

**Minimum Technical Standards Report  
Control Survey &  
Specific Purpose Survey for LiDAR**



**PREPARED FOR:  
UNITED STATES GEOLOGICAL SURVEY  
& FEDERAL EMERGENCY MANAGEMENT AGENCY**



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2011 FEMA VI-CHICOT AND DESHA LIDAR  
DATE: 21 JUNE 2012

**Technical Standards Report  
Control Survey & Specific Purpose Survey for LiDAR**

2011 FEMA VI-Chicot and Desha

Prepared For:  
**US Geological Survey**  
1400 Independence Road  
Rolla, MO 65401  
Phone: 573.308.3587

Prepared By:  
**Northrop Grumman Corporation**  
301 Voyager Way  
Huntsville, AL 35806  
Phone: 256.327.6500

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## **Introduction & Specification**

The purpose of this project was to provide ground truth data which will be used to validate LiDAR data of the Chicot & Desha LiDAR project located in South East Arkansas. The ground surveys were conducted utilizing the CORS network to collect checkpoints of 10% of the predominant vegetation within the AOI. The vertical accuracy requirements meet or exceed the required RMSEz of 12.5cm and the vertical accuracy of 24.5cm at the 95% confidence level as specified by the SOW using NDEP accuracy standards.

## **Ground Truth Survey**

Ground Truth data was collected of the five major land cover classes representing 10% of the predominate vegetation dispersed within the area of interest. 20 points were collected in each of the four predominate vegetation classes, FVA, tall weeds/ crops, brush lands, and forested/fully grown, all were collected with a Total Station. A pair of points was surveyed using the CORS network once completed the total station is used to collect the all vegetation ground classes. A Leica 1103 TCR+ total station was used to collect all the shots collected in all the classes surveyed, due to the limited GPS signal when working in and around tree canopy.

## **Datum & Coordinate Systems**

The survey data and coordinate values associated with this project are referenced to the Universal Transverse Mercator Coordinate System, Zone 15 units of Meters, North Americas Datum of 1983, in units of Meters. Geoid 09 was used to determine the NAVD88 heights.

## **Survey Area**

The project area is approximately 3,574 square miles and the AOI lies in a portion of Ashley, Chicot, Drew, Lincoln and Desha Counties in Arkansas.

## **Control Survey**

The GPS survey was tied into the CORS Network located in Arkansas, Mississippi and Louisiana. The CORS network is a network of continuously operating GPS reference stations. This allows post processing of the GPS points. Six (6) CORS stations were used (ARCM, ARLR, CSAL, MSB6, MSCL, TALL)

As a quality control measure differential levels using a Leica DNA 10 level were run between the pair of GPS points used to collect field data, also random points were collected to confirm that the project will meet the 5cm local network accuracy at the 95% confidence level.

Survey field work was performed on 2-20-12 thru 2-22-12 by Maptech Inc. field crews using Leica 1203 Global Positioning System with Leica ATX1230 and Leica ATX1230GG antennas.

## Vertical Accuracy Analysis

Data analysis was accomplished by comparing ground truth checkpoints with LIDAR points from the edited data set, which were within 1 meter horizontally from the ground truth points. Based on the number of returns and the density of points in this project, it was not necessary to compare to anything further away than 1 meter horizontally from the ground truth points. Vertical accuracy requirements follow the NSSDA specifications based on RMSE of 12.5 cm in open terrain land cover category. This assessment verifies the vertical accuracy of the LiDAR derived DEM shall be calculated and reported in three ways. 1. FVA 2.SVA 3.CVA. Additionally the FVA points were assessed against the TIN derived from the LAS LiDAR point cloud controlled and calibrated swath data to ensure they met the required accuracy of 12.5cm RMSEz and 24.5cm at the 95% confidence interval. The results can be found within Table 1.

Table 1- shows the complete results from the RMSE calculations. The required accuracies of the FVA and the CVA are within the required specifications.

<b>Land Cover Category Calculated against the DEM</b>	<b># of Points</b>	<b>FVA Required 24.5</b>	<b>SVA Target 36.3</b>	<b>CVA Required 36.3</b>	<b>FVA Calculated Against the TIN derived from the Swath Data Required 24.5</b>
Consolidated All Classes	80			0.25	
Bare earth (Open Terrain)	20	0.13			0.11
Tall Weeds Crops	20		0.24		
Brush Lands Trees	20		0.29		
Fully Forested	20		0.18		

## Horizontal Accuracy Analysis

There is not a systematic method of testing when testing horizontal accuracy in LiDAR. The horizontal accuracy is checked by collecting building corners during the survey. Lines are then digitized while viewing the intensity images representing the building outline and the differences are measure from each individual survey point to the corner of the building outline. Stats are calculated to ensure horizontal tolerances are met. These measurements resulted in an RMSEr of 0.26 meters and a horizontal accuracy of 0.45 meter horizontal accuracy at the 95 % confidence interval. Method used was the NSSDA standard for horizontal accuracy assessment.

FGDC-STD-007.3-1998

$$\text{RMSE}_{\text{northing}} = \sqrt{[\sum (\text{CONTROL}_{\text{northing}} - \text{MEASURED}_{\text{northing}})^2/n]}$$

$$\text{RMSE}_{\text{easting}} = \sqrt{[\sum (\text{CONTROL}_{\text{easting}} - \text{MEASURED}_{\text{easting}})^2/n]}$$

$$\text{RMSE}_r = \sqrt{[\text{RMSE}_{\text{easting}}^2 + \text{RMSE}_{\text{northing}}^2]}$$

$$\text{RMSE accuracy} = 1.7308 * \text{RMSE}_r$$

## **Appendix A**

# The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

```

DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.88.2
1 National Geodetic Survey, Retrieval Date = MAY 17, 2012
DH7101 *****
DH7101 CORS - This is a GPS Continuously Operating Reference Station.
DH7101 DESIGNATION - CAMDEN CORS ARP
DH7101 CORS_ID - ARCM
DH7101 PID - DH7101
DH7101 STATE/COUNTY- AR/OUACHITA
DH7101 COUNTRY - US
DH7101 USGS QUAD - CAMDEN SW (1985)
DH7101
DH7101 *CURRENT SURVEY CONTROL
DH7101
DH7101* NAD 83(CORS) POSITION- 33 32 32.63551(N) 092 52 57.80425(W) ADJUSTED
DH7101* NAD 83(CORS) ELLIP HT- 26.719 (meters) (11/??/05) ADJUSTED
DH7101* NAD 83(CORS) EPOCH - 2002.00
DH7101* NAVD 88 ORTHO HEIGHT - *(meters) *(feet)
DH7101
DH7101 NAD 83(CORS) X - -267,627.504 (meters) COMP
DH7101 NAD 83(CORS) Y - -5,314,760.860 (meters) COMP
DH7101 NAD 83(CORS) Z - 3,504,269.527 (meters) COMP
DH7101 GEOID HEIGHT - -26.28 (meters) GEOID09
DH7101 HORZ ORDER - SPECIAL (CORS)
DH7101 ELLP ORDER - SPECIAL (CORS)
DH7101
DH7101.The coordinates were established by GPS observations
DH7101.and adjusted by the National Geodetic Survey in November 2005.
DH7101
DH7101.The datum tag of NAD 83(CORS) is equivalent to NAD 83(CORS96).
DH7101
DH7101.The coordinates are valid at the epoch date displayed above
DH7101.which is a decimal equivalence of Year/Month/Day.
DH7101
DH7101.The PID for the CORS L1 Phase Center is DH7102.
DH7101
DH7101.The XYZ, and position/ellipsoidal ht. are equivalent.
DH7101
DH7101.The ellipsoidal height was determined by GPS observations
DH7101.and is referenced to NAD 83.
DH7101
DH7101. The following values were computed from the NAD 83(CORS) position.
DH7101
DH7101; North East Units Scale Factor Converg.
DH7101;SPC AR S - 497,483.380 318,019.804 MT 0.99995510 -0 29 38.6
DH7101;SPC AR S - 1,632,160.06 1,043,369.97 sFT 0.99995510 -0 29 38.6
DH7101
DH7101! - Elev Factor x Scale Factor = Combined Factor
DH7101!SPC AR S - 0.99999581 x 0.99995510 = 0.99995091
DH7101
DH7101 SUPERSEDED SURVEY CONTROL
DH7101
DH7101.No superseded survey control is available for this station.
DH7101
DH7101_U.S. NATIONAL GRID SPATIAL ADDRESS: 15SWT1088711426(NAD 83)
DH7101
DH7101_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DH7101
DH7101 STATION DESCRIPTION
DH7101
DH7101'DESCRIBED BY NATIONAL GEODETIC SURVEY 2005
DH7101'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DH7101'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DH7101'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DH7101' ftp://cors.ngs.noaa.gov/cors/README.txt
DH7101' ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DH7101' ftp://cors.ngs.noaa.gov/cors/station_log
DH7101' http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:03

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# The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

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DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.88.2
1 National Geodetic Survey, Retrieval Date = MAY 17, 2012
DH7107 *****
DH7107 CORS - This is a GPS Continuously Operating Reference Station.
DH7107 DESIGNATION - LITTLE ROCK CORS ARP
DH7107 CORS_ID - ARLR
DH7107 PID - DH7107
DH7107 STATE/COUNTY- AR/PULASKI
DH7107 COUNTRY - US
DH7107 USGS QUAD - ALEXANDER (1986)
DH7107
DH7107 *CURRENT SURVEY CONTROL
DH7107
DH7107* NAD 83(CORS) POSITION- 34 40 21.44379(N) 092 22 57.18174(W) ADJUSTED
DH7107* NAD 83(CORS) ELLIP HT- 74.408 (meters) (11/??/05) ADJUSTED
DH7107* NAD 83(CORS) EPOCH - 2002.00
DH7107* NAVD 88 ORTHO HEIGHT - *(meters) *(feet)
DH7107
DH7107 NAD 83(CORS) X - -218,300.990 (meters) COMP
DH7107 NAD 83(CORS) Y - -5,246,694.799 (meters) COMP
DH7107 NAD 83(CORS) Z - 3,608,099.611 (meters) COMP
DH7107 GEOID HEIGHT - -26.48 (meters) GEOID09
DH7107 HORZ ORDER - SPECIAL (CORS)
DH7107 ELLP ORDER - SPECIAL (CORS)
DH7107
DH7107.The coordinates were established by GPS observations
DH7107.and adjusted by the National Geodetic Survey in November 2005.
DH7107
DH7107.The datum tag of NAD 83(CORS) is equivalent to NAD 83(CORS96).
DH7107
DH7107.The coordinates are valid at the epoch date displayed above
DH7107.which is a decimal equivalence of Year/Month/Day.
DH7107
DH7107.The PID for the CORS L1 Phase Center is DH7108.
DH7107
DH7107.The XYZ, and position/ellipsoidal ht. are equivalent.
DH7107
DH7107.The ellipsoidal height was determined by GPS observations
DH7107.and is referenced to NAD 83.
DH7107
DH7107. The following values were computed from the NAD 83(CORS) position.
DH7107
DH7107; North East Units Scale Factor Converg.
DH7107;SPC AR S - 622,556.754 364,939.918 MT 0.99998038 -0 12 50.8
DH7107;SPC AR S - 2,042,504.95 1,197,307.05 sFT 0.99998038 -0 12 50.8
DH7107
DH7107! - Elev Factor x Scale Factor = Combined Factor
DH7107!SPC AR S - 0.99998832 x 0.99998038 = 0.99996870
DH7107
DH7107 SUPERSEDED SURVEY CONTROL
DH7107
DH7107.No superseded survey control is available for this station.
DH7107
DH7107_U.S. NATIONAL GRID SPATIAL ADDRESS: 15SWU5656736912(NAD 83)
DH7107
DH7107_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DH7107
DH7107 STATION DESCRIPTION
DH7107
DH7107'DESCRIBED BY NATIONAL GEODETIC SURVEY 2005
DH7107'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DH7107'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DH7107'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DH7107' ftp://cors.ngs.noaa.gov/cors/README.txt
DH7107' ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DH7107' ftp://cors.ngs.noaa.gov/cors/station_log
DH7107' http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:04

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# The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

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DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.88.2
1 National Geodetic Survey, Retrieval Date = MAY 17, 2012
DF3567 *****
DF3567 CORS - This is a GPS Continuously Operating Reference Station.
DF3567 DESIGNATION - MONTICELLO COOP CORS ARP
DF3567 CORS_ID - CSAL
DF3567 PID - DF3567
DF3567 STATE/COUNTY- AR/DREW
DF3567 COUNTRY - US
DF3567 USGS QUAD - MONTICELLO SOUTH (1966)
DF3567
DF3567 *CURRENT SURVEY CONTROL
DF3567
DF3567* NAD 83(CORS) POSITION- 33 35 31.13684(N) 091 48 53.23042(W) ADJUSTED
DF3567* NAD 83(CORS) ELLIP HT- 66.824 (meters) (01/??/03) ADJUSTED
DF3567* NAD 83(CORS) EPOCH - 2002.00
DF3567* NAVD 88 ORTHO HEIGHT - *(meters) *(feet)
DF3567
DF3567 NAD 83(CORS) X - -168,429.579 (meters) COMP
DF3567 NAD 83(CORS) Y - -5,315,819.822 (meters) COMP
DF3567 NAD 83(CORS) Z - 3,508,874.174 (meters) COMP
DF3567 GEOID HEIGHT - -25.75 (meters) GEOID09
DF3567 HORZ ORDER - SPECIAL (CORS)
DF3567 ELLP ORDER - SPECIAL (CORS)
DF3567
DF3567.The coordinates were established by GPS observations
DF3567.and adjusted by the National Geodetic Survey in January 2003.
DF3567
DF3567.The datum tag of NAD 83(CORS) is equivalent to NAD 83(CORS96).
DF3567
DF3567.The coordinates are valid at the epoch date displayed above
DF3567.which is a decimal equivalence of Year/Month/Day.
DF3567
DF3567.The PID for the CORS L1 Phase Center is DF3568.
DF3567
DF3567.The XYZ, and position/ellipsoidal ht. are equivalent.
DF3567
DF3567.The ellipsoidal height was determined by GPS observations
DF3567.and is referenced to NAD 83.
DF3567
DF3567. The following values were computed from the NAD 83(CORS) position.
DF3567
DF3567; North East Units Scale Factor Converg.
DF3567;SPC AR S - 502,644.769 417,191.408 MT 0.99994809 +0 06 13.2
DF3567;SPC AR S - 1,649,093.71 1,368,735.48 sFT 0.99994809 +0 06 13.2
DF3567
DF3567! - Elev Factor x Scale Factor = Combined Factor
DF3567!SPC AR S - 0.99998951 x 0.99994809 = 0.99993760
DF3567
DF3567 SUPERSEDED SURVEY CONTROL
DF3567
DF3567.No superseded survey control is available for this station.
DF3567
DF3567_U.S. NATIONAL GRID SPATIAL ADDRESS: 15SXT0997517546(NAD 83)
DF3567
DF3567_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DF3567
DF3567 STATION DESCRIPTION
DF3567
DF3567'DESCRIBED BY NATIONAL GEODETIC SURVEY 2003
DF3567'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DF3567'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DF3567'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DF3567' ftp://cors.ngs.noaa.gov/cors/README.txt
DF3567' ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DF3567' ftp://cors.ngs.noaa.gov/cors/station_log
DF3567' http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:05

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# The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

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DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.88.2
1 National Geodetic Survey, Retrieval Date = MAY 17, 2012
DJ3659 *****
DJ3659 CORS - This is a GPS Continuously Operating Reference Station.
DJ3659 DESIGNATION - BOBO 6 CORS ARP
DJ3659 CORS_ID - MSB6
DJ3659 PID - DJ3659
DJ3659 STATE/COUNTY- MS/BOLIVAR
DJ3659 COUNTRY - US
DJ3659 USGS QUAD - DUNCAN (1967)
DJ3659
DJ3659 *CURRENT SURVEY CONTROL
DJ3659
DJ3659* NAD 83(CORS) POSITION- 34 06 51.35579(N) 090 41 24.94912(W) ADJUSTED
DJ3659* NAD 83(CORS) ELLIP HT- 25.358 (meters) (12/??/09) ADJUSTED
DJ3659* NAD 83(CORS) EPOCH - 2002.00
DJ3659* NAVD 88 ORTHO HEIGHT - *(meters) *(feet)
DJ3659
DJ3659 NAD 83(CORS) X - -63,683.058 (meters) COMP
DJ3659 NAD 83(CORS) Y - -5,285,797.632 (meters) COMP
DJ3659 NAD 83(CORS) Z - 3,556,961.530 (meters) COMP
DJ3659 GEOID HEIGHT - -26.56 (meters) GEOID09
DJ3659 HORZ ORDER - SPECIAL (CORS)
DJ3659 ELLP ORDER - SPECIAL (CORS)
DJ3659
DJ3659.The coordinates were established by GPS observations
DJ3659.and adjusted by the National Geodetic Survey in December 2009.
DJ3659
DJ3659.The datum tag of NAD 83(CORS) is equivalent to NAD 83(CORS96).
DJ3659
DJ3659.The coordinates are valid at the epoch date displayed above
DJ3659.which is a decimal equivalence of Year/Month/Day.
DJ3659
DJ3659.The PID for the CORS L1 Phase Center is DJ3660.
DJ3659
DJ3659.The XYZ, and position/ellipsoidal ht. are equivalent.
DJ3659
DJ3659.The ellipsoidal height was determined by GPS observations
DJ3659.and is referenced to NAD 83.
DJ3659
DJ3659. The following values were computed from the NAD 83(CORS) position.
DJ3659
DJ3659; North East Units Scale Factor Converg.
DJ3659;SPC MS W - 511,678.828 667,070.855 MT 0.99996336 -0 12 00.7
DJ3659;SPC MS W - 1,678,732.95 2,188,548.30 sFT 0.99996336 -0 12 00.7
DJ3659
DJ3659! - Elev Factor x Scale Factor = Combined Factor
DJ3659!SPC MS W - 0.99999602 x 0.99996336 = 0.99995938
DJ3659
DJ3659 SUPERSEDED SURVEY CONTROL
DJ3659
DJ3659 NAD 83(CORS)- 34 06 51.35558(N) 090 41 24.94931(W) AD(2002.00) c
DJ3659 ELLIP H (10/??/07) 25.369 (m) GP(2002.00) c c
DJ3659
DJ3659.Superseded values are not recommended for survey control.
DJ3659.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DJ3659.See file dsdata.txt to determine how the superseded data were derived.
DJ3659
DJ3659_U.S. NATIONAL GRID SPATIAL ADDRESS: 15SYT1303477234(NAD 83)
DJ3659
DJ3659_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DJ3659
DJ3659 STATION DESCRIPTION
DJ3659
DJ3659'DESCRIBED BY NATIONAL GEODETIC SURVEY 2009
DJ3659'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DJ3659'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DJ3659'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DJ3659' ftp://cors.ngs.noaa.gov/cors/README.txt
DJ3659' ftp://cors.ngs.noaa.gov/cors/coord/coord 08

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# The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

```

DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.88.2
1 National Geodetic Survey, Retrieval Date = MAY 17, 2012
DI1868 *****
DI1868 HT_MOD - This is a Height Modernization Survey Station.
DI1868 CORS - This is a GPS Continuously Operating Reference Station.
DI1868 DESIGNATION - CLEVELAND MS CORS ARP
DI1868 CORS_ID - MSCL
DI1868 PID - DI1868
DI1868 STATE/COUNTY- MS/BOLIVAR
DI1868 COUNTRY - US
DI1868 USGS QUAD - CLEVELAND (1966)
DI1868
DI1868 *CURRENT SURVEY CONTROL
DI1868
DI1868* NAD 83(CORS) POSITION- 33 44 48.11274(N) 090 43 59.22417(W) ADJUSTED
DI1868* NAD 83(CORS) ELLIP HT- 35.302 (meters) (12/??/09) ADJUSTED
DI1868* NAD 83(CORS) EPOCH - 2002.00
DI1868* NAVD 88 ORTHO HEIGHT - 61.82 (meters) 202.8 (feet) GPS OBS
DI1868
DI1868 NAVD 88 orthometric height was determined with geoid model GEOID03
DI1868 GEOID HEIGHT - -26.49 (meters) GEOID03
DI1868 GEOID HEIGHT - -26.45 (meters) GEOID09
DI1868 NAD 83(CORS) X - -67,927.826 (meters) COMP
DI1868 NAD 83(CORS) Y - -5,308,512.808 (meters) COMP
DI1868 NAD 83(CORS) Z - 3,523,138.645 (meters) COMP
DI1868 HORZ ORDER - SPECIAL (CORS)
DI1868 ELLP ORDER - SPECIAL (CORS)
DI1868
DI1868.The coordinates were established by GPS observations
DI1868.and adjusted by the National Geodetic Survey in December 2009.
DI1868
DI1868.The datum tag of NAD 83(CORS) is equivalent to NAD 83(CORS96).
DI1868
DI1868.The coordinates are valid at the epoch date displayed above
DI1868.which is a decimal equivalence of Year/Month/Day.
DI1868
DI1868.The orthometric height was determined by GPS observations and a
DI1868.high-resolution geoid model using precise GPS observation and
DI1868.processing techniques.
DI1868
DI1868.The PID for the CORS L1 Phase Center is DI1869.
DI1868
DI1868.The XYZ, and position/ellipsoidal ht. are equivalent.
DI1868
DI1868.The ellipsoidal height was determined by GPS observations
DI1868.and is referenced to NAD 83.
DI1868
DI1868. The following values were computed from the NAD 83(CORS) position.
DI1868
DI1868; North East Units Scale Factor Converg.
DI1868;SPC MS W - 470,924.128 662,958.465 MT 0.99996691 -0 13 19.5
DI1868;SPC MS W - 1,545,023.58 2,175,056.23 sFT 0.99996691 -0 13 19.5
DI1868
DI1868! - Elev Factor x Scale Factor = Combined Factor
DI1868!SPC MS W - 0.99999446 x 0.99996691 = 0.99996137
DI1868
DI1868 SUPERSEDED SURVEY CONTROL
DI1868
DI1868 NAD 83(CORS)- 33 44 48.11269(N) 090 43 59.22421(W) AD(2002.00) c
DI1868 ELLIP H (10/??/06) 35.320 (m) GP(2002.00) c c
DI1868
DI1868.Superseded values are not recommended for survey control.
DI1868.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DI1868.See file dsdata.txt to determine how the superseded data were derived.
DI1868
DI1868_U.S. NATIONAL GRID SPATIAL ADDRESS: 15SYT0998236379(NAD 83)
DI1868
DI1868_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DI1868
DI1868 STATION DESCRIPTION

```

# The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

```

DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.88.2
1 National Geodetic Survey, Retrieval Date = MAY 17, 2012
DG5002 *****
DG5002 CORS - This is a GPS Continuously Operating Reference Station.
DG5002 DESIGNATION - TALLULAH CORS ARP
DG5002 CORS_ID - TALL
DG5002 PID - DG5002
DG5002 STATE/COUNTY- LA/MADISON
DG5002 COUNTRY - US
DG5002 USGS QUAD - TALLULAH (1994)
DG5002
DG5002 *CURRENT SURVEY CONTROL
DG5002
DG5002* NAD 83(CORS) POSITION- 32 24 01.19684(N) 091 10 58.81220(W) ADJUSTED
DG5002* NAD 83(CORS) ELLIP HT- 7.418 (meters) (04/??/04) ADJUSTED
DG5002* NAD 83(CORS) EPOCH - 2002.00
DG5002* NAVD 88 ORTHO HEIGHT - *(meters) *(feet)
DG5002
DG5002 NAD 83(CORS) X - -111,289.495 (meters) COMP
DG5002 NAD 83(CORS) Y - -5,389,259.492 (meters) COMP
DG5002 NAD 83(CORS) Z - 3,398,000.311 (meters) COMP
DG5002 GEOID HEIGHT - -26.47 (meters) GEOID09
DG5002 HORZ ORDER - SPECIAL (CORS)
DG5002 ELLP ORDER - SPECIAL (CORS)
DG5002
DG5002.The coordinates were established by GPS observations
DG5002.and adjusted by the National Geodetic Survey in April 2004.
DG5002
DG5002.The datum tag of NAD 83(CORS) is equivalent to NAD 83(CORS96).
DG5002
DG5002.The coordinates are valid at the epoch date displayed above
DG5002.which is a decimal equivalence of Year/Month/Day.
DG5002
DG5002.The PID for the CORS L1 Phase Center is DK6706.
DG5002
DG5002.The XYZ, and position/ellipsoidal ht. are equivalent.
DG5002
DG5002.The ellipsoidal height was determined by GPS observations
DG5002.and is referenced to NAD 83.
DG5002
DG5002. The following values were computed from the NAD 83(CORS) position.
DG5002
DG5002; North East Units Scale Factor Converg.
DG5002;SPC LA N - 211,455.094 1,123,894.160 MT 0.99995011 +0 41 46.7
DG5002;SPC LA N - 693,748.92 3,687,309.42 sFT 0.99995011 +0 41 46.7
DG5002
DG5002! - Elev Factor x Scale Factor = Combined Factor
DG5002!SPC LA N - 0.99999884 x 0.99995011 = 0.99994895
DG5002
DG5002 SUPERSEDED SURVEY CONTROL
DG5002
DG5002.No superseded survey control is available for this station.
DG5002
DG5002_U.S. NATIONAL GRID SPATIAL ADDRESS: 15SXR7088786263(NAD 83)
DG5002
DG5002_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DG5002
DG5002 STATION DESCRIPTION
DG5002
DG5002'DESCRIBED BY NATIONAL GEODETIC SURVEY 2004
DG5002'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DG5002'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DG5002'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DG5002' ftp://cors.ngs.noaa.gov/cors/README.txt
DG5002' ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DG5002' ftp://cors.ngs.noaa.gov/cors/station_log
DG5002' http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:05

```

## **Appendix B**



