-0.006	0.001
al84	-0.000	0.007	0.001	-0.000	0.004	-0.005
aldi	0.003	-0.034	0.023	0.002	0.002	0.041
al82	-0.000	0.029	-0.025	0.001	-0.006	-0.038
alan	-0.003	-0.007	0.006	-0.003	0.001	0.009
fle5	-0.008	-0.028	0.018	-0.009	0.001	0.033
al81	0.001	-0.003	0.005	0.001	0.003	0.005
alse	0.006	-0.017	0.004	0.005	-0.005	0.017

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

dop from interpolation is 0.487
scatter (mean square distance from rover) is 16468.343
average edop for rover is 0.870
average ndop for rover is 0.800
average hdop for rover is 1.182
average vdop for rover is 2.010
average gdop for rover is 2.690

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.

FILE: MOB_05.14O OP1393267352807

NGS OPUS-RS SOLUTION REPORT
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All computed coordinate accuracies are listed as 1-sigma RMS values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: blkimbrough@theatlgrp.com DATE: February 24, 2014
RINEX FILE: mob_048u.14o TIME: 19:32:57 UTC

SOFTWARE: rsgps 1.37 RS90.prl 1.89 START: 2014/02/17 20:53:22
EPHEMERIS: igr17801.eph [rapid] STOP: 2014/02/17 21:20:01
NAV FILE: brdc0480.14n OBS USED: 2079 / 2191 : 95%
ANT NAME: TPSHIPER_V NONE QUALITY IND. 3.95/ 33.65
ARP HEIGHT: 2.00 NORMALIZED RMS: 0.297

REF FRAME:	NAD_83(2011)(EPOCH:2010.0000)		IGS08 (EPOCH:2014.13118)	
X:	184892.253(m)	0.007(m)	184891.481(m)	0.007(m)
Y:	-5491505.539(m)	0.023(m)	-5491504.038(m)	0.023(m)
Z:	3227887.969(m)	0.019(m)	3227887.798(m)	0.019(m)
LAT:	30 36 3.75020	0.005(m)	30 36 3.77065	0.005(m)
E LON:	271 55 42.06057	0.007(m)	271 55 42.03351	0.007(m)
W LON:	88 4 17.93943	0.007(m)	88 4 17.96649	0.007(m)
EL HGT:	-26.007(m)	0.029(m)	-27.408(m)	0.029(m)
ORTHO HGT:	2.391(m)	0.031(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES UTM (Zone 16)	STATE PLANE COORDINATES SPC (0102 AL W)
Northing (Y) [meters]	3385877.810	66764.769
Easting (X) [meters]	397267.461	545182.250
Convergence [degrees]	-0.54557876	-0.29100965
Point Scale	0.99973019	0.99997039
Combined Factor	0.99973427	0.99997447

US NATIONAL GRID DESIGNATOR: 16RCU9726785877(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI3826	AL90 ALDOT 9 DIV OFF CORS ARP	N304126.969	W0880154.137	10664.7
DL3486	ALDI DAUPHIN ISLAND CORS ARP	N301456.987	W0880440.688	39013.6
DM5371	ALEB WS NEAL SCHOOL CORS ARP	N310529.223	W0870320.306	111360.7
DM3973	ALRE REPTON JR HGH SCH CORS ARP	N312440.664	W0871403.268	120269.3

DL9796 AL84 ALDOT 8 DIV DIS 4 CORS ARP N314201.327 W0874720.982 124824.4
DN7498 MSEV ELLISVILLE CORS ARP N313542.081 W0891213.274 154298.1
DM2680 ALAN ANDALUSIA POL DEP CORS ARP N311826.549 W0862902.227 170716.8

NEAREST NGS PUBLISHED CONTROL POINT
BH2001 HAGEN N303559.023 W0880337.724 1080.3

OPUS-RS Extended Output, Level 2

FINAL COORDINATES (ITRF at epoch of observations)

al90	188545.994	-5486311.756	3236456.347
aldi	184948.614	-5511274.908	3194254.851
aleb	280806.414	-5459556.651	3274587.855
alre	262901.930	-5442090.360	3304942.060
al84	209536.488	-5427642.084	3332268.815
msev	75572.355	-5437238.717	3322293.876
alan	334509.363	-5444166.214	3295102.834
mob_	184891.481	-5491504.038	3227887.798

Covariance matrix of the stations:

1 3.0810E-07 -1.2080E-06 7.7410E-07 -1.9350E-08 2.1460E-07 -1.0620E-07 -4.1070E-08 2.1240E-07 -1.2900E-07 -3.7310E-08 2.0960E-07 -1.3880E-07 -2.5390E-08 2.0420E-07 -1.4800E-07 8.8940E-09 1.6540E-07 -1.2500E-07 -5.0850E-08 2.0140E-07 -1.2700E-07 4.5250E-08 -1.1390E-07 8.6010E-08

2 -1.2080E-06 9.6770E-06 -5.6020E-06 2.1640E-07 -1.6130E-06 9.8320E-07 1.8700E-07 -1.5820E-06 9.3600E-07 1.8900E-07 -1.5720E-06 9.1700E-07 2.0080E-07 -1.5660E-06 9.0030E-07 2.4070E-07 -1.6160E-06 9.3380E-07 1.7420E-07 -1.5860E-06 9.3180E-07 4.3510E-08 -1.9720E-07 1.6520E-07

3 7.7410E-07 -5.6020E-06 3.7130E-06 -1.1510E-07 9.4620E-07 -5.4570E-07 -1.4460E-07 8.9170E-07 -5.5440E-07 -1.4280E-07 9.1530E-07 -5.9000E-07 -1.3150E-07 9.6850E-07 -6.4830E-07 -8.5030E-08 1.0400E-06 -7.0270E-07 -1.5490E-07 8.3960E-07 -5.2950E-07 3.1910E-08 -1.6880E-07 1.5660E-07

4 -1.9350E-08 2.1640E-07 -1.1510E-07 3.1000E-07 -1.2030E-06 7.7100E-07 -4.3450E-08 2.0980E-07 -1.2320E-07 -3.9170E-08 2.0790E-07 -1.3580E-07 -2.5350E-08 2.0550E-07 -1.4940E-07 1.5170E-08 1.6930E-07 -1.2850E-07 -5.4760E-08 1.9350E-07 -1.1890E-07 4.4550E-08 -1.1440E-07 9.3230E-08

5 2.1460E-07 -1.6130E-06 9.4620E-07 -1.2030E-06 9.8330E-06 -5.4940E-06 1.8160E-07 -1.6150E-06 9.2930E-07 1.8490E-07 -1.6030E-06 9.0420E-07 2.0110E-07 -1.5920E-06 8.7790E-07 2.5480E-07 -1.6350E-06 9.0580E-07 1.6570E-07 -1.6320E-06 9.3110E-07 7.8850E-08 -5.0710E-07 3.2440E-07

6 -1.0620E-07 9.8320E-07 -5.4570E-07 7.7100E-07 -5.4940E-06 3.6270E-06 -1.6560E-07 8.5200E-07 -5.0330E-07 -1.5860E-07 8.8370E-07 -5.6710E-07 -1.2860E-07 9.6480E-07 -

6.6860E-07 -2.0930E-08 1.0640E-06 -7.4370E-07 -1.9070E-07 7.4630E-07 -4.5560E-07 6.7970E-08 -2.9550E-07 2.8240E-07
7 -4.1070E-08 1.8700E-07 -1.4460E-07 -4.3450E-08 1.8160E-07 -1.6560E-07 3.6780E-07 -1.3090E-06 8.2690E-07 -2.1080E-08 2.5480E-07 -1.5010E-07 -3.3360E-08 2.1600E-07 -1.0570E-07 -7.7310E-08 1.4720E-07 -5.9170E-08 -8.6580E-09 3.2300E-07 -2.0200E-07 -2.9880E-08 2.4610E-07 -1.8200E-07
8 2.1240E-07 -1.5820E-06 8.9170E-07 2.0980E-07 -1.6150E-06 8.5200E-07 -1.3090E-06 9.0750E-06 -5.3790E-06 2.5660E-07 -1.3990E-06 8.6500E-07 2.2400E-07 -1.4700E-06 9.6010E-07 1.1740E-07 -1.6140E-06 1.0630E-06 2.8860E-07 -1.2510E-06 7.4720E-07 -2.5950E-08 2.8460E-07 -2.0870E-07
9 -1.2900E-07 9.3600E-07 -5.5440E-07 -1.2320E-07 9.2930E-07 -5.0330E-07 8.2690E-07 -5.3790E-06 3.6290E-06 -1.7070E-07 8.4400E-07 -5.6630E-07 -1.4750E-07 9.2170E-07 -6.5800E-07 -6.1170E-08 1.0290E-06 -7.3800E-07 -1.9500E-07 7.1890E-07 -4.6620E-07 3.3050E-08 -2.5380E-07 2.1750E-07
10 -3.7310E-08 1.8900E-07 -1.4280E-07 -3.9170E-08 1.8490E-07 -1.5860E-07 -2.1080E-08 2.5660E-07 -1.7070E-07 3.4980E-07 -1.2920E-06 8.5000E-07 -3.1510E-08 2.1190E-07 -1.1420E-07 -6.3280E-08 1.4730E-07 -7.1150E-08 -1.4670E-08 3.0230E-07 -1.9260E-07 -1.8550E-08 1.9210E-07 -1.4490E-07
11 2.0960E-07 -1.5720E-06 9.1530E-07 2.0790E-07 -1.6030E-06 8.8370E-07 2.5480E-07 -1.3990E-06 8.4400E-07 -1.2920E-06 9.0600E-06 -5.4560E-06 2.1810E-07 -1.4670E-06 9.6750E-07 1.2850E-07 -1.5970E-06 1.0610E-06 2.7250E-07 -1.2790E-06 7.8490E-07 -1.7590E-08 2.1240E-07 -1.3290E-07
12 -1.3880E-07 9.1700E-07 -5.9000E-07 -1.3580E-07 9.0420E-07 -5.6710E-07 -1.5010E-07 8.6500E-07 -5.6630E-07 8.5000E-07 -5.4560E-06 3.7430E-06 -1.4680E-07 9.3370E-07 -6.3750E-07 -1.2430E-07 1.0090E-06 -6.9310E-07 -1.5400E-07 8.2780E-07 -5.4680E-07 -1.6990E-08 2.5450E-08 -6.0070E-09
13 -2.5390E-08 2.0080E-07 -1.3150E-07 -2.5350E-08 2.0110E-07 -1.2860E-07 -3.3360E-08 2.2400E-07 -1.4750E-07 -3.1510E-08 2.1810E-07 -1.4680E-07 3.1080E-07 -1.2310E-06 8.1810E-07 -1.4890E-08 1.5420E-07 -1.0990E-07 -3.7580E-08 2.3250E-07 -1.5370E-07 2.0410E-08 3.6330E-09 -7.5260E-09
14 2.0420E-07 -1.5660E-06 9.6850E-07 2.0550E-07 -1.5920E-06 9.6480E-07 2.1600E-07 -1.4700E-06 9.2170E-07 2.1190E-07 -1.4670E-06 9.3370E-07 -1.2310E-06 9.2250E-06 -5.7040E-06 1.7410E-07 -1.5770E-06 1.0260E-06 2.1930E-07 -1.4100E-06 8.8930E-07 1.6820E-08 -7.6440E-08 1.0620E-07
15 -1.4800E-07 9.0030E-07 -6.4830E-07 -1.4940E-07 8.7790E-07 -6.6860E-07 -1.0570E-07 9.6010E-07 -6.5800E-07 -1.1420E-07 9.6750E-07 -6.3750E-07 8.1810E-07 -5.7040E-06 4.0580E-06 -2.1490E-07 9.8580E-07 -6.2500E-07 -8.6330E-08 1.0130E-06 -6.7760E-07 -8.7960E-08 4.6650E-07 -3.5270E-07
16 8.8940E-09 2.4070E-07 -8.5030E-08 1.5170E-08 2.5480E-07 -2.0930E-08 -7.7310E-08 1.1740E-07 -6.1170E-08 -6.3280E-08 1.2850E-07 -1.2430E-07 -1.4890E-08 1.7410E-07 -2.1490E-07 3.9000E-07 -9.1990E-07 5.2270E-07 -1.1580E-07 4.0740E-09 -1.5650E-08 1.4240E-07 -6.0570E-07 4.4790E-07
17 1.6540E-07 -1.6160E-06 1.0400E-06 1.6930E-07 -1.6350E-06 1.0640E-06 1.4720E-07 -1.6140E-06 1.0290E-06 1.4730E-07 -1.5970E-06 1.0090E-06 1.5420E-07 -1.5770E-06 9.8580E-07 -9.1990E-07 9.8040E-06 -6.1560E-06 1.3820E-07 -1.6220E-06 1.0280E-06 1.8130E-08 -4.2410E-07 3.6560E-07
18 -1.2500E-07 9.3380E-07 -7.0270E-07 -1.2850E-07 9.0580E-07 -7.4370E-07 -5.9170E-08 1.0630E-06 -7.3800E-07 -7.1150E-08 1.0610E-06 -6.9310E-07 -1.0990E-07 1.0260E-06 -

6.2500E-07 5.2270E-07 -6.1560E-06 4.4270E-06 -3.0080E-08 1.1670E-06 -7.8130E-07 -9.5600E-08 7.2710E-07 -5.5010E-07
19 -5.0850E-08 1.7420E-07 -1.5490E-07 -5.4760E-08 1.6570E-07 -1.9070E-07 -8.6580E-09 2.8860E-07 -1.9500E-07 -1.4670E-08 2.7250E-07 -1.5400E-07 -3.7580E-08 2.1930E-07 -8.6330E-08 -1.1580E-07 1.3820E-07 -3.0080E-08 4.2500E-07 -1.2580E-06 8.1040E-07 -6.1070E-08 3.9180E-07 -2.9210E-07
20 2.0140E-07 -1.5860E-06 8.3960E-07 1.9350E-07 -1.6320E-06 7.4630E-07 3.2300E-07 -1.2510E-06 7.1890E-07 3.0230E-07 -1.2790E-06 8.2780E-07 2.3250E-07 -1.4100E-06 1.0130E-06 4.0740E-09 -1.6220E-06 1.1670E-06 -1.2580E-06 8.9230E-06 -5.3130E-06 -1.1390E-07 8.5130E-07 -6.2030E-07
21 -1.2700E-07 9.3180E-07 -5.2950E-07 -1.1890E-07 9.3110E-07 -4.5560E-07 -2.0200E-07 7.4720E-07 -4.6620E-07 -1.9260E-07 7.8490E-07 -5.4680E-07 -1.5370E-07 8.8930E-07 -6.7760E-07 -1.5650E-08 1.0280E-06 -7.8130E-07 8.1040E-07 -5.3130E-06 3.5990E-06 6.7850E-08 -5.0120E-07 3.9550E-07
22 4.5250E-08 4.3510E-08 3.1910E-08 4.4550E-08 7.8850E-08 6.7970E-08 -2.9880E-08 -2.5950E-08 3.3050E-08 -1.8550E-08 -1.7590E-08 -1.6990E-08 2.0410E-08 1.6820E-08 -8.7960E-08 1.4240E-07 1.8130E-08 -9.5600E-08 -6.1070E-08 -1.1390E-07 6.7850E-08 3.2920E-06 -1.4770E-05 9.2710E-06
23 -1.1390E-07 -1.9720E-07 -1.6880E-07 -1.1440E-07 -5.0710E-07 -2.9550E-07 2.4610E-07 2.8460E-07 -2.5380E-07 1.9210E-07 2.1240E-07 2.5450E-08 3.6330E-09 -7.6440E-08 4.6650E-07 -6.0570E-07 -4.2410E-07 7.2710E-07 3.9180E-07 8.5130E-07 -5.0120E-07 -1.4770E-05 1.1570E-04 -6.7500E-05
24 8.6010E-08 1.6520E-07 1.5660E-07 9.3230E-08 3.2440E-07 2.8240E-07 -1.8200E-07 -2.0870E-07 2.1750E-07 -1.4490E-07 -1.3290E-07 -6.0070E-09 -7.5260E-09 1.0620E-07 -3.5270E-07 4.4790E-07 3.6560E-07 -5.5010E-07 -2.9210E-07 -6.2030E-07 3.9550E-07 9.2710E-06 -6.7500E-05 4.3790E-05

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

0.0000032920	-0.0000147700	0.0000092710
-0.0000147700	0.0001157000	-0.0000675000
0.0000092710	-0.0000675000	0.0000437900

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

0.0000024258	0.0000004811	0.0000129896
0.0000004811	0.0000032632	0.0000012123
0.0000129896	0.0000012123	0.0001570930

Horizontal network accuracy = 0.00415 meters.
Vertical network accuracy = 0.02458 meters.

		Vectors		
To	From	X	Y	Z
al90	mob_	3654.512	5192.282	8568.548
aldi	mob_	57.133	-19770.870	-33632.947
aleb	mob_	95914.933	31947.387	46700.056
alre	mob_	78010.449	49413.678	77054.262
al84	mob_	24645.007	63861.954	104381.016

msev mob_ -109319.126 54265.321 94406.077
alan mob_ 149617.882 47337.824 67215.036

Covariance matrix of the 7 vectors

1 3.5096E-06 -1.5908E-05 9.9272E-06 3.1828E-06 -1.4520E-05 9.0108E-06 3.2356E-06 -1.4418E-05 9.0229E-06 3.2280E-06 -1.4429E-05 9.0632E-06 3.2009E-06 -1.4469E-05 9.1249E-06 3.1132E-06 -1.4509E-05 9.1556E-06 3.2570E-06 -1.4341E-05 8.9901E-06

2 -1.5908E-05 1.2577E-04 -7.3098E-05 -1.4483E-05 1.1479E-04 -6.6387E-05 -1.4873E-05 1.1403E-04 -6.6475E-05 -1.4817E-05 1.1411E-04 -6.6774E-05 -1.4616E-05 1.1441E-04 -6.7231E-05 -1.3967E-05 1.1471E-04 -6.7458E-05 -1.5031E-05 1.1346E-04 -6.6232E-05

3 9.9272E-06 -7.3098E-05 4.7190E-05 9.0308E-06 -6.6709E-05 4.2805E-05 9.2765E-06 -6.6231E-05 4.2861E-05 9.2412E-06 -6.6283E-05 4.3049E-05 9.1151E-06 -6.6469E-05 4.3338E-05 8.7062E-06 -6.6657E-05 4.3481E-05 9.3763E-06 -6.5871E-05 4.2708E-05

4 3.1828E-06 -1.4483E-05 9.0308E-06 3.5129E-06 -1.5937E-05 9.8808E-06 3.2339E-06 -1.4420E-05 9.0215E-06 3.2268E-06 -1.4430E-05 9.0590E-06 3.2017E-06 -1.4467E-05 9.1163E-06 3.1202E-06 -1.4504E-05 9.1449E-06 3.2538E-06 -1.4348E-05 8.9910E-06

5 -1.4520E-05 1.1479E-04 -6.6709E-05 -1.5937E-05 1.2655E-04 -7.3023E-05 -1.4913E-05 1.1431E-04 -6.6641E-05 -1.4856E-05 1.1439E-04 -6.6946E-05 -1.4651E-05 1.1469E-04 -6.7413E-05 -1.3988E-05 1.1500E-04 -6.7646E-05 -1.5075E-05 1.1372E-04 -6.6392E-05

6 9.0108E-06 -6.6387E-05 4.2805E-05 9.8808E-06 -7.3023E-05 4.6852E-05 9.2194E-06 -6.6144E-05 4.2787E-05 9.1893E-06 -6.6188E-05 4.2947E-05 9.0820E-06 -6.6346E-05 4.3192E-05 8.7342E-06 -6.6506E-05 4.3314E-05 9.3044E-06 -6.5838E-05 4.2657E-05

7 3.2356E-06 -1.4873E-05 9.2765E-06 3.2339E-06 -1.4913E-05 9.2194E-06 3.7196E-06 -1.6299E-05 1.0247E-05 3.3193E-06 -1.4744E-05 9.3199E-06 3.2681E-06 -1.4817E-05 9.4353E-06 3.1022E-06 -1.4887E-05 9.4894E-06 3.3743E-06 -1.4579E-05 9.1832E-06

8 -1.4418E-05 1.1403E-04 -6.6231E-05 -1.4420E-05 1.1431E-04 -6.6144E-05 -1.6299E-05 1.2421E-04 -7.2417E-05 -1.4680E-05 1.1380E-04 -6.6452E-05 -1.4524E-05 1.1402E-04 -6.6798E-05 -1.4021E-05 1.1423E-04 -6.6955E-05 -1.4847E-05 1.1331E-04 -6.6043E-05

9 9.0229E-06 -6.6475E-05 4.2861E-05 9.0215E-06 -6.6641E-05 4.2787E-05 1.0247E-05 -7.2417E-05 4.6984E-05 9.2121E-06 -6.6269E-05 4.3012E-05 9.0980E-06 -6.6431E-05 4.3267E-05 8.7289E-06 -6.6583E-05 4.3385E-05 9.3350E-06 -6.5907E-05 4.2711E-05

10 3.2280E-06 -1.4817E-05 9.2412E-06 3.2268E-06 -1.4856E-05 9.1893E-06 3.3193E-06 -1.4680E-05 9.2121E-06 3.6789E-06 -1.6237E-05 1.0283E-05 3.2586E-06 -1.4767E-05 9.3897E-06 3.1049E-06 -1.4833E-05 9.4404E-06 3.3570E-06 -1.4546E-05 9.1555E-06

11 -1.4429E-05 1.1411E-04 -6.6283E-05 -1.4430E-05 1.1439E-04 -6.6188E-05 -1.4744E-05 1.1380E-04 -6.6269E-05 -1.6237E-05 1.2434E-04 -7.2849E-05 -1.4538E-05 1.1410E-04 -6.6866E-05 -1.4018E-05 1.1431E-04 -6.7033E-05 -1.4872E-05 1.1336E-04 -6.6081E-05

12 9.0632E-06 -6.6774E-05 4.3049E-05 9.0590E-06 -6.6946E-05 4.2947E-05 9.3199E-06 -6.6452E-05 4.3012E-05 1.0283E-05 -7.2849E-05 4.7545E-05 9.1487E-06 -6.6698E-05 4.3511E-05 8.7158E-06 -6.6882E-05 4.3653E-05 9.4261E-06 -6.6077E-05 4.2854E-05

13 3.2009E-06 -1.4616E-05 9.1151E-06 3.2017E-06 -1.4651E-05 9.0820E-06 3.2681E-06 -1.4524E-05 9.0980E-06 3.2586E-06 -1.4538E-05 9.1487E-06 3.5620E-06 -1.6021E-05 1.0185E-05 3.1143E-06 -1.4638E-05 9.2642E-06 3.2951E-06 -1.4427E-05 9.0570E-06

14 -1.4469E-05 1.1441E-04 -6.6469E-05 -1.4467E-05 1.1469E-04 -6.6346E-05 -1.4817E-05 1.1402E-04 -6.6431E-05 -1.4767E-05 1.1410E-04 -6.6698E-05 -1.6021E-05 1.2508E-04 -7.3777E-05 -1.4007E-05 1.1462E-04 -6.7307E-05 -1.4959E-05 1.1352E-04 -6.6216E-05

15 9.1249E-06 -6.7231E-05 4.3338E-05 9.1163E-06 -6.7413E-05 4.3192E-05 9.4353E-06 -6.6798E-05 4.3267E-05 9.3897E-06 -6.6866E-05 4.3511E-05 1.0185E-05 -7.3777E-05 4.8553E-05 8.6962E-06 -6.7346E-05 4.4068E-05 9.5647E-06 -6.6333E-05 4.3070E-05
16 3.1132E-06 -1.3967E-05 8.7062E-06 3.1202E-06 -1.3988E-05 8.7342E-06 3.1022E-06 -1.4021E-05 8.7289E-06 3.1049E-06 -1.4018E-05 8.7158E-06 3.1143E-06 -1.4007E-05 8.6962E-06 3.3972E-06 -1.5102E-05 9.4414E-06 3.0949E-06 -1.4046E-05 8.7396E-06
17 -1.4509E-05 1.1471E-04 -6.6657E-05 -1.4504E-05 1.1500E-04 -6.6506E-05 -1.4887E-05 1.1423E-04 -6.6583E-05 -1.4833E-05 1.1431E-04 -6.6882E-05 -1.4638E-05 1.1462E-04 -6.7346E-05 -1.5102E-05 1.2635E-04 -7.4749E-05 -1.5042E-05 1.1365E-04 -6.6336E-05
18 9.1556E-06 -6.7458E-05 4.3481E-05 9.1449E-06 -6.7646E-05 4.3314E-05 9.4894E-06 -6.6955E-05 4.3385E-05 9.4404E-06 -6.7033E-05 4.3653E-05 9.2642E-06 -6.7307E-05 4.4068E-05 9.4414E-06 -7.4749E-05 4.9317E-05 9.6286E-06 -6.6440E-05 4.3163E-05
19 3.2570E-06 -1.5031E-05 9.3763E-06 3.2538E-06 -1.5075E-05 9.3044E-06 3.3743E-06 -1.4847E-05 9.3350E-06 3.3570E-06 -1.4872E-05 9.4261E-06 3.2951E-06 -1.4959E-05 9.5647E-06 3.0949E-06 -1.5042E-05 9.6286E-06 3.8391E-06 -1.6306E-05 1.0306E-05
20 -1.4341E-05 1.1346E-04 -6.5871E-05 -1.4348E-05 1.1372E-04 -6.5838E-05 -1.4579E-05 1.1331E-04 -6.5907E-05 -1.4546E-05 1.1336E-04 -6.6077E-05 -1.4427E-05 1.1352E-04 -6.6333E-05 -1.4046E-05 1.1365E-04 -6.6440E-05 -1.6306E-05 1.2292E-04 -7.1691E-05
21 8.9901E-06 -6.6232E-05 4.2708E-05 8.9910E-06 -6.6392E-05 4.2657E-05 9.1832E-06 -6.6043E-05 4.2711E-05 9.1555E-06 -6.6081E-05 4.2854E-05 9.0570E-06 -6.6216E-05 4.3070E-05 8.7396E-06 -6.6336E-05 4.3163E-05 1.0306E-05 -7.1691E-05 4.6598E-05

Correlation matrix of the 7 vectors

1 1.0000E+00 -7.5716E-01 7.7139E-01 9.0647E-01 -6.8900E-01 7.0270E-01 8.9552E-01 -6.9055E-01 7.0266E-01 8.9835E-01 -6.9073E-01 7.0162E-01 9.0532E-01 -6.9058E-01 6.9902E-01 9.0162E-01 -6.8899E-01 6.9592E-01 8.8729E-01 -6.9045E-01 7.0300E-01
2 -7.5716E-01 1.0000E+00 -9.4884E-01 -6.8901E-01 9.0990E-01 -8.6482E-01 -6.8762E-01 9.1235E-01 -8.6476E-01 -6.8881E-01 9.1253E-01 -8.6350E-01 -6.9056E-01 9.1217E-01 -8.6034E-01 -6.7570E-01 9.0992E-01 -8.5654E-01 -6.8404E-01 9.1251E-01 -8.6516E-01
3 7.7139E-01 -9.4884E-01 1.0000E+00 7.0140E-01 -8.6325E-01 9.1035E-01 7.0019E-01 -8.6510E-01 9.1027E-01 7.0137E-01 -8.6533E-01 9.0885E-01 7.0306E-01 -8.6518E-01 9.0538E-01 6.8761E-01 -8.6323E-01 9.0131E-01 6.9661E-01 -8.6489E-01 9.1076E-01
4 9.0647E-01 -6.8901E-01 7.0140E-01 1.0000E+00 -7.5589E-01 7.7018E-01 8.9463E-01 -6.9033E-01 7.0222E-01 8.9760E-01 -6.9046E-01 7.0096E-01 9.0511E-01 -6.9016E-01 6.9804E-01 9.0322E-01 -6.8846E-01 6.9478E-01 8.8600E-01 -6.9048E-01 7.0274E-01
5 -6.8900E-01 9.0990E-01 -8.6325E-01 -7.5589E-01 1.0000E+00 -9.4835E-01 -6.8739E-01 9.1175E-01 -8.6426E-01 -6.8852E-01 9.1195E-01 -8.6307E-01 -6.9009E-01 9.1162E-01 -8.6002E-01 -6.7465E-01 9.0942E-01 -8.5628E-01 -6.8393E-01 9.1183E-01 -8.6458E-01
6 7.0270E-01 -8.6482E-01 9.1035E-01 7.7018E-01 -9.4835E-01 1.0000E+00 6.9838E-01 -8.6707E-01 9.1195E-01 6.9994E-01 -8.6719E-01 9.0993E-01 7.0302E-01 -8.6668E-01 9.0558E-01 6.9231E-01 -8.6438E-01 9.0108E-01 6.9376E-01 -8.6756E-01 9.1293E-01
7 8.9552E-01 -6.8762E-01 7.0019E-01 8.9463E-01 -6.8739E-01 6.9838E-01 1.0000E+00 -7.5831E-01 7.7512E-01 8.9732E-01 -6.8559E-01 7.0083E-01 8.9785E-01 -6.8694E-01 7.0210E-01 8.7269E-01 -6.8671E-01 7.0064E-01 8.9294E-01 -6.8183E-01 6.9753E-01
8 -6.9055E-01 9.1235E-01 -8.6510E-01 -6.9033E-01 9.1175E-01 -8.6707E-01 -7.5831E-01 1.0000E+00 -9.4796E-01 -6.8672E-01 9.1578E-01 -8.6473E-01 -6.9049E-01 9.1480E-01 -8.6016E-01 -6.8257E-01 9.1180E-01 -8.5549E-01 -6.7992E-01 9.1706E-01 -8.6810E-01

9 7.0266E-01 -8.6476E-01 9.1027E-01 7.0222E-01 -8.6426E-01 9.1195E-01 7.7512E-01 -9.4796E-01 1.0000E+00 7.0069E-01 -8.6704E-01 9.1005E-01 7.0327E-01 -8.6657E-01 9.0589E-01 6.9091E-01 -8.6416E-01 9.0128E-01 6.9506E-01 -8.6725E-01 9.1281E-01
10 8.9835E-01 -6.8881E-01 7.0137E-01 8.9760E-01 -6.8852E-01 6.9994E-01 8.9732E-01 -6.8672E-01 7.0069E-01 1.0000E+00 -7.5917E-01 7.7751E-01 9.0018E-01 -6.8840E-01 7.0256E-01 8.7826E-01 -6.8798E-01 7.0086E-01 8.9324E-01 -6.8402E-01 6.9926E-01
11 -6.9073E-01 9.1253E-01 -8.6533E-01 -6.9046E-01 9.1195E-01 -8.6719E-01 -6.8559E-01 9.1578E-01 -8.6704E-01 -7.5917E-01 1.0000E+00 -9.4748E-01 -6.9081E-01 9.1493E-01 -8.6060E-01 -6.8208E-01 9.1204E-01 -8.5604E-01 -6.8069E-01 9.1694E-01 -8.6815E-01
12 7.0162E-01 -8.6350E-01 9.0885E-01 7.0096E-01 -8.6307E-01 9.0993E-01 7.0083E-01 -8.6473E-01 9.1005E-01 7.7751E-01 -9.4748E-01 1.0000E+00 7.0301E-01 -8.6491E-01 9.0561E-01 6.8579E-01 -8.6291E-01 9.0149E-01 6.9769E-01 -8.6435E-01 9.1044E-01
13 9.0532E-01 -6.9056E-01 7.0306E-01 9.0511E-01 -6.9009E-01 7.0302E-01 8.9785E-01 -6.9049E-01 7.0327E-01 9.0018E-01 -6.9081E-01 7.0301E-01 1.0000E+00 -7.5904E-01 7.7444E-01 8.9527E-01 -6.8997E-01 6.9898E-01 8.9105E-01 -6.8949E-01 7.0300E-01
14 -6.9058E-01 9.1217E-01 -8.6518E-01 -6.9016E-01 9.1162E-01 -8.6668E-01 -6.8694E-01 9.1480E-01 -8.6657E-01 -6.8840E-01 9.1493E-01 -8.6491E-01 -7.5904E-01 1.0000E+00 -9.4671E-01 -6.7951E-01 9.1178E-01 -8.5698E-01 -6.8266E-01 9.1549E-01 -8.6734E-01
15 6.9902E-01 -8.6034E-01 9.0538E-01 6.9804E-01 -8.6002E-01 9.0558E-01 7.0210E-01 -8.6016E-01 9.0589E-01 7.0256E-01 -8.6060E-01 9.0561E-01 7.7444E-01 -9.4671E-01 1.0000E+00 6.7711E-01 -8.5983E-01 9.0056E-01 7.0056E-01 -8.5864E-01 9.0548E-01
16 9.0162E-01 -6.7570E-01 6.8761E-01 9.0322E-01 -6.7465E-01 6.9231E-01 8.7269E-01 -6.8257E-01 6.9091E-01 8.7826E-01 -6.8208E-01 6.8579E-01 8.9527E-01 -6.7951E-01 6.7711E-01 1.0000E+00 -7.2894E-01 7.2942E-01 8.5697E-01 -6.8737E-01 6.9462E-01
17 -6.8899E-01 9.0992E-01 -8.6323E-01 -6.8846E-01 9.0942E-01 -8.6438E-01 -6.8671E-01 9.1180E-01 -8.6416E-01 -6.8798E-01 9.1204E-01 -8.6291E-01 -6.8997E-01 9.1178E-01 -8.5983E-01 -7.2894E-01 1.0000E+00 -9.4692E-01 -6.8295E-01 9.1195E-01 -8.6452E-01
18 6.9592E-01 -8.5654E-01 9.0131E-01 6.9478E-01 -8.5628E-01 9.0108E-01 7.0064E-01 -8.5549E-01 9.0128E-01 7.0086E-01 -8.5604E-01 9.0149E-01 6.9898E-01 -8.5698E-01 9.0056E-01 7.2942E-01 -9.4692E-01 1.0000E+00 6.9976E-01 -8.5333E-01 9.0039E-01
19 8.8729E-01 -6.8404E-01 6.9661E-01 8.8600E-01 -6.8393E-01 6.9376E-01 8.9294E-01 -6.7992E-01 6.9506E-01 8.9324E-01 -6.8069E-01 6.9769E-01 8.9105E-01 -6.8266E-01 7.0056E-01 8.5697E-01 -6.8295E-01 6.9976E-01 1.0000E+00 -7.5061E-01 7.7050E-01
20 -6.9045E-01 9.1251E-01 -8.6489E-01 -6.9048E-01 9.1183E-01 -8.6756E-01 -6.8183E-01 9.1706E-01 -8.6725E-01 -6.8402E-01 9.1694E-01 -8.6435E-01 -6.8949E-01 9.1549E-01 -8.5864E-01 -6.8737E-01 9.1195E-01 -8.5333E-01 -7.5061E-01 1.0000E+00 -9.4727E-01
21 7.0300E-01 -8.6516E-01 9.1076E-01 7.0274E-01 -8.6458E-01 9.1293E-01 6.9753E-01 -8.6810E-01 9.1281E-01 6.9926E-01 -8.6815E-01 9.1044E-01 7.0300E-01 -8.6734E-01 9.0548E-01 6.9462E-01 -8.6452E-01 9.0039E-01 7.7050E-01 -9.4727E-01 1.0000E+00

G-FILE for the vectors

Axx2014 2172014 217
B201402172000201402172100 7 rsgps 1.37IGS
Iant_info.003 NGS
C00080001 36545124 18 51922818 112 85685480 68
C00080002 571325 18 -197708703 112 -336329471 68

C00080003 959149332 19 319473868 111 467000563 68
C00080004 780104485 19 494136780 111 770542618 68
C00080005 246450066 18 638619544 111 1043810160 69
C00080006-1093191264 18 542653208 112 944060774 70
C00080007 1496178815 19 473378236 110 672150356 68
D 1 2 -7571556 1 3 7713882 1 4 9064721 1 5 -6890044 1 6 7027008 D 1 7 8955191 1 8 -6905541 1 9 7026584 1 10 8983475 1 11 -6907289 D 1 12 7016157 1 13 9053246 1 14 -6905753 1 15 6990236 1 16 9016205 D 1 17 -6889888 1 18 6959184 1 19 8872948 1 20 -6904505 1 21 7029978 D 2 3 -9488397 2 4 -6890107 2 5 9098960 2 6 -8648162 2 7 -6876230 D 2 8 9123458 2 9 -8647588 2 10 -6888091 2 11 9125283 2 12 -8634986 D 2 13 -6905609 2 14 9121658 2 15 -8603425 2 16 -6757017 2 17 9099156 D 2 18 -8565377 2 19 -6840425 2 20 9125138 2 21 -8651563 3 4 7014025 D 3 5 -8632502 3 6 9103501 3 7 7001866 3 8 -8650973 3 9 9102659 D 3 10 7013662 3 11 -8653285 3 12 9088466 3 13 7030600 3 14 -8651754 D 3 15 9053843 3 16 6876097 3 17 -8632348 3 18 9013101 3 19 6966104 D 3 20 -8648886 3 21 9107634 4 5 -7558918 4 6 7701835 4 7 8946336 D 4 8 -6903302 4 9 7022177 4 10 8976028 4 11 -6904618 4 12 7009595 D 4 13 9051085 4 14 -6901649 4 15 6980351 4 16 9032162 4 17 -6884562 D 4 18 6947770 4 19 8860039 4 20 -6904822 4 21 7027363 5 6 -9483481 D 5 7 -6873899 5 8 9117536 5 9 -8642555 5 10 -6885224 5 11 9119503 D 5 12 -8630651 5 13 -6900913 5 14 9116221 5 15 -8600180 5 16 -6746517 D 5 17 9094227 5 18 -8562778 5 19 -6839315 5 20 9118283 5 21 -8645826 D 6 7 6983824 6 8 -8670681 6 9 9119474 6 10 6999384 6 11 -8671945 D 6 12 9099349 6 13 7030215 6 14 -8666801 6 15 9055772 6 16 6923051 D 6 17 -8643807 6 18 9010815 6 19 6937576 6 20 -8675589 6 21 9129281 D 7 8 -7583125 7 9 7751211 7 10 8973219 7 11 -6855891 7 12 7008297 D 7 13 8978528 7 14 -6869448 7 15 7020988 7 16 8726884 7 17 -6867060 D 7 18 7006403 7 19 8929351 7 20 -6818297 7 21 6975289 8 9 -9479634 D 8 10 -6867249 8 11 9157765 8 12 -8647349 8 13 -6904942 8 14 9148014 D 8 15 -8601629 8 16 -6825680 8 17 9118023 8 18 -8554910 8 19 -6799204 D 8 20 9170588 8 21 -8681036 9 10 7006917 9 11 -8670424 9 12 9100478 D 9 13 7032731 9 14 -8665698 9 15 9058868 9 16 6909123 9 17 -8641629 D 9 18 9012834 9 19 6950638 9 20 -8672505 9 21 9128072 10 11 -7591658 D 10 12 7775059 10 13 9001819 10 14 -6884043 10 15 7025561 10 16 8782615 D 10 17 -6879811 10 18 7008577 10 19 8932415 10 20 -6840212 10 21 6992573 D 11 12 -9474828 11 13 -6908124 11 14 9149283 11 15 -8605955 11 16 -6820794 D 11 17 9120394 11 18 -8560392 11 19 -6806861 11 20 9169390 11 21 -8681522 D 12 13 7030106 12 14 -8649076 12 15 9056050 12 16 6857940 12 17 -8629103 D 12 18 9014932 12 19 6976893 12 20 -8643470 12 21 9104419 13 14 -7590421 D 13 15 7744400 13 16 8952702 13 17 -6899722 13 18 6989791 13 19 8910524 D 13 20 -6894857 13 21 7029975 14 15 -9467147 14 16 -6795085 14 17 9117843 D 14 18 -8569839 14 19 -6826602 14 20 9154856 14 21 -8673354 15 16 6771067 D 15 17 -8598298 15 18 9005593 15 19 7005609 15 20 -8586360 15 21 9054769 D 16 17 -7289403 16 18 7294182 16 19 8569685 16 20 -6873694 16 21 6946201 D 17 18 -9469194 17 19 -6829507 17 20 9119459 17 21 -8645236 18 19 6997579 D 18 20 -8533302 18 21 9003923 19 20 -7506125 19 21 7705037 20 21 -9472662

ITRF position of mob_ as determined by individual baselines

	X	Y	Z
al90	184891.491	-5491504.022	3227887.789
aldi	184891.494	-5491504.068	3227887.828

aleb	184891.481	-5491504.060	3227887.814
alre	184891.478	-5491504.065	3227887.817
al84	184891.479	-5491504.057	3227887.809
msev	184891.482	-5491504.035	3227887.797
alan	184891.475	-5491504.015	3227887.779

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
al90	0.010	0.016	-0.010	0.010	-0.001	-0.018
aldi	0.013	-0.030	0.030	0.012	0.010	0.041
aleb	0.000	-0.022	0.015	-0.001	0.002	0.026
alre	-0.003	-0.027	0.018	-0.004	0.002	0.032
al84	-0.002	-0.019	0.011	-0.002	-0.000	0.022
msev	0.001	0.003	-0.001	0.001	0.001	-0.003
alan	-0.006	0.023	-0.020	-0.005	-0.005	-0.030

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

dop from interpolation is 0.597
scatter (mean square distance from rover) is 13859.974
average edop for rover is 0.650
average ndop for rover is 0.910
average hdop for rover is 1.118
average vdop for rover is 1.750
average gdop for rover is 2.350

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.

FILE: MOB_06.14O OP1393355646617

NGS OPUS-RS SOLUTION REPORT
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All computed coordinate accuracies are listed as 1-sigma RMS values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: blkimbrough@theatlgrp.com DATE: February 25, 2014
RINEX FILE: mob_049o.14o TIME: 19:34:45 UTC

SOFTWARE: rsgps 1.37 RS94.prl 1.89 START: 2014/02/18 14:53:50
EPHEMERIS: igr17802.eph [rapid] STOP: 2014/02/18 15:15:58
NAV FILE: brdc0490.14n OBS USED: 1141 / 1561 : 73%
ANT NAME: TPSHIPER_V NONE QUALITY IND. 9.92/ 15.91
ARP HEIGHT: 2.000 NORMALIZED RMS: 0.353

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.13323)

X:	188517.306(m)	0.006(m)	188516.533(m)	0.006(m)
Y:	-5472707.828(m)	0.032(m)	-5472706.330(m)	0.032(m)
Z:	3259256.116(m)	0.010(m)	3259255.948(m)	0.010(m)

LAT:	30 55 48.99157	0.012(m)	30 55 49.01232	0.012(m)
E LON:	271 58 22.35552	0.007(m)	271 58 22.32836	0.007(m)
W LON:	88 1 37.64448	0.007(m)	88 1 37.67164	0.007(m)
EL HGT:	-17.186(m)	0.031(m)	-18.579(m)	0.031(m)
ORTHO HGT:	11.305(m)	0.033(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES UTM (Zone 16)	STATE PLANE COORDINATES SPC (0102 AL W)
Northing (Y) [meters]	3422326.865	103242.877
Easting (X) [meters]	401870.799	549623.891
Convergence [degrees]	-0.52797814	-0.27094432
Point Scale	0.99971878	0.99996463
Combined Factor	0.99972148	0.99996733

US NATIONAL GRID DESIGNATOR: 16RDV0187022326(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI3826	AL90 ALDOT 9 DIV OFF CORS ARP	N304126.969	W0880154.137	26550.5
DL3486	ALDI DAUPHIN ISLAND CORS ARP	N301456.987	W0880440.688	75666.4
DM5367	ALBU CHOCTAW ELEM SCH CORS ARP	N320453.895	W0881359.331	129150.2
DM3483	AL82 ALDOT 8 DIV DIS 2 CORS ARP	N321526.784	W0873732.930	152000.7

DM3975 ALSE WALLACE COMM COLL CORS ARP N322650.689 W0870042.376 193809.1
DG6568 COVG COVINGTON CORS ARP N302833.269 W0900543.922 204441.2
DM3489 ALCE ADHR OFFICE CORS ARP N325645.621 W0870902.274 238369.9

NEAREST NGS PUBLISHED CONTROL POINT
BH1948 CREOLA N305406.431 W0880030.992 3631.0

OPUS-RS Extended Output, Level 2

FINAL COORDINATES (ITRF at epoch of observations)

al90	188546.000	-5486311.732	3236456.334
aldi	184948.620	-5511274.946	3194254.878
albu	166780.581	-5406697.794	3368114.568
al82	223651.350	-5394263.099	3384621.170
alse	280860.570	-5380301.820	3402419.979
covg	-9174.184	-5501675.370	3215950.502
alce	266336.507	-5351156.718	3448966.179
mob_	188516.533	-5472706.330	3259255.948

Covariance matrix of the stations:
1 4.3600E-07 2.2370E-06 -1.0820E-06 -3.0040E-08 -3.3300E-07 1.2940E-07 -5.9190E-08 -4.1350E-07 2.0890E-07 -3.8370E-08 -3.1520E-07 1.6370E-07 -1.8510E-08 -2.1510E-07 1.1710E-07 -1.1760E-07 -7.0800E-07 3.1710E-07 -2.9540E-08 -2.5210E-07 1.4560E-07 1.0070E-07 9.3180E-07 -5.1160E-07
2 2.2370E-06 2.9210E-05 -1.4550E-05 -3.3340E-07 -4.7860E-06 2.3820E-06 -3.8780E-07 -4.9030E-06 2.4620E-06 -3.5640E-07 -4.6820E-06 2.3520E-06 -3.2820E-07 -4.4680E-06 2.2440E-06 -4.8410E-07 -5.6800E-06 2.8260E-06 -3.4780E-07 -4.5430E-06 2.2860E-06 -5.6450E-08 -1.1030E-06 5.9950E-07
3 -1.0820E-06 -1.4550E-05 7.7180E-06 1.3310E-07 2.3760E-06 -1.1520E-06 2.0720E-07 2.5080E-06 -1.3240E-06 1.5550E-07 2.2920E-06 -1.2310E-06 1.0510E-07 2.0660E-06 -1.1320E-06 3.4760E-07 3.1710E-06 -1.5430E-06 1.3350E-07 2.1380E-06 -1.1940E-06 -1.4310E-07 -1.6140E-06 9.2220E-07
4 -3.0040E-08 -3.3340E-07 1.3310E-07 4.3390E-07 2.1870E-06 -1.0690E-06 -6.0550E-08 -4.0990E-07 2.0900E-07 -3.4850E-08 -2.9580E-07 1.5760E-07 -1.0120E-08 -1.7820E-07 1.0390E-07 -1.3200E-07 -7.5190E-07 3.2890E-07 -2.3570E-08 -2.1820E-07 1.3670E-07 1.2000E-07 1.2230E-06 -6.7270E-07
5 -3.3300E-07 -4.7860E-06 2.3760E-06 2.1870E-06 2.9440E-05 -1.4560E-05 -3.7610E-07 -4.9450E-06 2.4620E-06 -3.5040E-07 -4.7400E-06 2.3580E-06 -3.2790E-07 -4.5460E-06 2.2580E-06 -4.5570E-07 -5.6580E-06 2.8090E-06 -3.4510E-07 -4.6230E-06 2.2970E-06 -8.9520E-08 -1.6930E-06 8.8970E-07
6 1.2940E-07 2.3820E-06 -1.1520E-06 -1.0690E-06 -1.4560E-05 7.7080E-06 2.1140E-07 2.5300E-06 -1.3330E-06 1.4350E-07 2.2610E-06 -1.2190E-06 7.7060E-08 1.9770E-06 -

1.0960E-06 3.9490E-07 3.3500E-06 -1.5910E-06 1.1340E-07 2.0590E-06 -1.1740E-06 -2.1990E-07 -2.5130E-06 1.4320E-06
7 -5.9190E-08 -3.8780E-07 2.0720E-07 -6.0550E-08 -3.7610E-07 2.1140E-07 4.8870E-07 2.5920E-06 -1.2740E-06 -6.1850E-08 -4.5320E-07 2.0550E-07 -7.4680E-08 -4.7100E-07 2.0690E-07 -1.9920E-08 -4.1530E-07 2.3660E-07 -6.9650E-08 -4.8860E-07 2.0690E-07 -7.1300E-08 -1.1360E-06 6.2490E-07
8 -4.1350E-07 -4.9030E-06 2.5080E-06 -4.0990E-07 -4.9450E-06 2.5300E-06 2.5920E-06 2.9800E-05 -1.5140E-05 -4.2560E-07 -4.8120E-06 2.4560E-06 -4.0950E-07 -4.6510E-06 2.3710E-06 -5.1110E-07 -5.6440E-06 2.8800E-06 -4.2190E-07 -4.6980E-06 2.3920E-06 -1.7640E-07 -1.9170E-06 1.0800E-06
9 2.0890E-07 2.4620E-06 -1.3240E-06 2.0900E-07 2.4620E-06 -1.3330E-06 -1.2740E-06 -1.5140E-05 8.1790E-06 2.1710E-07 2.5290E-06 -1.3270E-06 2.2660E-07 2.5220E-06 -1.3180E-06 1.8740E-07 2.6120E-06 -1.4100E-06 2.2510E-07 2.5510E-06 -1.3240E-06 1.8320E-07 2.1630E-06 -1.1770E-06
10 -3.8370E-08 -3.5640E-07 1.5550E-07 -3.4850E-08 -3.5040E-07 1.4350E-07 -6.1850E-08 -4.2560E-07 2.1710E-07 4.5310E-07 2.3510E-06 -1.1250E-06 -2.4070E-08 -2.3770E-07 1.2940E-07 -1.1680E-07 -7.0830E-07 3.2320E-07 -3.4290E-08 -2.7260E-07 1.5610E-07 8.6010E-08 8.3230E-07 -4.5470E-07
11 -3.1520E-07 -4.6820E-06 2.2920E-06 -2.9580E-07 -4.7400E-06 2.2610E-06 -4.5320E-07 -4.8120E-06 2.5290E-06 2.3510E-06 2.8530E-05 -1.4460E-05 -2.1480E-07 -3.7780E-06 2.0720E-06 -7.9560E-07 -6.4950E-06 3.1230E-06 -2.7680E-07 -3.8850E-06 2.1810E-06 3.5840E-07 4.5050E-06 -2.4280E-06
12 1.6370E-07 2.3520E-06 -1.2310E-06 1.5760E-07 2.3580E-06 -1.2190E-06 2.0550E-07 2.4560E-06 -1.3270E-06 -1.1250E-06 -1.4460E-05 7.8440E-06 1.4350E-07 2.1560E-06 -1.1920E-06 2.9310E-07 2.9270E-06 -1.4990E-06 1.6150E-07 2.2080E-06 -1.2340E-06 -3.2700E-08 -3.7280E-07 2.0390E-07
13 -1.8510E-08 -3.2820E-07 1.0510E-07 -1.0120E-08 -3.2790E-07 7.7060E-08 -7.4680E-08 -4.0950E-07 2.2660E-07 -2.4070E-08 -2.1480E-07 1.4350E-07 4.8430E-07 2.3440E-06 -1.0690E-06 -2.1420E-07 -1.0030E-06 4.1020E-07 4.4510E-11 -6.0210E-08 1.0650E-07 2.4200E-07 2.7930E-06 -1.5310E-06
14 -2.1510E-07 -4.4680E-06 2.0660E-06 -1.7820E-07 -4.5460E-06 1.9770E-06 -4.7100E-07 -4.6510E-06 2.5220E-06 -2.3770E-07 -3.7780E-06 2.1560E-06 2.3440E-06 2.8060E-05 -1.4080E-05 -1.1170E-06 -7.4580E-06 3.3990E-06 -1.2500E-07 -3.0160E-06 1.9610E-06 9.4150E-07 1.1580E-05 -6.2960E-06
15 1.1710E-07 2.2440E-06 -1.1320E-06 1.0390E-07 2.2580E-06 -1.0960E-06 2.0690E-07 2.3710E-06 -1.3180E-06 1.2940E-07 2.0720E-06 -1.1920E-06 -1.0690E-06 -1.4080E-05 7.6260E-06 4.1860E-07 3.3020E-06 -1.6070E-06 9.3710E-08 1.8340E-06 -1.1370E-06 -2.7520E-07 -3.2630E-06 1.7800E-06
16 -1.1760E-07 -4.8410E-07 3.4760E-07 -1.3200E-07 -4.5570E-07 3.9490E-07 -1.9920E-08 -5.1110E-07 1.8740E-07 -1.1680E-07 -7.9560E-07 2.9310E-07 -2.1420E-07 -1.1170E-06 4.1860E-07 9.1140E-07 4.4520E-06 -1.9880E-06 -1.6800E-07 -1.0900E-06 3.4720E-07 -4.9970E-07 -6.4820E-06 3.5500E-06
17 -7.0800E-07 -5.6800E-06 3.1710E-06 -7.5190E-07 -5.6580E-06 3.3500E-06 -4.1530E-07 -5.6440E-06 2.6120E-06 -7.0830E-07 -6.4950E-06 2.9270E-06 -1.0030E-06 -7.4580E-06 3.3020E-06 4.4520E-06 3.8410E-05 -1.8420E-05 -8.6440E-07 -7.3360E-06 3.0600E-06 -1.8150E-06 -2.1770E-05 1.1870E-05
18 3.1710E-07 2.8260E-06 -1.5430E-06 3.2890E-07 2.8090E-06 -1.5910E-06 2.3660E-07 2.8800E-06 -1.4100E-06 3.2320E-07 3.1230E-06 -1.4990E-06 4.1020E-07 3.3990E-06 -

1.6070E-06 -1.9880E-06 -1.8420E-05 9.3400E-06 3.7140E-07 3.3860E-06 -1.5470E-06 6.2150E-07 7.2190E-06 -3.8860E-06
19 -2.9540E-08 -3.4780E-07 1.3350E-07 -2.3570E-08 -3.4510E-07 1.1340E-07 -6.9650E-08 -4.2190E-07 2.2510E-07 -3.4290E-08 -2.7680E-07 1.6150E-07 4.4510E-11 -1.2500E-07 9.3710E-08 -1.6800E-07 -8.6440E-07 3.7140E-07 4.6790E-07 2.3810E-06 -1.0990E-06 1.6510E-07 1.8370E-06 -1.0050E-06
20 -2.5210E-07 -4.5430E-06 2.1380E-06 -2.1820E-07 -4.6230E-06 2.0590E-06 -4.8860E-07 -4.6980E-06 2.5510E-06 -2.7260E-07 -3.8850E-06 2.2080E-06 -6.0210E-08 -3.0160E-06 1.8340E-06 -1.0900E-06 -7.3360E-06 3.3860E-06 2.3810E-06 2.8250E-05 -1.4180E-05 8.3700E-07 1.0540E-05 -5.7120E-06
21 1.4560E-07 2.2860E-06 -1.1940E-06 1.3670E-07 2.2970E-06 -1.1740E-06 2.0690E-07 2.3920E-06 -1.3240E-06 1.5610E-07 2.1810E-06 -1.2340E-06 1.0650E-07 1.9610E-06 -1.1370E-06 3.4720E-07 3.0600E-06 -1.5470E-06 -1.0990E-06 -1.4180E-05 7.7530E-06 -1.3400E-07 -1.6210E-06 8.6810E-07
22 1.0070E-07 -5.6450E-08 -1.4310E-07 1.2000E-07 -8.9520E-08 -2.1990E-07 -7.1300E-08 -1.7640E-07 1.8320E-07 8.6010E-08 3.5840E-07 -3.2700E-08 2.4200E-07 9.4150E-07 -2.7520E-07 -4.9970E-07 -1.8150E-06 6.2150E-07 1.6510E-07 8.3700E-07 -1.3400E-07 5.9520E-06 4.3920E-05 -2.2140E-05
23 9.3180E-07 -1.1030E-06 -1.6140E-06 1.2230E-06 -1.6930E-06 -2.5130E-06 -1.1360E-06 -1.9170E-06 2.1630E-06 8.3230E-07 4.5050E-06 -3.7280E-07 2.7930E-06 1.1580E-05 -3.2630E-06 -6.4820E-06 -2.1770E-05 7.2190E-06 1.8370E-06 1.0540E-05 -1.6210E-06 4.3920E-05 5.7180E-04 -2.9610E-04
24 -5.1160E-07 5.9950E-07 9.2220E-07 -6.7270E-07 8.8970E-07 1.4320E-06 6.2490E-07 1.0800E-06 -1.1770E-06 -4.5470E-07 -2.4280E-06 2.0390E-07 -1.5310E-06 -6.2960E-06 1.7800E-06 3.5500E-06 1.1870E-05 -3.8860E-06 -1.0050E-06 -5.7120E-06 8.6810E-07 -2.2140E-05 -2.9610E-04 1.5820E-04

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

0.0000059520	0.0000439200	-0.0000221400
0.0000439200	0.0005718000	-0.0002961000
-0.0000221400	-0.0002961000	0.0001582000

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

0.0000096448	0.0000045939	-0.0000709114
0.0000045939	0.0000059794	-0.0000394130
-0.0000709114	-0.0000394130	0.0007203277

Horizontal network accuracy = 0.00724 meters.
Vertical network accuracy = 0.05263 meters.

		Vectors		
To	From	X	Y	Z
al90	mob_	29.468	-13605.402	-22799.614
aldi	mob_	-3567.913	-38568.616	-65001.070
albu	mob_	-21735.952	66008.536	108858.620
al82	mob_	35134.817	78443.231	125365.222
alse	mob_	92344.037	92404.510	143164.030

covg mob_ -197690.717 -28969.040 -43305.446
alce mob_ 77819.975 121549.612 189710.230

Covariance matrix of the 7 vectors
1 6.1866E-06 4.5282E-05 -2.2567E-05 5.7013E-06 4.2745E-05 -2.1279E-05 5.8634E-06 4.2751E-05 -2.1603E-05 5.7269E-06 4.2315E-05 -2.1432E-05 5.5908E-06 4.1832E-05 -2.1236E-05 6.2334E-06 4.4095E-05 -2.1933E-05 5.6567E-06 4.1899E-05 -2.1349E-05
2 4.5282E-05 6.0322E-04 -3.0964E-04 4.2420E-05 5.6981E-04 -2.9180E-04 4.4725E-05 5.6992E-04 -2.9640E-04 4.2788E-05 5.6372E-04 -2.9397E-04 4.0855E-05 5.5685E-04 -2.9119E-04 4.9974E-05 5.8899E-04 -3.0109E-04 4.1792E-05 5.5782E-04 -2.9279E-04
3 -2.2567E-05 -3.0964E-04 1.6407E-04 -2.1191E-05 -2.9300E-04 1.5469E-04 -2.2415E-05 -2.9306E-04 1.5713E-04 -2.1387E-05 -2.8977E-04 1.5584E-04 -2.0361E-05 -2.8612E-04 1.5437E-04 -2.5199E-05 -3.0318E-04 1.5962E-04 -2.0858E-05 -2.8664E-04 1.5522E-04
4 5.7013E-06 4.2420E-05 -2.1191E-05 6.1459E-06 4.4974E-05 -2.2316E-05 5.8428E-06 4.2463E-05 -2.1442E-05 5.7111E-06 4.2043E-05 -2.1277E-05 5.5799E-06 4.1577E-05 -2.1088E-05 6.1997E-06 4.3760E-05 -2.1760E-05 5.6433E-06 4.1642E-05 -2.1197E-05
5 4.2745E-05 5.6981E-04 -2.9300E-04 4.4974E-05 6.0463E-04 -3.0904E-04 4.4769E-05 5.7047E-04 -2.9669E-04 4.2827E-05 5.6425E-04 -2.9426E-04 4.0889E-05 5.5737E-04 -2.9147E-04 5.0036E-05 5.8960E-04 -3.0140E-04 4.1827E-05 5.5833E-04 -2.9307E-04
6 -2.1279E-05 -2.9180E-04 1.5469E-04 -2.2316E-05 -3.0904E-04 1.6304E-04 -2.2334E-05 -2.9214E-04 1.5661E-04 -2.1322E-05 -2.8890E-04 1.5535E-04 -2.0312E-05 -2.8531E-04 1.5389E-04 -2.5075E-05 -3.0211E-04 1.5906E-04 -2.0802E-05 -2.8582E-04 1.5473E-04
7 5.8634E-06 4.4725E-05 -2.2415E-05 5.8428E-06 4.4769E-05 -2.2334E-05 6.5833E-06 4.7824E-05 -2.4222E-05 5.8754E-06 4.4244E-05 -2.2527E-05 5.7066E-06 4.3643E-05 -2.2283E-05 6.5031E-06 4.6456E-05 -2.3150E-05 5.7885E-06 4.3730E-05 -2.2424E-05
8 4.2751E-05 5.6992E-04 -2.9306E-04 4.2463E-05 5.7047E-04 -2.9214E-04 4.7824E-05 6.0543E-04 -3.1448E-04 4.2838E-05 5.6440E-04 -2.9435E-04 4.0894E-05 5.5749E-04 -2.9155E-04 5.0067E-05 5.8984E-04 -3.0152E-04 4.1838E-05 5.5848E-04 -2.9317E-04
9 -2.1603E-05 -2.9640E-04 1.5713E-04 -2.1442E-05 -2.9669E-04 1.5661E-04 -2.4222E-05 -3.1448E-04 1.6873E-04 -2.1651E-05 -2.9331E-04 1.5785E-04 -2.0566E-05 -2.8944E-04 1.5628E-04 -2.5686E-05 -3.0752E-04 1.6185E-04 -2.1093E-05 -2.9000E-04 1.5718E-04
10 5.7269E-06 4.2788E-05 -2.1387E-05 5.7111E-06 4.2827E-05 -2.1322E-05 5.8754E-06 4.2838E-05 -2.1651E-05 6.2331E-06 4.5080E-05 -2.2778E-05 5.5999E-06 4.1909E-05 -2.1281E-05 6.2489E-06 4.4194E-05 -2.1984E-05 5.6666E-06 4.1978E-05 -2.1395E-05
11 4.2315E-05 5.6372E-04 -2.8977E-04 4.2043E-05 5.6425E-04 -2.8890E-04 4.4244E-05 5.6440E-04 -2.9331E-04 4.5080E-05 5.9132E-04 -3.0776E-04 4.0554E-05 5.5194E-04 -2.8834E-04 4.9248E-05 5.8257E-04 -2.9777E-04 4.1448E-05 5.5287E-04 -2.8987E-04
12 -2.1432E-05 -2.9397E-04 1.5584E-04 -2.1277E-05 -2.9426E-04 1.5535E-04 -2.2527E-05 -2.9435E-04 1.5785E-04 -2.2778E-05 -3.0776E-04 1.6564E-04 -2.0433E-05 -2.8728E-04 1.5502E-04 -2.5364E-05 -3.0467E-04 1.6038E-04 -2.0941E-05 -2.8781E-04 1.5589E-04
13 5.5908E-06 4.0855E-05 -2.0361E-05 5.5799E-06 4.0889E-05 -2.0312E-05 5.7066E-06 4.0894E-05 -2.0566E-05 5.5999E-06 4.0554E-05 -2.0433E-05 5.9523E-06 4.2529E-05 -2.1403E-05 5.9955E-06 4.1939E-05 -2.0820E-05 5.5449E-06 4.0230E-05 -2.0368E-05
14 4.1832E-05 5.5685E-04 -2.8612E-04 4.1577E-05 5.5737E-04 -2.8531E-04 4.3643E-05 5.5749E-04 -2.8944E-04 4.1909E-05 5.5194E-04 -2.8728E-04 4.2529E-05 5.7670E-04 -3.0062E-04 4.8344E-05 5.7453E-04 -2.9362E-04 4.1016E-05 5.4666E-04 -2.8622E-04

15 -2.1236E-05 -2.9119E-04 1.5437E-04 -2.1088E-05 -2.9147E-04 1.5389E-04 -2.2283E-05 -2.9155E-04 1.5628E-04 -2.1281E-05 -2.8834E-04 1.5502E-04 -2.1403E-05 -3.0062E-04 1.6227E-04 -2.4996E-05 -3.0140E-04 1.5870E-04 -2.0766E-05 -2.8529E-04 1.5441E-04
16 6.2334E-06 4.9974E-05 -2.5199E-05 6.1997E-06 5.0036E-05 -2.5075E-05 6.5031E-06 5.0067E-05 -2.5686E-05 6.2489E-06 4.9248E-05 -2.5364E-05 5.9955E-06 4.8344E-05 -2.4996E-05 7.8628E-06 5.6669E-05 -2.8300E-05 6.1186E-06 4.8475E-05 -2.5209E-05
17 4.4095E-05 5.8899E-04 -3.0318E-04 4.3760E-05 5.8960E-04 -3.0211E-04 4.6456E-05 5.8984E-04 -3.0752E-04 4.4194E-05 5.8257E-04 -3.0467E-04 4.1939E-05 5.7453E-04 -3.0140E-04 5.6669E-05 6.5375E-04 -3.3361E-04 4.3034E-05 5.7569E-04 -3.0329E-04
18 -2.1933E-05 -3.0109E-04 1.5962E-04 -2.1760E-05 -3.0140E-04 1.5906E-04 -2.3150E-05 -3.0152E-04 1.6185E-04 -2.1984E-05 -2.9777E-04 1.6038E-04 -2.0820E-05 -2.9362E-04 1.5870E-04 -2.8300E-05 -3.3361E-04 1.7531E-04 -2.1385E-05 -2.9422E-04 1.5967E-04
19 5.6567E-06 4.1792E-05 -2.0858E-05 5.6433E-06 4.1827E-05 -2.0802E-05 5.7885E-06 4.1838E-05 -2.1093E-05 5.6666E-06 4.1448E-05 -2.0941E-05 5.5449E-06 4.1016E-05 -2.0766E-05 6.1186E-06 4.3034E-05 -2.1385E-05 6.0897E-06 4.3627E-05 -2.2100E-05
20 4.1899E-05 5.5782E-04 -2.8664E-04 4.1642E-05 5.5833E-04 -2.8582E-04 4.3730E-05 5.5848E-04 -2.9000E-04 4.1978E-05 5.5287E-04 -2.8781E-04 4.0230E-05 5.4666E-04 -2.8529E-04 4.8475E-05 5.7569E-04 -2.9422E-04 4.3627E-05 5.7897E-04 -3.0295E-04
21 -2.1349E-05 -2.9279E-04 1.5522E-04 -2.1197E-05 -2.9307E-04 1.5473E-04 -2.2424E-05 -2.9317E-04 1.5718E-04 -2.1395E-05 -2.8987E-04 1.5589E-04 -2.0368E-05 -2.8622E-04 1.5441E-04 -2.5209E-05 -3.0329E-04 1.5967E-04 -2.2100E-05 -3.0295E-04 1.6422E-04

Correlation matrix of the 7 vectors

1 1.0000E+00 7.4124E-01 -7.0833E-01 9.2460E-01 6.9890E-01 -6.7000E-01 9.1876E-01 6.9853E-01 -6.6862E-01 9.2224E-01 6.9961E-01 -6.6951E-01 9.2131E-01 7.0033E-01 -6.7025E-01 8.9374E-01 6.9336E-01 -6.6598E-01 9.2159E-01 7.0008E-01 -6.6979E-01
2 7.4124E-01 1.0000E+00 -9.8423E-01 6.9669E-01 9.4352E-01 -9.3047E-01 7.0972E-01 9.4307E-01 -9.2906E-01 6.9780E-01 9.4387E-01 -9.3003E-01 6.8182E-01 9.4413E-01 -9.3074E-01 7.2564E-01 9.3792E-01 -9.2589E-01 6.8953E-01 9.4391E-01 -9.3028E-01
3 -7.0833E-01 -9.8423E-01 1.0000E+00 -6.6733E-01 -9.3026E-01 9.4580E-01 -6.8201E-01 -9.2982E-01 9.4437E-01 -6.6876E-01 -9.3029E-01 9.4534E-01 -6.5153E-01 -9.3016E-01 9.4606E-01 -7.0159E-01 -9.2573E-01 9.4116E-01 -6.5988E-01 -9.3000E-01 9.4560E-01
4 9.2460E-01 6.9669E-01 -6.6733E-01 1.0000E+00 7.3777E-01 -7.0498E-01 9.1855E-01 6.9613E-01 -6.6583E-01 9.2274E-01 6.9741E-01 -6.6687E-01 9.2255E-01 6.9837E-01 -6.6778E-01 8.9184E-01 6.9037E-01 -6.6292E-01 9.2245E-01 6.9809E-01 -6.6721E-01
5 6.9890E-01 9.4352E-01 -9.3026E-01 7.3777E-01 1.0000E+00 -9.8427E-01 7.0960E-01 9.4287E-01 -9.2888E-01 6.9762E-01 9.4366E-01 -9.2984E-01 6.8158E-01 9.4389E-01 -9.3054E-01 7.2569E-01 9.3780E-01 -9.2575E-01 6.8932E-01 9.4367E-01 -9.3008E-01
6 -6.7000E-01 -9.3047E-01 9.4580E-01 -7.0498E-01 -9.8427E-01 1.0000E+00 -6.8169E-01 -9.2982E-01 9.4422E-01 -6.6884E-01 -9.3042E-01 9.4530E-01 -6.5202E-01 -9.3046E-01 9.4613E-01 -7.0033E-01 -9.2534E-01 9.4083E-01 -6.6016E-01 -9.3026E-01 9.4559E-01
7 9.1876E-01 7.0972E-01 -6.8201E-01 9.1855E-01 7.0960E-01 -6.8169E-01 1.0000E+00 7.5752E-01 -7.2676E-01 9.1721E-01 7.0913E-01 -6.8218E-01 9.1162E-01 7.0831E-01 -6.8176E-01 9.0388E-01 7.0813E-01 -6.8143E-01 9.1422E-01 7.0833E-01 -6.8200E-01
8 6.9853E-01 9.4307E-01 -9.2982E-01 6.9613E-01 9.4287E-01 -9.2982E-01 7.5752E-01 1.0000E+00 -9.8393E-01 6.9735E-01 9.4328E-01 -9.2951E-01 6.8121E-01 9.4346E-01 -9.3016E-01 7.2566E-01 9.3756E-01 -9.2550E-01 6.8902E-01 9.4329E-01 -9.2976E-01

9 -6.6862E-01 -9.2906E-01 9.4437E-01 -6.6583E-01 -9.2888E-01 9.4422E-01 -7.2676E-01 -9.8393E-01 1.0000E+00 -6.6763E-01 -9.2856E-01 9.4418E-01 -6.4893E-01 -9.2788E-01 9.4447E-01 -7.0519E-01 -9.2591E-01 9.4105E-01 -6.5803E-01 -9.2783E-01 9.4428E-01
10 9.2224E-01 6.9780E-01 -6.6876E-01 9.2274E-01 6.9762E-01 -6.6884E-01 9.1721E-01 6.9735E-01 -6.6763E-01 1.0000E+00 7.4255E-01 -7.0889E-01 9.1937E-01 6.9900E-01 -6.6915E-01 8.9261E-01 6.9233E-01 -6.6503E-01 9.1976E-01 6.9878E-01 -6.6874E-01
11 6.9961E-01 9.4387E-01 -9.3029E-01 6.9741E-01 9.4366E-01 -9.3042E-01 7.0913E-01 9.4328E-01 -9.2856E-01 7.4255E-01 1.0000E+00 -9.8338E-01 6.8356E-01 9.4516E-01 -9.3084E-01 7.2225E-01 9.3698E-01 -9.2483E-01 6.9070E-01 9.4490E-01 -9.3021E-01
12 -6.6951E-01 -9.3003E-01 9.4534E-01 -6.6687E-01 -9.2984E-01 9.4530E-01 -6.8218E-01 -9.2951E-01 9.4418E-01 -7.0889E-01 -9.8338E-01 1.0000E+00 -6.5074E-01 -9.2949E-01 9.4560E-01 -7.0284E-01 -9.2586E-01 9.4119E-01 -6.5935E-01 -9.2939E-01 9.4524E-01
13 9.2131E-01 6.8182E-01 -6.5153E-01 9.2255E-01 6.8158E-01 -6.5202E-01 9.1162E-01 6.8121E-01 -6.4893E-01 9.1937E-01 6.8356E-01 -6.5074E-01 1.0000E+00 7.2589E-01 -6.8868E-01 8.7638E-01 6.7231E-01 -6.4452E-01 9.2099E-01 6.8529E-01 -6.5149E-01
14 7.0033E-01 9.4413E-01 -9.3016E-01 6.9837E-01 9.4389E-01 -9.3046E-01 7.0831E-01 9.4346E-01 -9.2788E-01 6.9900E-01 9.4516E-01 -9.2949E-01 7.2589E-01 1.0000E+00 -9.8272E-01 7.1792E-01 9.3569E-01 -9.2344E-01 6.9213E-01 9.4606E-01 -9.3008E-01
15 -6.7025E-01 -9.3074E-01 9.4606E-01 -6.6778E-01 -9.3054E-01 9.4613E-01 -6.8176E-01 -9.3016E-01 9.4447E-01 -6.6915E-01 -9.3084E-01 9.4560E-01 -6.8868E-01 -9.8272E-01 1.0000E+00 -6.9980E-01 -9.2540E-01 9.4092E-01 -6.6061E-01 -9.3078E-01 9.4595E-01
16 8.9374E-01 7.2564E-01 -7.0159E-01 8.9184E-01 7.2569E-01 -7.0033E-01 9.0388E-01 7.2566E-01 -7.0519E-01 8.9261E-01 7.2225E-01 -7.0284E-01 8.7638E-01 7.1792E-01 -6.9980E-01 1.0000E+00 7.9041E-01 -7.6223E-01 8.8423E-01 7.1846E-01 -7.0154E-01
17 6.9336E-01 9.3792E-01 -9.2573E-01 6.9037E-01 9.3780E-01 -9.2534E-01 7.0813E-01 9.3756E-01 -9.2591E-01 6.9233E-01 9.3698E-01 -9.2586E-01 6.7231E-01 9.3569E-01 -9.2540E-01 7.9041E-01 1.0000E+00 -9.8543E-01 6.8203E-01 9.3575E-01 -9.2564E-01
18 -6.6598E-01 -9.2589E-01 9.4116E-01 -6.6292E-01 -9.2575E-01 9.4083E-01 -6.8143E-01 -9.2550E-01 9.4105E-01 -6.6503E-01 -9.2483E-01 9.4119E-01 -6.4452E-01 -9.2344E-01 9.4092E-01 -7.6223E-01 -9.8543E-01 1.0000E+00 -6.5450E-01 -9.2351E-01 9.4105E-01
19 9.2159E-01 6.8953E-01 -6.5988E-01 9.2245E-01 6.8932E-01 -6.6016E-01 9.1422E-01 6.8902E-01 -6.5803E-01 9.1976E-01 6.9070E-01 -6.5935E-01 9.2099E-01 6.9213E-01 -6.6061E-01 8.8423E-01 6.8203E-01 -6.5450E-01 1.0000E+00 7.3473E-01 -6.9885E-01
20 7.0008E-01 9.4391E-01 -9.3000E-01 6.9809E-01 9.4367E-01 -9.3026E-01 7.0833E-01 9.4329E-01 -9.2783E-01 6.9878E-01 9.4490E-01 -9.2939E-01 6.8529E-01 9.4606E-01 -9.3078E-01 7.1846E-01 9.3575E-01 -9.2351E-01 7.3473E-01 1.0000E+00 -9.8249E-01
21 -6.6979E-01 -9.3028E-01 9.4560E-01 -6.6721E-01 -9.3008E-01 9.4559E-01 -6.8200E-01 -9.2976E-01 9.4428E-01 -6.6874E-01 -9.3021E-01 9.4524E-01 -6.5149E-01 -9.3008E-01 9.4595E-01 -7.0154E-01 -9.2564E-01 9.4105E-01 -6.9885E-01 -9.8249E-01 1.0000E+00

G-FILE for the vectors

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C00080002 -35679125 24 -385686157 245 -650010699 127

C00080003 -217359516 25 660085360 246 1088586197 129
C00080004 351348174 24 784432306 243 1253652219 128
C00080005 923440370 24 924045098 240 1431640302 127
C00080006-1976907166 28 -289690402 255 -433054459 132
C00080007 778199746 24 1215496118 240 1897102302 128
D 1 2 7412416 1 3 -7083277 1 4 9245961 1 5 6988967 1 6 -6700000 D 1 7 9187607
1 8 6985345 1 9 -6686240 1 10 9222395 1 11 6996050 D 1 12 -6695130 1 13 9213078
1 14 7003312 1 15 -6702471 1 16 8937382 D 1 17 6933610 1 18 -6659816 1 19 9215865
1 20 7000847 1 21 -6697899 D 2 3 -9842263 2 4 6966938 2 5 9435180 2 6 -9304716 2
7 7097227 D 2 8 9430653 2 9 -9290572 2 10 6978011 2 11 9438710 2 12 -9300277 D 2
13 6818189 2 14 9441276 2 15 -9307434 2 16 7256415 2 17 9379244 D 2 18 -9258863 2
19 6895331 2 20 9439079 2 21 -9302822 3 4 -6673311 D 3 5 -9302601 3 6 9458039 3
7 -6820085 3 8 -9298241 3 9 9443695 D 3 10 -6687642 3 11 -9302866 3 12 9453443 3
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3 19 -6598780 D 3 20 -9300008 3 21 9456000 4 5 7377695 4 6 -7049835 4 7 9185498 D
4 8 6961288 4 9 -6658285 4 10 9227386 4 11 6974090 4 12 -6668682 D 4 13 9225495
4 14 6983748 4 15 -6677793 4 16 8918448 4 17 6903665 D 4 18 -6629157 4 19 9224540
4 20 6980856 4 21 -6672132 5 6 -9842699 D 5 7 7096042 5 8 9428708 5 9 -9288819 5
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16 7256864 D 5 17 9378036 5 18 -9257497 5 19 6893181 5 20 9436686 5 21 -9300829 D
6 7 -6816861 6 8 -9298239 6 9 9442187 6 10 -6688398 6 11 -9304238 D 6 12 9452953
6 13 -6520167 6 14 -9304556 6 15 9461279 6 16 -7003310 D 6 17 -9253425 6 18 9408295
6 19 -6601588 6 20 -9302637 6 21 9455876 D 7 8 7575203 7 9 -7267582 7 10 9172067
7 11 7091289 7 12 -6821786 D 7 13 9116218 7 14 7083090 7 15 -6817641 7 16 9038755
7 17 7081272 D 7 18 -6814274 7 19 9142185 7 20 7083266 7 21 -6819970 8 9 -9839289
D 8 10 6973479 8 11 9432836 8 12 -9295115 8 13 6812126 8 14 9434645 D 8 15 -
9301648 8 16 7256582 8 17 9375559 8 18 -9254979 8 19 6890240 D 8 20 9432903 8 21
-9297643 9 10 -6676281 9 11 -9285593 9 12 9441830 D 9 13 -6489316 9 14 -9278783 9
15 9444671 9 16 -7051872 9 17 -9259102 D 9 18 9410548 9 19 -6580250 9 20 -9278332
9 21 9442826 10 11 7425473 D 10 12 -7088902 10 13 9193652 10 14 6989977 10 15 -
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21 -6687383 D 11 12 -9833817 11 13 6835619 11 14 9451554 11 15 -9308406 11 16
7222519 D 11 17 9369814 11 18 -9248278 11 19 6907044 11 20 9448953 11 21 -9302146 D
12 13 -6507405 12 14 -9294917 12 15 9456007 12 16 -7028374 12 17 -9258625 D 12 18
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13 16 8763838 13 17 6723103 13 18 -6445234 13 19 9209941 D 13 20 6852946 13 21 -
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20 9460573 14 21 -9300777 15 16 -6997962 D 15 17 -9254028 15 18 9409241 15 19 -
6606067 15 20 -9307783 15 21 9459466 D 16 17 7904075 16 18 -7622269 16 19 8842305 16
20 7184576 16 21 -7015437 D 17 18 -9854306 17 19 6820306 17 20 9357456 17 21 -
9256397 18 19 -6544967 D 18 20 -9235061 18 21 9410466 19 20 7347327 19 21 -6988525
20 21 -9824938

ITRF position of mob_ as determined by individual baselines

	X	Y	Z
al90	188516.536	-5472706.321	3259255.942
aldi	188516.540	-5472706.292	3259255.933

albu	188516.529	-5472706.342	3259255.952
al82	188516.527	-5472706.367	3259255.945
alse	188516.542	-5472706.299	3259255.938
covg	188516.532	-5472706.292	3259255.944
alce	188516.536	-5472706.302	3259255.938

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
al90	0.003	0.009	-0.006	0.003	-0.001	-0.011
aldi	0.007	0.038	-0.015	0.009	0.006	-0.040
albu	-0.004	-0.012	0.004	-0.004	-0.003	0.012
al82	-0.006	-0.037	-0.003	-0.007	-0.022	0.030
alse	0.009	0.031	-0.010	0.010	0.007	-0.032
covg	-0.000	0.038	-0.005	0.001	0.015	-0.035
alce	0.003	0.028	-0.011	0.004	0.005	-0.029

** Orthometric Heights Above Future Geopotential Datum.

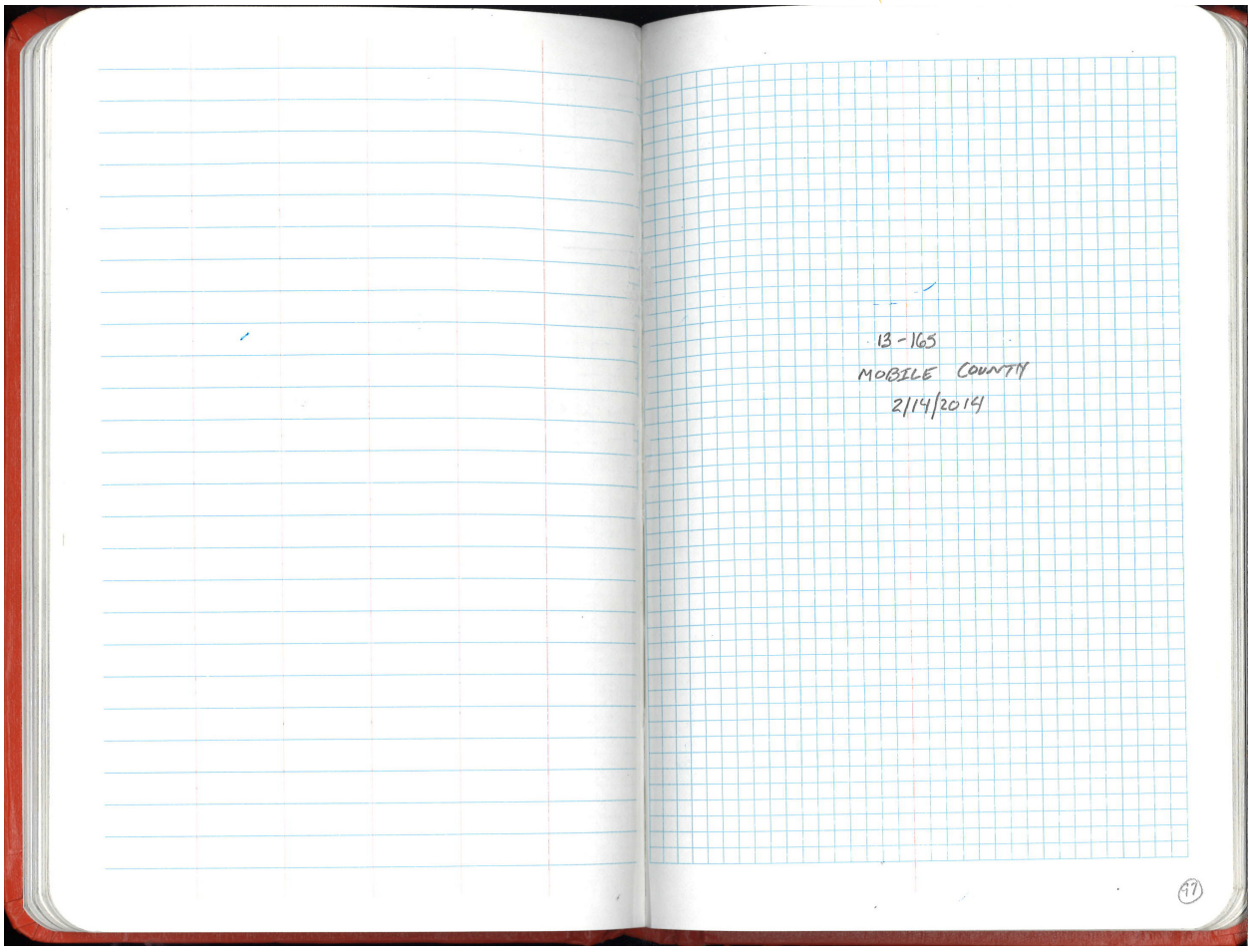
Prototype orthometric heights are now being made available as a precursor to the completion of GRAV-D and the replacement of NAVD 88 with a new geopotential reference system. The following height reflects the current best estimate of the true orthometric height, based on the existing gravimetric geoid 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

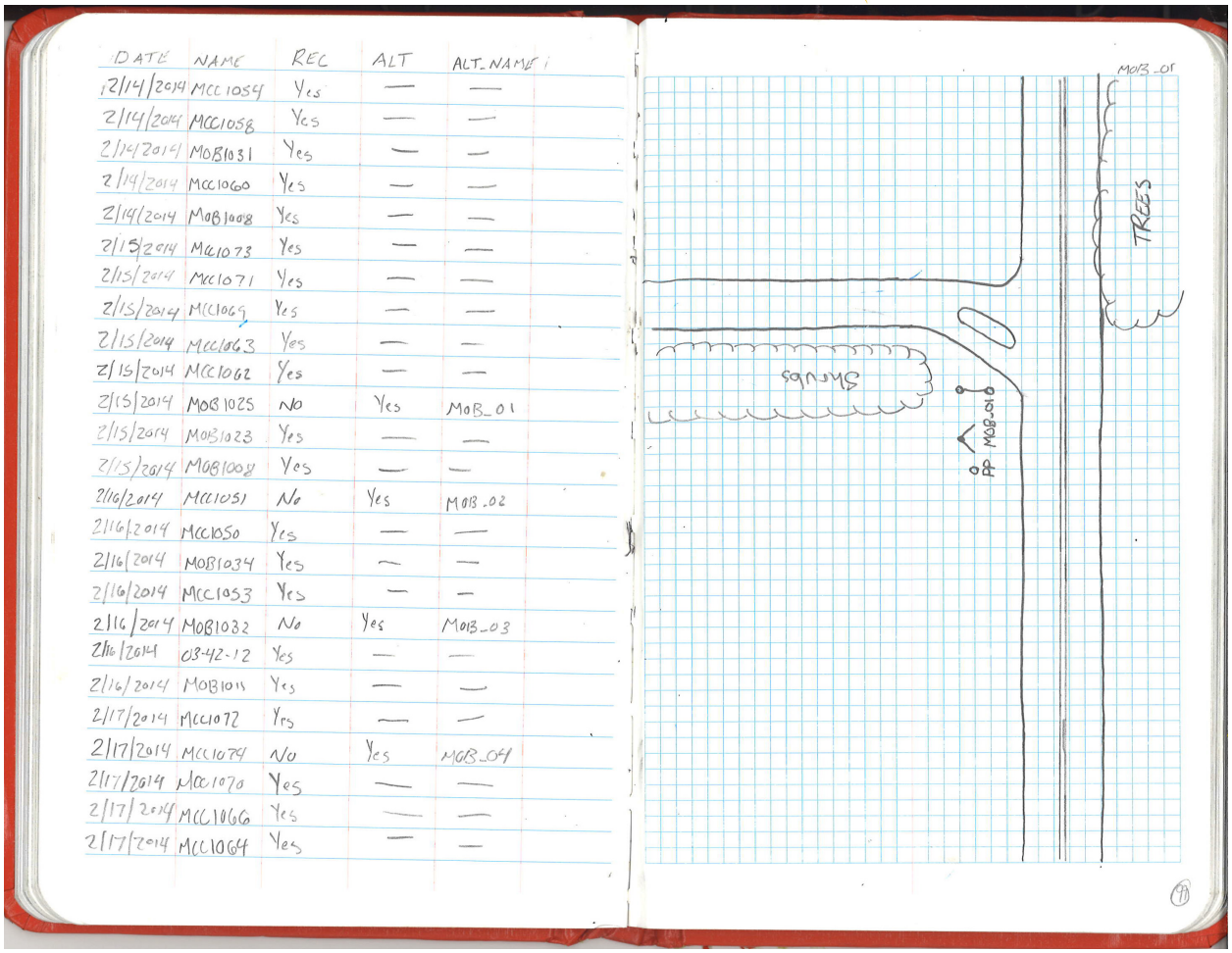
APPROX ORTHO HGT: 11.062 (m) [PROTOTYPE (Computed using USGG2012,GRS80,IGS08)]

dop from interpolation is 0.513
scatter (mean square distance from rover) is 26048.313
average edop for rover is 1.990
average ndop for rover is 1.260
average hdop for rover is 2.355
average vdop for rover is 6.310
average gdop for rover is 8.520

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.

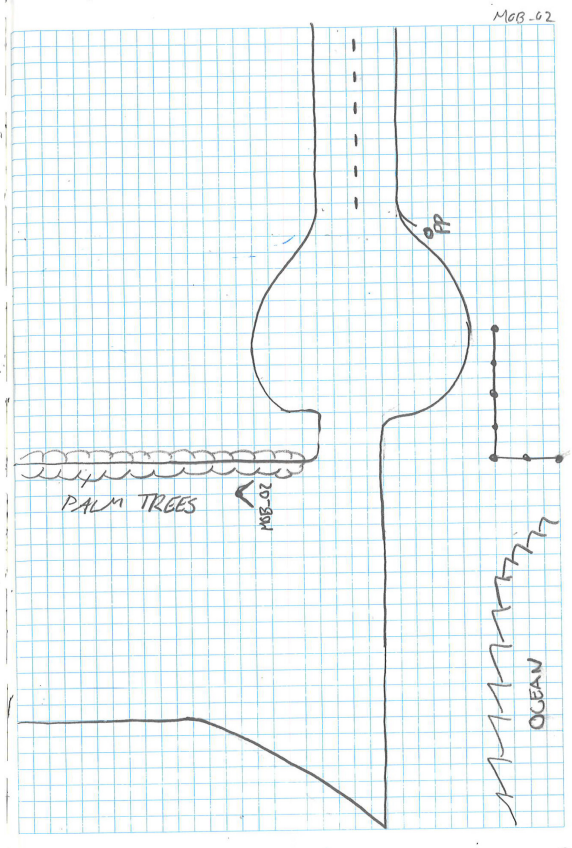
Appendix C: Field Notes


13-165
MOBILE COUNTY
2/14/2014
97



DATE	NAME	REC	ALT	ALT_NAME
2/14/2014	MCC1054	Yes	—	—
2/14/2014	MCC1058	Yes	—	—
2/14/2014	MOB1031	Yes	—	—
2/14/2014	MCC1060	Yes	—	—
2/14/2014	MOB1008	Yes	—	—
2/15/2014	MCC1073	Yes	—	—
2/15/2014	MCC1071	Yes	—	—
2/15/2014	MCC1069	Yes	—	—
2/15/2014	MCC1063	Yes	—	—
2/15/2014	MCC1062	Yes	—	—
2/15/2014	MOB1025	No	Yes	MOB_01
2/15/2014	MOB1023	Yes	—	—
2/15/2014	MOB1002	Yes	—	—
2/16/2014	MCC1051	No	Yes	MOB_02
2/16/2014	MCC1050	Yes	—	—
2/16/2014	MOB1034	Yes	—	—
2/16/2014	MCC1053	Yes	—	—
2/16/2014	MOB1032	No	Yes	MOB_03
2/16/2014	03-42-12	Yes	—	—
2/16/2014	MOB1011	Yes	—	—
2/17/2014	MCC1077	Yes	—	—
2/17/2014	MCC1074	No	Yes	MOB_04
2/17/2014	MCC1070	Yes	—	—
2/17/2014	MCC1066	Yes	—	—
2/17/2014	MCC1064	Yes	—	—

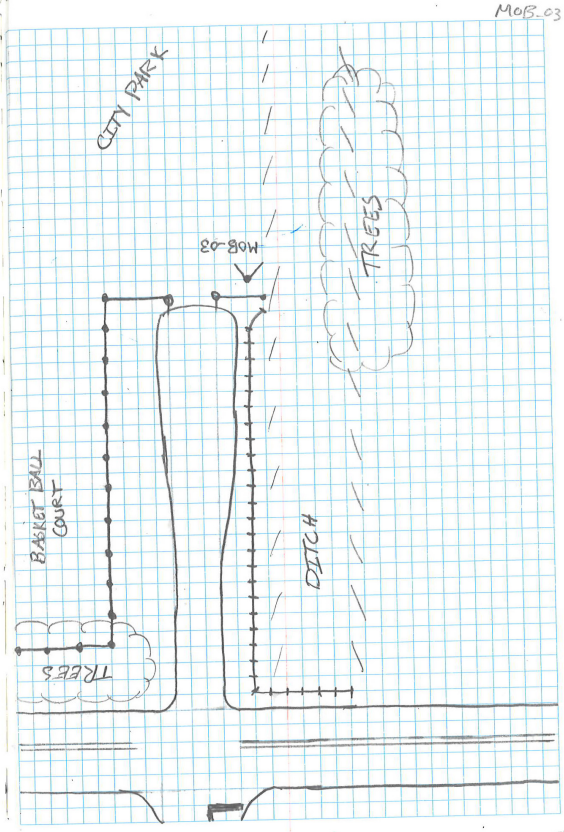
Unit	TI	TI	TI	TI	TI
Date	2/15/2014	2/16/2014	2/16/2014	2/17/2014	2/17/2014
Station	MOB_01	MOB_02	MOB_03	MOB_04	MOB_010
Ant Type	HiPer V	HiPer V	HiPer V	HiPer V	HiPer V
Ant HT	2.00	2.00	2.00	2.00	2.00
Off Set	—	—	—	—	—
Ant ARP	2.00	2.00	2.00	2.00	2.00
Start	20:51	15:07	19:05	15:46	19:53
Stop	21:18	15:27	19:25	16:06	20:13
Notes					



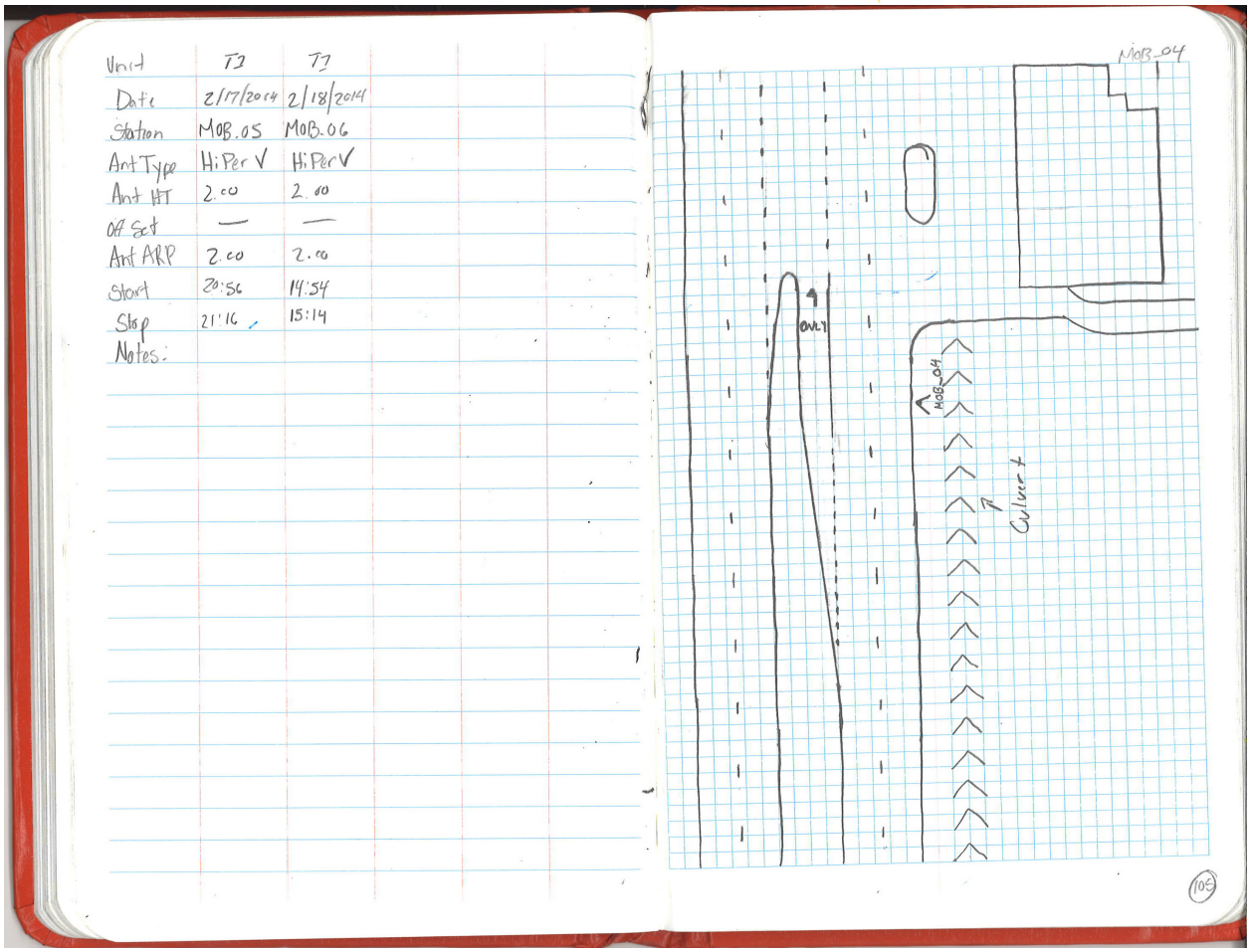
(101)

Date	Name	Rec	ACT	Att_Name
2/17/2014	MCC1065	NO	—	MOB_06
2/17/2014	MOB1000	Yes	—	——
2/17/2014	MOB1018	Yes	—	—
2/17/2014	MOB1027	NO	Yes	MOB_05

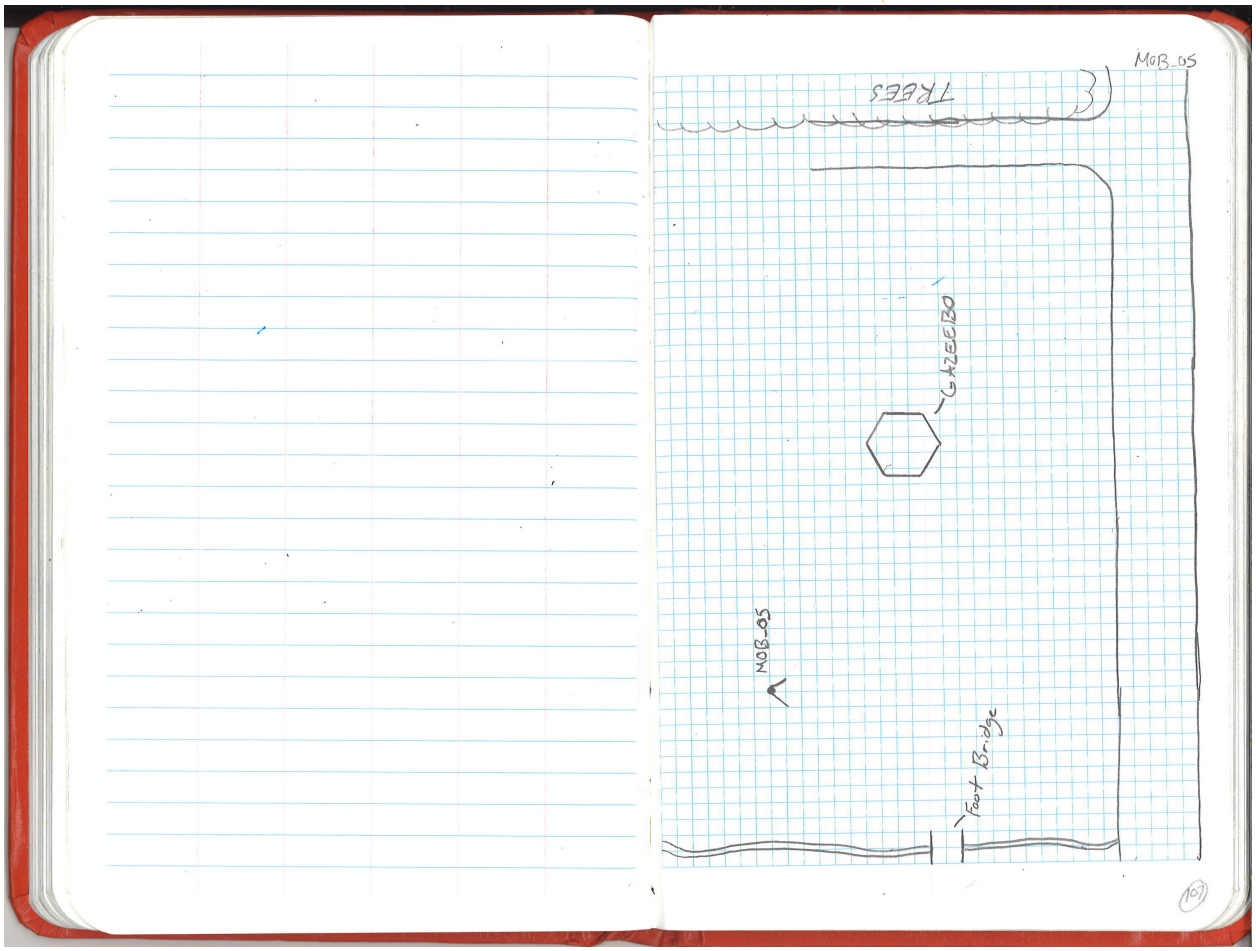
MOB_03

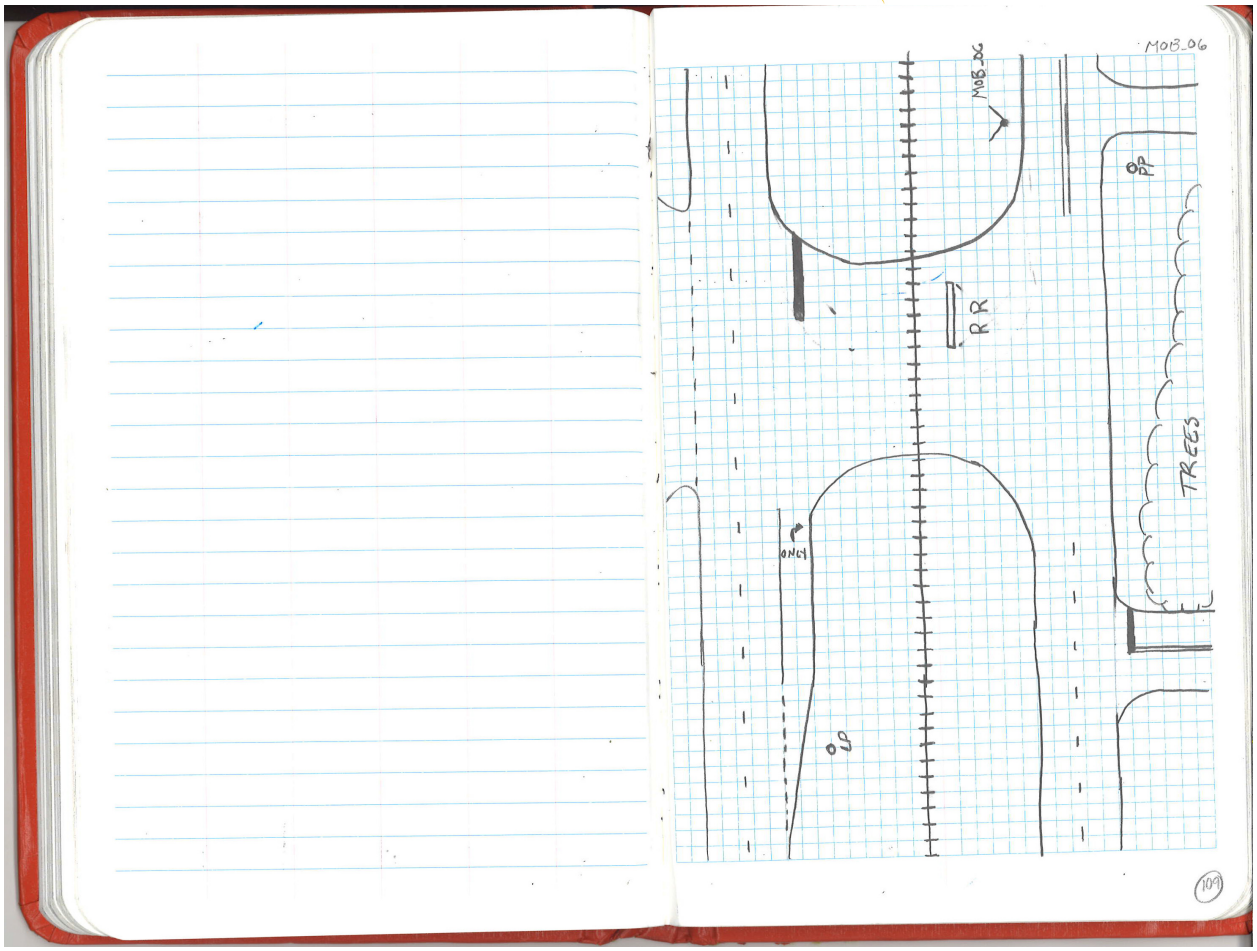


103



Unit	TJ	TJ
Date	2/17/2014	2/18/2014
Station	MOB.05	MOB.06
Ant Type	HiPer V	HiPer V
Ant HT	2.00	2.00
Off Set	—	—
Ant ARP	2.00	2.00
Start	20:56	14:54
Stop	21:16	15:14
Notes:		


MOB_05
TREES
GAZEBO
MOB_05
Foot Bridge
107


MOB_06
MOB_06
PP
RR
TREES
ONCY
OP
109

Appendix D: Photographs


03-42-12_16February2014


MCC1008_15February2014


MCC1050_16February2014


MCC1053_16February2014


MCC1054_14February2014


MCC1058_14February2014


MCC1060_14February2014


MCC1062_15February2014


MCC1063_15February2014


MCC1064_17February2014


MCC1066_17February2014


MCC1069_15February2014


MCC1070_17February2014


MCC1071_15February2014


The Boat Doctor
On Site Service
251-442-4133
MCC1072_16February2014


MCC1073_15February2014


MOB_01_1_15February2014


MOB_01_2_15February2014


MOB_01_3E_15february2014


HERITAGE USED
375-2135
MOB_01_3N_15february2014


MOB_01_3S_15February2014


MOB_01_3W_15February2014


MOB_02_1_16February2014
MOB_02_2_16February2014


MOB_02_3E_16February2014


MOB_02_3N_16February2014


MOB_02_IS_16February2014


MOB_02_IW_16February2014


MOB_03_1_16February2014


MOB_03_2_16February2014


MOB_03_3E_16February2014


MOB_03_3N_16February2014


MOB_03_3S_16February2014


MOB_03_3W_16February2014


MOB_04_1_17February2014


MOB_04_2_17February2014


MOB_04_3E_17february2014


MOB_04_3N_17february2014


MOB_04_3S_17February2014


MOB_04_3W_17February2014


MOB_05_1_17February2014
MOB_05_2_17February2014


MOB_05_3E_17February2014


MOB_05_3N_17February2014


MOB_05_3S_17February2014


MOB_05_3W_17February2014


MOB_06_1_18February2014


MOB_06_2_18February2014


MOB_06_3E_18February2014


MOB_06_3N_18February2014


MOB_05_3S_18February2014


MOB_05_3W_18February2014


MOB1000_16February2014


MOB1008_14February2014


MOB1010_17February2014


MOB1011_16February2014


MOB1023_15February2014


MOB1031_14February2014


MOB1034_16February2014

Appendix E: GPS Station Description Forms

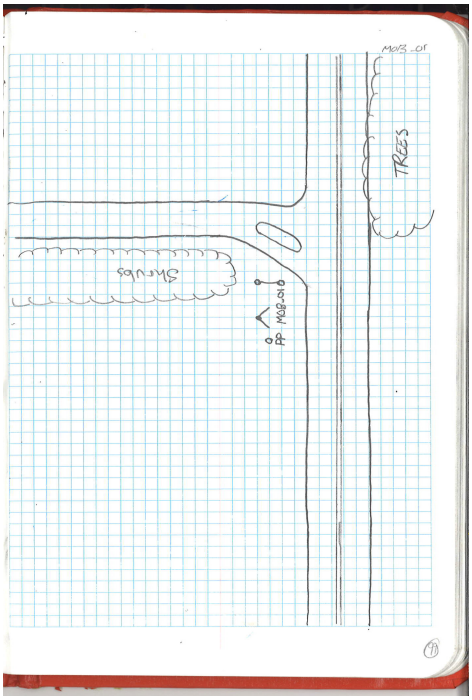
GPS Station Description Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Saturday, February 15, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
13-165	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_01		

Collection Type *(check all that apply)*

meters ☐ Above or ☐ Below Ground Level

Station Sketch



Latitude:	N 30 38 05.6	Longitude:	W 88 19 44.6

The Town / City of:	The County / Township of:	The State / Territory / Providence of:
Semmes	Mobile	Alabama

To reach the station, begin at the:

geographic center of Semmes, Al. Head south on County Road 68 and travel 1.9mi. Turn left onto County Road 25 and travel 6.4mi. Turn right onto County Rod 56 and travel 3.7mi. Turn left onto County Road 11. MOB_01 is on the right.

Station is located:

MOB_01 is a chevron target placed over a capped rebar near the entrance of Newman Auto Recycling and County Road 11. Approximately 40ft from the power pole and 70ft from the sign pole.

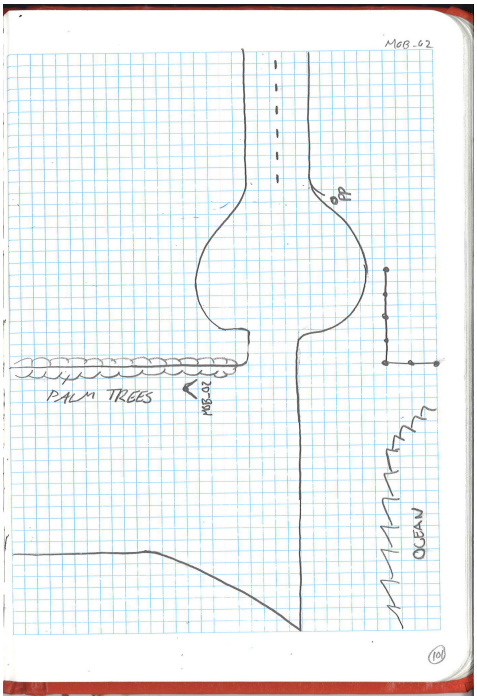
GPS Station Description Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Sunday, February 16, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
13-165	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_02		

Collection Type *(check all that apply)*

meters ☐ Above or ☐ Below Ground Level

Station Sketch



Latitude:	N 30 14 56.2	Longitude:	W 88 11 30.5

The Town / City of:	The County / Township of:	The State / Territory / Providence of:
Dauphin Island	Mobile	Alabama

To reach the station, begin at the:

geographic center of Dauphin Island, Al. Head west on Bridgeview Dr and travel 0.1mi. Take 1st left on Sehoy St and travel 233ft. Take the 1st right onto Bienville Blvd and travel 1.2mi. MOB_02 is on the right.

Station is located:

MOB_02 is a chevron target placed over a capped rebar located on the western end of Dauphin Island in a sand parking lot. Approximately 20ft from a row of palm trees and 30ft from the entrance gates of the parking lot.

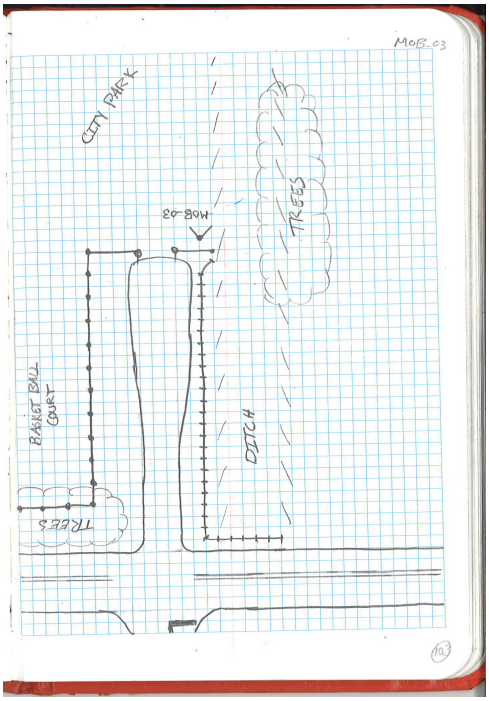
GPS Station Description Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Sunday, February 16, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
13-165	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_03		

Collection Type *(check all that apply)*

meters ☐ Above or ☐ Below Ground Level

Station Sketch



Latitude:	N 30 14 56.2	Longitude:	W 88 11 30.5

The Town / City of:	The County / Township of:	The State / Territory / Providence of:
Theodore	Mobile	Alabama

To reach the station, begin at the:

geographic center of Theodroe, Al. Head southeast on Government Blvd and travel 0.6mi. Turn right onto Hamilton Blvd and travel 4.7mi. Turn right onto Cedar Point Rd and travel 0.4mi. Take the 2nd left onto Hammock Rd and travel 1.1mi. Turn into the city park and MOB_03 will be directly ahead.

Station is located:

MOB_03 is a chevron target placed over a capped rebar just inside the entrance gate to a city park. Approximately 10ft east of the fence and 15ft north of the ditch.

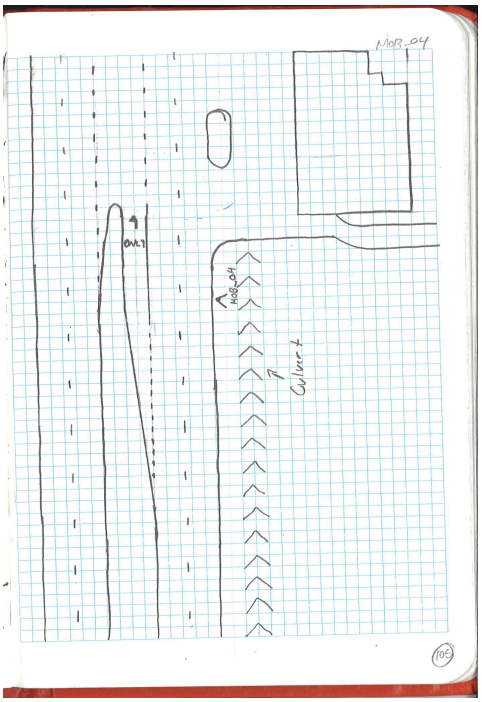
GPS Station Description Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Monday, February 17, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
13-165	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_04		

Collection Type *(check all that apply)*

meters ☐ Above or ☐ Below Ground Level

Station Sketch



Latitude:	N 31 09 17.5	Longitude:	W 88 00 35.0

The Town / City of:	The County / Township of:	The State / Territory / Providence of:
Le Moyne	Mobile	Alabama

To reach the station, begin at the:

geographic center of Le Moyne, Al. Head north on US 43 and travel 0.4mi. Turn left onto Ritchie St and travel 0.1mi. Take the 1st left toward US 43 and travel 0.1mi. Take the 2nd right onto US 43 N and travel 14.1mi. MOB_04 is on the right.

Station is located:

MOB_04 is a chevron target placed over a capped rebar on the east side of US 43 N and an abandonded furniture store.

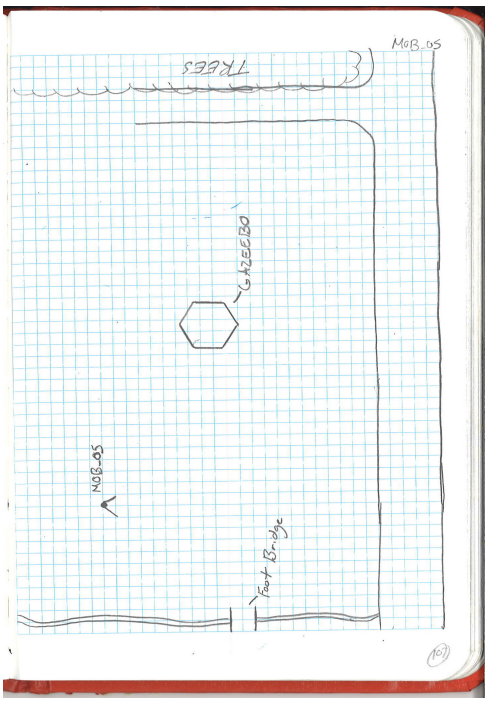
GPS Station Description Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Monday, February 17, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
13-165	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_05		

Collection Type *(check all that apply)*

meters ☐ Above or ☐ Below Ground Level

Station Sketch



Latitude:	N 30 36 04.0	Longitude:	W 88 04 18.0

The Town / City of:	The County / Township of:	The State / Territory / Providence of:
Mobile	Mobile	Alabama

To reach the station, begin at the:

geographic center of Mobile, Al. Head east on St. Louis St and travel 0.2mi. Take the 3rd right onto N Water St and travel 0.4mi. Merge onto I 10 W and travel 4.7mi. Take the Dauphin Island Parkway exit and travel 0.5mi. Turn right onto AL 163 and travel 3.0mi. Turn left onto Stewart Rd and travel 0.4mi. MOB_05 is on the left.

Station is located:

MOB_05 is a chevron target placed over a capped rebar located in a city park. Approximately 30ft from a park bench and 75ft from the gazeebo.

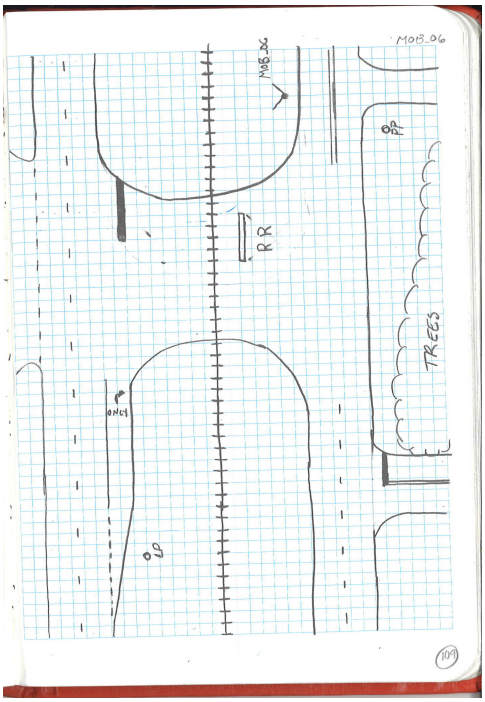
GPS Station Description Form

Contract # / TO #	Client / Project Name	Date
	Mobile County	Tuesday, February 18, 2014
Atlantic Project No.	**Survey Firm**	**GPS System Operator**
13-165	The Atlantic Group, LLC	Ben Kimbrough
Monument Name/Designation	**NGS Permanent ID # (PID)**	**Exact Stamping** *(photo in survey report)*
MOB_06		

Collection Type *(check all that apply)*

meters ☐ Above or ☐ Below Ground Level

Station Sketch



Latitude:	N 30 55 48.8	Longitude:	W 88 01 37.8

The Town / City of:	The County / Township of:	The State / Territory / Providence of:
Le Moyne	Mobile	Alabama

To reach the station, begin at the:

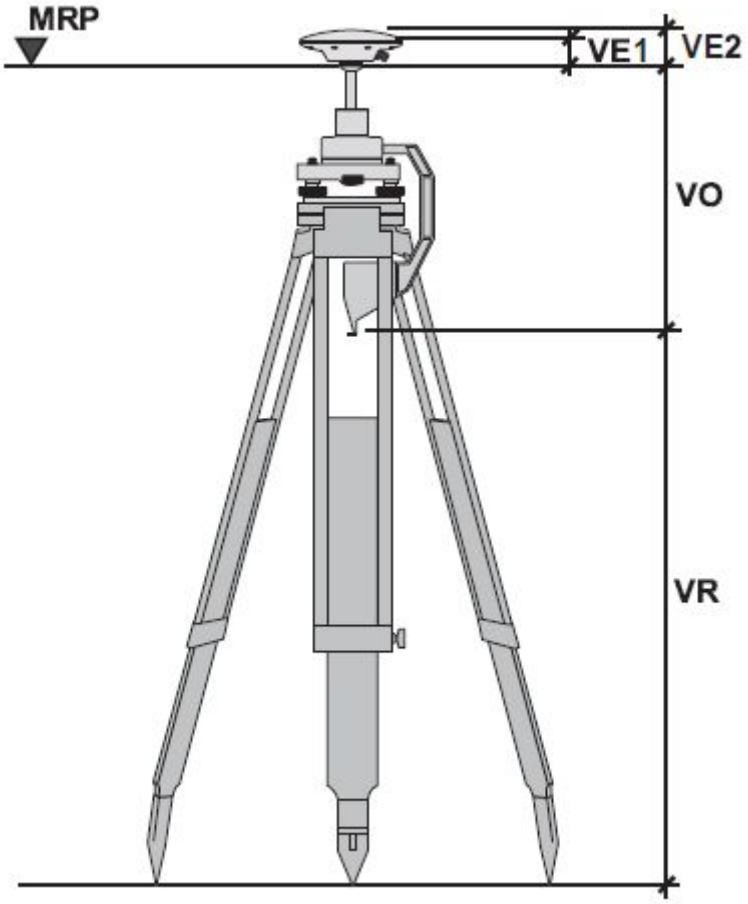
geographic center of Le Moyne, Al. Head south on US 43 S and travel 2.0mi. Turn left and cross over a railroad track. Turn left onto Old US 43. MOB_06 is on the left.

Station is located:

MOB_06 is a chevron target placed over a capped rebar located next to a railroad track and Old US 43. Approximately 60ft from the crossing gate and 40ft from the railroad tracks.

Appendix F: GPS System Vertical Height Diagrams

Leica Tripod Setup

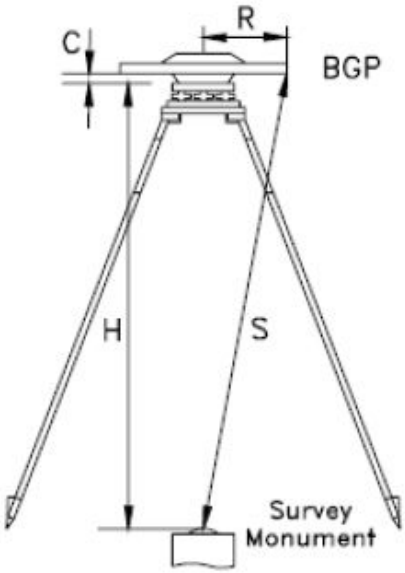


VO Vertical Offset
VR Vertical Height Reading
VE1 Vertical Phase Center Eccentricity for L1.
VE2 Vertical Phase Center Eccentricity for L2
MRP Mechanical Reference Plane

Although an AT502 Antenna is shown, the same principles apply to the AX1202 and SR399 Antennas.
The Vertical Height Reading (VR) value is measured using the Height Hook.
The Vertical Offset (VO) value is stored in the Antenna Setup record and for a Tripod Setup with the Height Hook as shown is 0.36m for AT502 and AX1202 Antennas. For the SR399 Antenna, an offset of 0.441m was added to the Height Hook bringing the true height to the VE1.
The Vertical Phase Center Eccentricities are stored in the Receiver for all Leica System Antennas.

NovAtel DL-4+L1 L2 receiver w/ NovAtel NOV702_3.00 Antenna

and Topcon HiPerV receiver



H = True height of fixed height tripod rod

S = Slant height field measeurment

C = Distance for addition of ground plane

R = Radius from antenna phase center to edge of ground plane

BGP = Bottom of ground plane (or antenna)

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