



Mapping & Survey Quality Control Report for:

PIK-C.R. 66-3.95

Report Submitted by: Carpenter Marty Transportation
04.05.2019

Mapping Performed by: Andrew W. Nixon, CST
07.20.2016

Mapping Checked by: Kevin P. Carpenter P.E., P.S.
07.22.2016

Surveying Performed by: Adam W. Fleenor,
Nick J. Secrist,
Lucas W. Gunka
Ian VanDootingh
08.31.2015-
07.17.2017

Surveying Checked by: Kevin P. Carpenter P.E., P.S.
07.22.2016



Surveying Parameters for PIK-C.R. 66-3.95

POSITIONING METHOD: ODOT VRS

VERTICAL POSITIONING

ORTHOMETRIC HEIGHT DATUM: NAVD 88

GEOID: GEOID12A

HORIZONTAL POSITIONING

REFERENCE FRAME: NAD 83 (2011)

ELLIPSOID: GRS80

MAP PROJECTION: LAMBERT CONFORMAL CONIC

COORDINATE SYSTEM: OHIO STATE PLANE, SOUTH OHIO

COMBINED SCALE FACTOR: 1.00006800 (PROJECT IS IN GROUND COORDINATES)

ORIGIN OF COORDINATE SYSTEM 0,0

UNITS

ALL UNITS ARE IN U.S. SURVEY FEET

EQUIPMENT MAINTENANCE

EQUIPMENT MAINTENANCE LOGS ARE ON FILE AT THE CARPENTER MARTY
TRANSPORTATION OFFICE.

Surveyor's Certification for Primary Project Control

I, Kevin P. Carpenter do hereby certify that the Primary Project Control for PIK-C.R. 66-3.95 were constructed and established in accordance with the Ohio Department of Transportation's Survey and Mapping Specifications, dated July 19, 2013 for a minor project and meet the accuracy requirements as set forth therein. All observation data and RMSE calculations are on file and available at the request of the Ohio Department of Transportation.

A handwritten signature in blue ink, appearing to read "K. P. Carpenter".

12/08/2020

Signature

Date

Kevin P. Carpenter

Professional Land Surveyor No. 8124

Digital Terrain Model

Methodology & Equipment Used

Control Points were collected using ODOT VRS Data Collection using a Fast Static GNSS Data Collection using a Leica Viva CS15 Receiver.

Survey points were collected using a TopCon GPS 2003 Total Station a Leica TCRP 1203 Robotic Total Station and a Leica Nova MS50 Smart Station.

The level survey was performed using a Topcon DL-103 Electronic Digital Level.

Control Points

Six 5/8"x30" rebar with Red "CM Trans Traverse Point" control monuments were used for the project with three separate temporary benchmarks. Listed below is the coordinate data:

State Plane Coordinates	Ground Coordinates
GP01 (Azimuth Control)	
Northing: 366,375.1260	366,400.0375
Easting: 1,851,861.6290	1,851,987.5459
Height: 669.500 (GPS Height)	669.496
GP02 (Azimuth Control)	
Northing: 366,467.1887	366,492.1065
Easting: 1,851,582.6360	1,851,708.5339
Height: 658.270 (GPS Height)	658.098
GP03 (Azimuth Control)	
Northing: 367,148.9390	367,173.9032
Easting: 1,850,414.7590	1,850,540.5777
Height: 667.965 (GPS Height)	668.020
GP04 (Primary Control)	
Northing: 368,679.1793	368,704.2475
Easting: 1,850,365.1020	1,850,490.9168
Height: 631.757 (GPS Height)	631.757
GP05 (Azimuth Control)	
Northing: 370,629.3089	370,654.5097
Easting: 1,850,158.8930	1,850,284.6943
Height: 623.388 (GPS Height)	623.167

GP06 (Azimuth Control)		
Northing:	370,886.9948	370,912.2131
Easting:	1,850,177.0190	1,850,302.8212
Height:	622.699 (GPS Height)	622.503

Temporary Benchmarks:

BM#1: MN01
STA. 209+88.15, 14.26' LT.
Elev. = 655.731

BM#2: MN02
STA. 213+00.08, 14.00' LT.
Elev. = 675.231

BM#3: MN03
STA. 216+60.43, 12.61' RT.
Elev. = 683.719

BM#4: MN04
STA. 223+06.42, 13.98' RT.
Elev. = 647.632

BM#5: MN05
STA. 226+53.16, 10.13' LT.
Elev. = 659.459

BM#6: MN06
STA. 230+26.07, 10.96' RT.
Elev. = 661.589

BM#7: MN07
STA. 233+12.13, 8.72' RT.
Elev. = 639.764

BM#8: MN08
STA. 239+28.52, 21.67' LT.
Elev. = 631.295

BM#9: MN09
STA. 242+41.32, 13.94' RT.
Elev. = 640.441

BM#10: MN10
STA. 245+20.66, 16.76' RT.
Elev. = 642.502

BM#11: MN11
STA. 248+93.99, 13.25' LT.
Elev. = 636.237

BM#12: MN12
STA. 252+75.55, 19.32' RT.
Elev. = 623.614

Level Closures

0.008', -0.003', 0.002', and -0.001

Job Name: Germany RD

Job No.: PIKTR0026

Location: Pike County

Sheet: 1 of 4

Task: Back

By: IUD Date: 7/30/15

Crew: AF Temp.: 90

Station	BS (+)	HI	FS (-)	Elevation		Description
6P04				631.757	6P04	1 Plus
	7.454	639.211				
TP			1.266	637.945	TP	Keel
	6.555	644.3				
M207			4.534	639.764	M207	1 Plus
	15.564	655.328				
TP			2.471	654.857	TP	Keel
	7.993	662.85				
M206			1.261	661.589	M206	1 Plus
	5.275	666.864				
M205			7.405	659.459	M205	MAGS
	3.742	663.201				
TP			15.044	648.157	TP	Keel
	4.214	652.371				
M204			4.739	647.632	M204	1 Plus
	10.873	658.505				
TP			1.031	657.474	TP	Keel
	11.663	669.137				
6P03			1.117	*668.02	6P03	1 Plus
	1.033	669.053				
TP			11.574	657.479	TP	Keel
	.602	658.081				
M204			10.434	647.647	M204	1 Plus
	4.819	652.466				
TP			4.295	648.171	TP	Keel
	14.894	663.065				
M205			3.593	659.472	M205	1 Plus
	7.04	666.512				
M206			4.906	661.606	M206	1 Plus
	1.387	662.988				
TP			8.114	654.874	TP	Keel
	.480	655.354				
M207			15.572	639.782	M207	1 Plus
	4.377	644.159				
TP			6.2	637.959	TP	Keel
	1.227	639.736				
6P04			7.967	631.765 (4.008)	6P04	1 Plus

Reduced By: IUD

Date: 7/31/15

Checked By: ANN

Date: 8/5/15

Job Name: Germany RD
Location: Pike County
Task: Bench

Job No.: PIK TQ 002G
Sheet: 2 of _____
By: LUD Date: 7/30/15
Crew: AF Temp.: 90

Station	BS (+)	HI	FS (-)	Elevation		Description
<u>6P03</u>				<u>*668.02</u>	<u>6P03</u>	<u>1PWS</u>
	<u>15.3</u>	<u>683.32</u>				
<u>TP</u>			<u>1.842</u>	<u>681.478</u>	<u>TP</u>	<u>Keel</u>
	<u>6.727</u>	<u>688.205</u>				
<u>MW03</u>			<u>4.480</u>	<u>682.719</u>	<u>MW03</u>	<u>1PWS</u>
	<u>2.657</u>	<u>686.370</u>				
<u>MW02</u>			<u>11.145</u>	<u>675.231</u>	<u>MW02</u>	<u>1PWS</u>
	<u>0.713</u>	<u>675.944</u>				
<u>TP</u>			<u>13.723</u>	<u>662.621</u>	<u>TP</u>	<u>Keel</u>
	<u>1.295</u>	<u>663.916</u>				
<u>MW01</u>			<u>8.185</u>	<u>655.731</u>	<u>MW01</u>	<u>1PWS</u>
	<u>2.799</u>	<u>658.53</u>				
<u>TP</u>			<u>5.281</u>	<u>653.249</u>	<u>TP</u>	<u>Keel</u>
	<u>7.513</u>	<u>660.762</u>				
<u>6P02</u>			<u>2.664</u>	<u>658.098</u>	<u>6P02</u>	<u>1PWS</u>
	<u>12.175</u>	<u>670.273</u>				
<u>6P01</u>			<u>0.777</u>	<u>669.496</u>	<u>6P01</u>	<u>1PWS</u>
	<u>.987</u>	<u>670.483</u>				
<u>6P02</u>			<u>12.292</u>	<u>658.091</u>	<u>6P02</u>	<u>1PWS</u>
	<u>2.582</u>	<u>660.673</u>				
<u>TP</u>			<u>7.43</u>	<u>653.243</u>	<u>TP</u>	<u>Keel</u>
	<u>4.451</u>	<u>657.694</u>				
<u>MW01</u>			<u>1.971</u>	<u>655.723</u>	<u>MW01</u>	<u>1PWS</u>
	<u>8.244</u>	<u>663.967</u>				
<u>TP</u>			<u>1.354</u>	<u>662.613</u>	<u>TP</u>	<u>Keel</u>
	<u>13.704</u>	<u>676.317</u>				
<u>MW02</u>			<u>1.087</u>	<u>671.23</u>	<u>MW02</u>	<u>1PWS</u>
	<u>10.761</u>	<u>685.991</u>				
<u>MW03</u>			<u>7.272</u>	<u>683.719</u>	<u>MW03</u>	<u>1PWS</u>
	<u>4.182</u>	<u>687.901</u>				
<u>TP</u>			<u>6.431</u>	<u>681.47</u>	<u>TP</u>	<u>Keel</u>
	<u>1.564</u>	<u>683.034</u>				
<u>6P03</u>			<u>15.007</u>	<u>668.017</u> <u>(-1.003)</u>	<u>6P03</u>	<u>1PWS</u>

Reduced By: LUD Date: 7/31/15 Checked By: AMN Date: 8/5/15

Job Name: Germany RD
Location: Pike County
Task: Bench

Job No.: PIK T 0026
Sheet: 3 of 4
By: LVJ Date: 7/30/15
Crew: AF Temp.: 90

Station	BS (+)	HI	FS (-)	Elevation		Description
6804				631.757	6804	1 Plus
	3.853	635.61				
<u>MV08</u>			4.315	<u>631.295</u>	MV08	1 Plus
	6.877	638.172				
TP			2.321	635.851	TP	GR Bolt
	7.922	643.773				
<u>MV09</u>			3.372	<u>640.441</u>	MV09	1 Plus
	5.092	645.533				
<u>MV10</u>			3.031	<u>642.502</u>	MV10	1 Plus
	1.281	643.783				
<u>MV11</u>			7.546	<u>636.237</u>	MV11	1 Plus
	7.432	643.669				
MV10			1.168	642.501	MV10	1 Plus
	3.724	646.225				
MV09			5.280	640.429	MV09	1 Plus
	3.906	644.345				
TP			8.497	625.848	TP	GR Bolt
	2.151	627.999				
MV08			6.704	621.295	MV08	1 Plus
	4.206	635.501				
6804			2.742	621.759	6804	1 Plus
				(4.002)		

Reduced By: LVJ Date: 7/31/15 Checked By: AVJ Date: 8/5/15

Job Name: Germany, LD
 Location: Pike County
 Task: Bench

Job No.: PKT0026
 Sheet: 4 of 4
 By: UD Date: 7/30/15
 Crew: AF Temp.: 90

Station	BS (+)	HI	FS (-)	Elevation	Description
2211				636.237	
	1.251	637.488			
TP			9.767	627.721	
	3.185	630.906			
mw12			7.292	623.614	
	6.254	629.868			
6PW			6.701	623.167	
	5.039	628.206			
6POC			5.703	622.502	
	5.720	628.273			
6P05			5.107	622.117	
	6.826	629.996			
mw12			6.381	623.615	
	7.357	630.968			
TP			3.248	627.722	
	9.342	637.064			
mw11			.828	636.276	
				(-0.001)	

Reduced By: UD Date: 7/31/15 Checked By: Am Date: 8/5/15

Kevin Moyer

From: opus <opus@ngs.noaa.gov>
Sent: Friday, 26 June, 2015 10:50
To: Andy Nixon
Subject: OPUS-RS solution : GERMANY_STAT_2686_0616_090247.m00 OP1435329735367

GPOI

FILE: GERMANY_STAT_2686_0616_090247.m00 OP1435329735367

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: anixon@cmtran.com DATE: June 26, 2015
RINEX FILE: germ167n.15o TIME: 14:48:57 UTC

SOFTWARE: rsgps 1.37 RS54.prl 1.99.2 START: 2015/06/16 13:03:38
EPHEMERIS: igr18492.eph [rapid] STOP: 2015/06/16 14:48:38
NAV FILE: brdc1670.15n OBS USED: 8080 / 9560 : 85%
ANT NAME: LEIGS15 NONE QUALITY IND. 25.71/ 56.05
ARP HEIGHT: 2.013 NORMALIZED RMS: 0.410

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.45639)

X: 612547.883(m) 0.006(m) 612547.052(m) 0.006(m)
Y: -4925151.067(m) 0.032(m) -4925149.643(m) 0.032(m)
Z: 3992872.915(m) 0.027(m) 3992872.827(m) 0.027(m)

LAT: 39 0 18.71730 0.004(m) 39 0 18.74601 0.004(m)
E LON: 277 5 22.38360 0.005(m) 277 5 22.35663 0.005(m)
W LON: 82 54 37.61640 0.005(m) 82 54 37.64337 0.005(m)
EL HGT: 170.549(m) 0.042(m) 169.316(m) 0.042(m)
ORTHO HGT: 204.064(m) 0.047(m) [NAVD88 (Computed using GEOID12B)]

669.500

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 17) SPC (3402 OH S)

Northing (Y) [meters]	4319089.710	111671.324	<i>366 375,0022</i>
Easting (X) [meters]	334576.540	564448.509	<i>1 851 861.483</i>
Convergence [degrees]	-1.20269167	-0.26043791	
Point Scale	0.99993696	0.99995768	
Combined Factor	0.99991020	0.99993092	

US NATIONAL GRID DESIGNATOR: 17SLD3457619089(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF4048	GALP GALLIPOLIS CORS ARP	N385039.148	W0821640.091	57700.8
DI1876	OHAD ADAMS COUNTY CORS ARP	N384709.347	W0833322.647	61089.9
DI1856	OHHO HOCKING COUNTY CORS ARP	N393207.276	W0822637.876	71314.7
DI1684	OHFA FAYETTE COUNTY CORS ARP	N393133.291	W0832831.214	75623.6
DH9001	WVHU MARSHALL UNIV-HUN CORS ARP	N382522.617	W0822528.918	77219.4
AI4945	STKR STOCKER OHIO UNIV CORS ARP	N391933.825	W0820625.629	78033.4
DK3328	KYTI KY HWY DIST 9 CORS ARP	N382520.011	W0834458.032	97536.4
DH9003	WVRA MARSHALL UNIV-RAV CORS ARP	N385628.863	W0814504.842	100697.3

NEAREST NGS PUBLISHED CONTROL POINT

JY0680	U 216	N390010.	W0825420.	501.9
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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.

Kevin Moyer

From: opus <opus@ngs.noaa.gov>
Sent: Friday, 26 June, 2015 10:53
To: Andy Nixon
Subject: OPUS-RS solution : GERMANY_STAT2_2686_0616_105119.m00 OP1435329763510

GPO2

FILE: GERMANY_STAT2_2686_0616_105119.m00 OP1435329763510

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: anixon@cmtran.com DATE: June 26, 2015
RINEX FILE: germ167o.15o TIME: 14:52:25 UTC

SOFTWARE: rsgps 1.37 RS91.prl 1.99.2 START: 2015/06/16 14:52:09
EPHEMERIS: igr18492.eph [rapid] STOP: 2015/06/16 16:37:10
NAV FILE: brdc1670.15n OBS USED: 4158 / 10647 : 39%
ANT NAME: LEIGS15 NONE QUALITY IND. 14.73/ 27.34
ARP HEIGHT: 2.013 NORMALIZED RMS: 0.479

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.45659)

X: 612460.880(m) 0.007(m) 612460.049(m) 0.007(m)
Y: -4925141.671(m) 0.039(m) -4925140.247(m) 0.039(m)
Z: 3992892.247(m) 0.031(m) 3992892.159(m) 0.031(m)

LAT: 39 0 19.61388 0.004(m) 39 0 19.64259 0.004(m)
E LON: 277 5 18.84360 0.006(m) 277 5 18.81664 0.006(m)
W LON: 82 54 41.15640 0.006(m) 82 54 41.18336 0.006(m)
EL HGT: 167.127(m) 0.050(m) 165.894(m) 0.050(m)
ORTHO HGT: 200.641(m) 0.055(m) [NAVD88 (Computed using GEOID12B)]

658.270

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 17) SPC (3402 OH S)

Northing (Y) [meters] 4319119.139 111699.359 366466.9803
Easting (X) [meters] 334491.969 564363.463 1851582.462
Convergence [degrees] -1.20331745 -0.26106185
Point Scale 0.99993731 0.99995765
Combined Factor 0.99991109 0.99993143

US NATIONAL GRID DESIGNATOR: 17SLD3449119119(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF4048	GALP GALLIPOLIS CORS ARP	N385039.148	W0821640.091	57790.3
DK7557	KYGB GREENBO LAKE SRP CORS ARP	N382850.195	W0825223.976	58358.1
DI1876	OHAD ADAMS COUNTY CORS ARP	N384709.347	W0833322.647	61022.7
DI1856	OHHO HOCKING COUNTY CORS ARP	N393207.276	W0822637.876	71339.7
DI1684	OHFA FAYETTE COUNTY CORS ARP	N393133.291	W0832831.214	75547.8
DH9001	WVHU MARSHALL UNIV-HUN CORS ARP	N382522.617	W0822528.918	77289.2
AI4945	STKR STOCKER OHIO UNIV CORS ARP	N391933.825	W0820625.629	78096.3
DK3328	KYTI KY HWY DIST 9 CORS ARP	N382520.011	W0834458.032	97490.7
DH9003	WVRA MARSHALL UNIV-RAV CORS ARP	N385628.863	W0814504.842	100784.1

NEAREST NGS PUBLISHED CONTROL POINT

JY0680	U 216	N390010.	W0825420.	588.9
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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.

Kevin Moyer

From: opus <opus@ngs.noaa.gov>
Sent: Friday, 26 June, 2015 10:59
To: Andy Nixon
Subject: OPUS-RS solution : GERMANY_STAT3_2686_0616_124710.m00 OP1435329790789

GP03

FILE: GERMANY_STAT3_2686_0616_124710.m00 OP1435329790789

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: anixon@cmtran.com DATE: June 26, 2015
RINEX FILE: germ167q.15o TIME: 14:58:40 UTC

SOFTWARE: rsgps 1.37 RS92.prl 1.99.2 START: 2015/06/16 16:48:04
EPHEMERIS: igr18492.eph [rapid] STOP: 2015/06/16 18:33:04
NAV FILE: brdc1670.15n OBS USED: 7263 / 12492 : 58%
ANT NAME: LEIGS15 NONE QUALITY IND. 9.14/ 46.14
ARP HEIGHT: 2.013 NORMALIZED RMS: 0.563

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.45681)

X: 612090.971(m) 0.006(m) 612090.140(m) 0.006(m)
Y: -4925059.170(m) 0.028(m) -4925057.746(m) 0.028(m)
Z: 3993054.366(m) 0.023(m) 3993054.278(m) 0.023(m)

LAT: 39 0 26.30136 0.008(m) 39 0 26.33007 0.008(m)
E LON: 277 5 4.01048 0.004(m) 277 5 3.98350 0.004(m)
W LON: 82 54 55.98952 0.004(m) 82 54 56.01650 0.004(m)
EL HGT: 170.085(m) 0.036(m) 168.851(m) 0.036(m)
ORTHO HGT: 203.596(m) 0.042(m) [NAVD88 (Computed using GEOID12B)]

667.965

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 17) SPC (3402 OH S)

Northing (Y) [meters] 4319332.810 111907.208
Easting (X) [meters] 334139.509 564007.530
Convergence [degrees] -1.20596077 -0.26367627
Point Scale 0.99993875 0.99995743
Combined Factor 0.99991207 0.99993075

367 148.8982
1850 414.705

US NATIONAL GRID DESIGNATOR: 17SLD3413919332(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF4048	GALP GALLIPOLIS CORS ARP	N385039.148	W0821640.091	58193.3
DK7557	KYGB GREENBO LAKE SRP CORS ARP	N382850.195	W0825223.976	58585.4
DI1876	OHAD ADAMS COUNTY CORS ARP	N384709.347	W0833322.647	60777.5
DI1856	OHHO HOCKING COUNTY CORS ARP	N393207.276	W0822637.876	71371.7
DI1684	OHFA FAYETTE COUNTY CORS ARP	N393133.291	W0832831.214	75160.7
DH9001	WVHU MARSHALL UNIV-HUN CORS ARP	N382522.617	W0822528.918	77658.0
AI4945	STKR STOCKER OHIO UNIV CORS ARP	N391933.825	W0820625.629	78319.2
DK3328	KYTI KY HWY DIST 9 CORS ARP	N382520.011	W0834458.032	97359.8
DH9003	WVRA MARSHALL UNIV-RAV CORS ARP	N385628.863	W0814504.842	101153.7

NEAREST NGS PUBLISHED CONTROL POINT

JY0681	V 216	N390042.	W0825457.	486.0
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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.

Kevin Moyer

From: opus <opus@ngs.noaa.gov>
Sent: Friday, 26 June, 2015 10:57
To: Andy Nixon
Subject: OPUS-RS solution : GERMANY_STAT4_2686_0617_085227.m00 OP1435329814047

6P04

FILE: GERMANY_STAT4_2686_0617_085227.m00 OP1435329814047

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: anixon@cmtran.com DATE: June 26, 2015
RINEX FILE: germ168m.15o TIME: 14:56:06 UTC

SOFTWARE: rsgps 1.37 RS54.prl 1.99.2 START: 2015/06/17 12:53:18
EPHEMERIS: igr18493.eph [rapid] STOP: 2015/06/17 14:38:18
NAV FILE: brdc1680.15n OBS USED: 6471 / 10530 : 61%
ANT NAME: LEIGS15 NONE QUALITY IND. 19.94/ 50.06
ARP HEIGHT: 2.013 NORMALIZED RMS: 0.453

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.45911)

X: 612036.569(m) 0.012(m) 612035.738(m) 0.012(m)
Y: -4924761.460(m) 0.044(m) -4924760.036(m) 0.044(m)
Z: 3993409.818(m) 0.035(m) 3993409.730(m) 0.035(m)

LAT: 39 0 41.42489 0.005(m) 39 0 41.45361 0.005(m)
E LON: 277 5 3.29270 0.009(m) 277 5 3.26572 0.009(m)
W LON: 82 54 56.70730 0.009(m) 82 54 56.73428 0.009(m)
EL HGT: 159.042(m) 0.056(m) 157.809(m) 0.056(m)
ORTHO HGT: 192.560(m) 0.061(m) [NAVD88 (Computed using GEOID12B)]

631.757

	UTM COORDINATES	STATE PLANE COORDINATES	(GND)	(GROSS)
	UTM (Zone 17)	SPC (3402 OH S)		
Northing (Y) [meters]	4319799.416	112373.638	368 679.1773	368704.2475
Easting (X) [meters]	334132.060	563992.408	1850 365.092	1850490.9170
Convergence [degrees]	-1.20619549	-0.26380278		
Point Scale	0.99993878	0.99995696		
Combined Factor	0.99991383	0.99993201	PRJ. S.F = 1.00006800	

US NATIONAL GRID DESIGNATOR: 17SLD3413219799(NAD 83)

BASE STATIONS USED

Germany Rd.

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF4048	GALP GALLIPOLIS CORS ARP	N385039.148	W0821640.091	58354.9
DK7557	KYGB GREENBO LAKE SRP CORS ARP	N382850.195	W0825223.976	59051.9
DI1876	OHAD ADAMS COUNTY CORS ARP	N384709.347	W0833322.647	60950.3
DI1856	OHHO HOCKING COUNTY CORS ARP	N393207.276	W0822637.876	70998.2
DI1684	OHFA FAYETTE COUNTY CORS ARP	N393133.291	W0832831.214	74791.9
AI4945	STKR STOCKER OHIO UNIV CORS ARP	N391933.825	W0820625.629	78123.1
DH9001	WVHU MARSHALL UNIV-HUN CORS ARP	N382522.617	W0822528.918	78056.7
DK3328	KYTI KY HWY DIST 9 CORS ARP	N382520.011	W0834458.032	97657.0
DH9003	WVRA MARSHALL UNIV-RAV CORS ARP	N385628.863	W0814504.842	101202.6

NEAREST NGS PUBLISHED CONTROL POINT

JY0681	V 216	N390042.	W0825457.	19.1
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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.

Kevin Moyer

From: opus <opus@ngs.noaa.gov>
Sent: Friday, 26 June, 2015 11:01
To: Andy Nixon
Subject: OPUS-RS solution : GERMANY_STAT5_2686_0617_105143.m00 OP1435329846330

GP05

FILE: GERMANY_STAT5_2686_0617_105143.m00 OP1435329846330

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: anixon@cmtran.com DATE: June 26, 2015
RINEX FILE: germ168o.15o TIME: 15:00:49 UTC

SOFTWARE: rsgps 1.37 RS90.prl 1.99.2 START: 2015/06/17 14:52:22
EPHEMERIS: igr18493.eph [rapid] STOP: 2015/06/17 16:37:23
NAV FILE: brdc1680.15n OBS USED: 6948 / 10485 : 66%
ANT NAME: LEIGS15 NONE QUALITY IND. 9.33/ 39.70
ARP HEIGHT: 2.013 NORMALIZED RMS: 0.467

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.45933)

X: 611925.078(m) 0.008(m) 611924.247(m) 0.008(m)
Y: -4924396.382(m) 0.031(m) -4924394.958(m) 0.031(m)
Z: 3993869.888(m) 0.024(m) 3993869.800(m) 0.024(m)

LAT: 39 1 0.69278 0.005(m) 39 1 0.72150 0.005(m)
E LON: 277 5 0.56529 0.009(m) 277 5 0.53831 0.009(m)
W LON: 82 54 59.43471 0.009(m) 82 54 59.46169 0.009(m)
EL HGT: 156.482(m) 0.039(m) 155.249(m) 0.039(m)
ORTHO HGT: 190.009(m) 0.045(m) [NAVD88 (Computed using GEOID12B)]

623.388

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 17) SPC (3402 OH S)

Northing (Y) [meters]	4320394.807	112968.086	370 629.4622
Easting (X) [meters]	334078.973	563929.534	1850 158.813
Convergence [degrees]	-1.20681181	-0.26428350	
Point Scale	0.99993899	0.99995636	
Combined Factor	0.99991444	0.99993181	

US NATIONAL GRID DESIGNATOR: 17SLD3407820394(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF4048	GALP GALLIPOLIS CORS ARP	N385039.148	W0821640.091	58606.8
DK7557	KYGB GREENBO LAKE SRP CORS ARP	N382850.195	W0825223.976	59649.0
DI1876	OHAD ADAMS COUNTY CORS ARP	N384709.347	W0833322.647	61135.3
DI1856	OHHO HOCKING COUNTY CORS ARP	N393207.276	W0822637.876	70549.2
DI1684	OHFA FAYETTE COUNTY CORS ARP	N393133.291	W0832831.214	74295.5
AI4945	STKR STOCKER OHIO UNIV CORS ARP	N391933.825	W0820625.629	77915.7
DH9001	WVHU MARSHALL UNIV-HUN CORS ARP	N382522.617	W0822528.918	78589.7
DK3328	KYTI KY HWY DIST 9 CORS ARP	N382520.011	W0834458.032	98005.3
DH9003	WVRA MARSHALL UNIV-RAV CORS ARP	N385628.863	W0814504.842	101311.7

NEAREST NGS PUBLISHED CONTROL POINT

JY0682	W 216	N390100.	W0825501.	43.3
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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.

Kevin Moyer

From: opus <opus@ngs.noaa.gov>
Sent: Friday, 26 June, 2015 11:02
To: Andy Nixon
Subject: OPUS-RS solution : GERMANY_STAT6_2686_0617_123941.m00 OP1435329874865

(GPOB)
~~(GPS)~~

FILE: GERMANY_STAT6_2686_0617_123941.m00 OP1435329874865

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: anixon@cmtran.com DATE: June 26, 2015
RINEX FILE: germ168q.15o TIME: 15:01:59 UTC

SOFTWARE: rsgps 1.37 RS91.prl 1.99.2 START: 2015/06/17 16:40:23
EPHEMERIS: igr18493.eph [rapid] STOP: 2015/06/17 17:56:35
NAV FILE: brdc1680.15n OBS USED: 6408 / 8721 : 73%
ANT NAME: LEIGS15 NONE QUALITY IND. 21.33/ 47.50
ARP HEIGHT: 2.013 NORMALIZED RMS: 0.439

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.45951)

X: 611924.062(m) 0.005(m) 611923.231(m) 0.005(m)
Y: -4924346.491(m) 0.023(m) -4924345.067(m) 0.023(m)
Z: 3993930.810(m) 0.018(m) 3993930.722(m) 0.018(m)

LAT: 39 1 3.24096 0.006(m) 39 1 3.26968 0.006(m)
E LON: 277 5 0.77912 0.005(m) 277 5 0.75214 0.005(m)
W LON: 82 54 59.22088 0.005(m) 82 54 59.24786 0.005(m)
EL HGT: 156.271(m) 0.028(m) 155.038(m) 0.028(m)
ORTHO HGT: 189.799(m) 0.036(m) [NAVD88 (Computed using GEOID12B)]

622.699

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 17) SPC (3402 OH S)

Northing (Y) [meters] 4320473.257 113046.638 = 370 887.1782
Easting (X) [meters] 334085.770 563935.040 = 1850 176.877
Convergence [degrees] -1.20679279 -0.26424582
Point Scale 0.99993897 0.99995628
Combined Factor 0.99991445 0.99993176

US NATIONAL GRID DESIGNATOR: 17SLD3408520473(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF4048	GALP GALLIPOLIS CORS ARP	N385039.148	W0821640.091	58627.4
DK7557	KYGB GREENBO LAKE SRP CORS ARP	N382850.195	W0825223.976	59727.1
DI1876	OHAD ADAMS COUNTY CORS ARP	N384709.347	W0833322.647	61172.7
DI1856	OHHO HOCKING COUNTY CORS ARP	N393207.276	W0822637.876	70482.0
DI1684	OHFA FAYETTE COUNTY CORS ARP	N393133.291	W0832831.214	74238.9
AI4945	STKR STOCKER OHIO UNIV CORS ARP	N391933.825	W0820625.629	77876.1
DH9001	WVHU MARSHALL UNIV-HUN CORS ARP	N382522.617	W0822528.918	78652.7
DK3328	KYTI KY HWY DIST 9 CORS ARP	N382520.011	W0834458.032	98061.8
DH9003	WVRA MARSHALL UNIV-RAV CORS ARP	N385628.863	W0814504.842	101312.6

NEAREST NGS PUBLISHED CONTROL POINT

JY0682	W 216	N390100.	W0825501.	109.0
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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.