# LiDAR Project Report

## G15PD00057, South Terrebonne and Gulf Islands

## QL2 LiDAR

Prepared For:

United States Geological Survey


Prepared By:

Digital Aerial Solutions, LLC


CONTRACT: #G10PC00093 CONTRACTOR:
DIGITAL AERIAL SOLUTIONS
TASK ORDER: # G15PD00057

Project Report
LiDAR Collection, Processing, and QA/QC

# G15PD00057, South Terrebonne and Gulf Islands QL2 LiDAR

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South Terrabonne and Gulf Islands
N
Baton Rouge
New Orleans
Mobile
MISSISSIPPI
Jackson
LOUISIANA
COAST
Baton Rouge
New Orleans
0 15 30 60
Miles
Legend
South Terrebonne and Gulf Islands
Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -93.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter
Date: 10/31/2014

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# 1 Introduction and Specifications

Digital Aerial Solutions, LLC (DAS) was tasked to collect and process a Light Detection And Ranging (LiDAR) derived elevation dataset for the G15PD00057, South Terrebonne and Gulf Islands . The area encompasses approximately 2093 square miles Aerial LiDAR data was collected utilizing an ALS70 and ALS80. The ALS80 is a discrete return topographic LiDAR mapping system manufactured by Leica Geosystems. LiDAR data collected for the G15PD00057, South Terrebonne and Gulf Islands survey has a nominal pulse spacing of 0.7 meters, and includes up to 4 discrete returns per pulse, along with intensity values for each return.

LiDAR datasets were post processed to generate elevation point cloud swaths for each flight line. Deliverables include the point cloud swaths, tiled point clouds classified by land cover type, breaklines to support hydro-flattening of digital elevation models (DEM)s, intensity tiles, and bare-earth DEM tiles. Point cloud deliverables are stored in the LAS version 1.2 format, point data record format 1. The tiling scheme for tiled deliverables is a 1500 meter x 1500 meter grid. Tile number is the appropriate cell number values found in the USNG index. All deliverables were generated in conformance with the *U.S. Geological Survey National Geospatial Program Guidelines and Base Specifications, Version 1.0.*

# 2 Spatial Reference System

The spatial reference of the data is as follows.

Horizontal Spatial Reference
- Datum: NAVD88, Meters (to 3 decimal places)
- Coordinates: UTM Zone 15, NAD83, Meters (to 2 decimal places);

Vertical Spatial Reference
*All datasets are available with orthometric elevation; point cloud datasets are also available with ellipsoid heights*
- Datum: North American Vertical Datum of 1983 (GEOID12A)

# 3 LiDAR Acquisition

## 3.1 Survey Area

The South Terrebonne and Gulf Islands, 2ppsm Lidar survey covers approximately 2093 square miles covering all of South Terrebonne basin and several islands along the gulf coast of Louisiana and Alabama. The flight plan consisted of 184 survey lines and 21 control lines.

## 3.2 Acquisition Parameters

Acquisition parameters include the sensor configuration and the flight plan characteristics, and are selected based on a number of project specific criteria. Criteria reviewed include the required accuracies for the final dataset, the land cover types within the project survey area, and the required nominal pulse spacing. Acquisition parameters selected for the Terrebonne, 2ppsm Lidar project are summarized below.

| Parameter | Value |
|---|---|
| Flying Height Above Ground Level | 5900 feet |
| Nominal Sidelap | 30% |
| Nominal Speed Over Ground | 155 knots |
| Field of View | 36° |
| Laser Rate | 132 kHz |
| Scan Rate | 66.2 hz |
| Maximum Cross Track Spacing | 0.78 meters |
| Maximum Along Track Spacing | 0.82 meters |
| Average Spacing | 0.5 meters |

## 3.3 Acquisition Mission

The acquisition mission for the G15PD00057, South Terrebonne and Gulf Islands QL2 LiDAR survey was coordinated to be acquired in 2 weeks, due to weather conditions and tidal levels the completion of acquisition was not until 4 weeks. Collection began on January 18th 2015 and was completed on February 13th, 2015.

## 3.4 Airborne GPS/IMU

Airborne global positioning system (GPS) and inertial measurement unit (IMU) data was collected on the aircraft during the acquisition mission, providing sensor position and orientation information for geo-referencing the LiDAR data. Airborne GPS observations were collected at a frequency of 2Hz, and IMU observations are collected at a frequency of 200Hz.

| Aircraft | Sensor | GPS Lever Arm (m) | IMU Lever Arm (m) |
|---|---|---|---|
| C421 – N112MJ | ALS70 – SN1132 | x: -0.210, y: -0.060, z: -1.370 | x: -0.450, y: -0.159, z: -0.169 |

In addition, GPS data was collected with ground base stations during the acquisition mission, providing corrections to support differential post-processing of the airborne GPS. One ground base station was setup at an NGS Benchmark (Keyport) as the base of operation. The additional ground base station were selected and place threw the project to ensure complete coverage. Ground GPS observations were collected at a frequency of 2Hz.

# 4 LiDAR Processing

## 4.1 Acquisition Post-Processing

Once the acquisition was completed, initial post-processing was performed to generate geo-referenced LiDAR elevation point clouds.

The airborne GPS dataset was differentially corrected using the ground base station GPS datasets collected by DAS in Lecia's IPAS software. IPAS computes the GPS dataset corrections in both forward and reverse chronological sequence, obtaining two solutions for the GPS trajectory. The differences between these two solutions were reviewed to ensure a consistent result, and agree within +/- 3cm. The forward and reverse solutions also show good fit between the two different base stations used in the post-processing.

Differentially corrected airborne GPS data was merged with the airborne IMU dataset in Leica's IPAS software through Kalman filtering techniques. IPAS applies the reference lever arms for the GPS and IMU measurement systems during processing to determine the trajectory (position and orientation) of the LiDAR sensor during the acquisition mission. Estimated lever arm values reported posteriori validate the measurements made during sensor installation in the aircraft.

Raw LiDAR sensor ranging data and the final sensor trajectory from IPAS were processed in Leica's ALSPP software to produce the LiDAR elevation point cloud swaths for each flightline, stored in LAS version 1.2 file format. Quality control of the swath point clouds was performed to validate proper function of the sensor systems, full coverage of the project AOI, and point density consistent with the planned nominal pulse spacing.

Swath point clouds were assigned a unique File Source ID within the LAS file format before further processing. Swath files for the G15PD00057, South Terrebonne and Gulf Islands QL2 LiDAR project were numbered in chronological order of acquisition.

## 4.2 Geometric Calibration

Geometric and positional accuracy of the LiDAR swath point clouds is highly dependent on accurate calibration of the various subsystems within the LiDAR sensor system. Sensor calibration parameters fall into two categories, one being those parameters proprietary to the manufacturer's sensor design, and the other being parameters common to most commercial airborne LiDAR sensors, the IMU to laser reference system alignment angles (bore-site), and mirror deformation constants (scaling).

The manufacturer specific calibration parameters are applied in Leica's ALSPP software for the ALS70 sensor system. Terrasolid's Terramatch software was used to calculate the IMU bore-site and mirror scale parameters for the G15PD00057, South Terrebonne and Gulf Islands QL2 LiDAR. Within the TerraMatch software, the Tie- line workflow was used to solve for the parameters. The Tie-line workflow involves automated selection of numerous 'tie-lines', which represent a linear segment fit to the data that should have the same slope, azimuth, position and elevation, within the overlap sections of the survey lines and control lines. The tie- lines provide observations for algorithms within TerraMatch to solve for the bore-site and mirror scale parameters for the lift.

The Tie-line workflow is dependent upon well distributed tie-lines throughout the swath point clouds to effectively solve for bore-site and mirror scale parameters with the automated algorithms.

survey and control lines. Manual estimation of the bore-site and mirror scale parameters was performed using the observed tie-lines in overlap areas.

The final step of geometric calibration is to determine elevation (z) offset corrections to be applied to the swath point clouds. Z values calculated during the course of the acquisition mission can vary at the centimeter level as the GPS satellite constellation observed in the survey area changes with satellites moving through their orbits over the course of the mission. Baseline length from the ground base station GPS to the airborne GPS can also impact the z values calculated for the swath point clouds. Z offset corrections are calculated in two steps; a relative step, where individual lines are corrected one to another using the adjusted tie-lines from the bore-site and mirror scale calculation step; and an absolute step, where groups of lines are leveled to project ground control.

For the G15PD00057, South Terrebonne and Gulf Islands QL2 LiDAR project, the control lines were used to determine relative z offset corrections in areas of discernible ground. The base station operated by DAS in the survey area provided for minimal baseline lengths, resulting in generally good z agreement between the survey lines and control lines.

The final geometrically calibrated swath point clouds were compared to the bare-earth profile survey data. The data fit the profile surveys within the vertical accuracy tolerance specified for the project. Full documentation of the vertical accuracy checks maybe found in section 5.1.

## 4.3 Point Cloud Classification

Georeference information was applied to the swath point could LAS files. Geometrically calibrated swath point clouds were cut into USNG index, 1500 meter x 1500 meter LAS 1.2 format tiles for point cloud classification and derived product creation.

Tiled point cloud data was processed in Terrasolid's Terrascan software to assign initial classification values. The Terrascan software provides a number of routines to algorithmically detect and assign points to their appropriate class. Points left unclassified by the algorithmic routine remain as Class 1 – Processed, but unclassified. Automated classification routines assigned points to one of the following classes:

```
Code 1 – Processed, but unclassified
Code 2 – Bare-earth ground
Code 3 – Low/medium vegetation (3 meters or less)
Code 7 – Noise (low or high, manually identified, if needed
Code 9 – Water
Code 10 – Ignored Ground (Breakline Proximity)
```

Automated classification results were reviewed for each tiled point cloud, and manual edits made where necessary to correct for misclassified points. Points remaining in Class 1 after the automated classification routines were run were left in Class 1. Points falling outside of a 100 meter buffer of the project AOI polygon were excluded from the tiled point clouds.

## 4.4 Breakline Collection

Manual breakline collection was performed to support the hydro-flattening requirements of the project's DEM deliverables. Breaklines were collected directly from the classified point clouds and from triangulated irregular network (TIN) surface models built from the classified point clouds, in Terrasolids's Terrascan and Terramodeler software. Breakline features were collected as design file elements in Bentley's Microstation software. Breaklines were converted to ESRI 3D shapefile format for the breakline deliverable, and tiled to USNG index.

The data collected for the G15PD00057, South Terrebonne and Gulf Islands QL2 LiDAR survey maintained significant point density in the water, marsh, and swamp, limiting the usefulness of point density as guiding factor in breakline placement.

Points classified as Class 2 – Bare-earth ground, falling within a one meter buffer of the collected breaklines, were reassigned to Class 10 – Ignored Ground. These points are excluded from the surface model during DEM generation to preserve the hydro-flattening characteristics of the breaklines.

## 4.5 DEM Generation

The final classified point clouds and collected breaklines were reviewed for completeness and conformance to the task order scope of work. Within the Terramodeler software, points in Class 2 – Bare-earth ground and the breaklines were combined to generate TIN elevation models for each tile, from which the bare-earth DEM tiles were interpolated and exported as 32 bit raster TIF format.

# 5 Quality Control

## 5.1 Point Clouds

Accuracy and completeness of the LiDAR point clouds directly impacts the quality of all other derived LiDAR derived products. Ensuring a quality LiDAR dataset begins with proper mission planning and execution. Ground GPS base stations are located such that GPS baselines between the ground and airborne receivers do not exceed 30km. For the G15PD00057, South Terrebonne and Gulf Islands QL2 LiDAR project, two base stations were run to meet this requirement, one at the field operations airport and one within the survey area. Static alignment is performed both before take-off and after landing to allow for GPS integer ambiguity resolution. Sensor operators carefully monitor the LiDAR unit and its various subsystems during the acquisition mission to ensure proper function. Airborne GPS positional dilution of precision (PDOP) estimates are monitored to ensure they remain less than 3.The optical system is monitored to ensure there are no ranging errors encountered during the flight lines.

During acquisition post-processing estimates of the trajectory data accuracy are reviewed to ensure they will support the required accuracies of the point cloud data. The trajectory accuracy is a function of the differentially corrected GPS data and the IMU data.

The raw swath point clouds generated from ALSPP are reviewed as another check for proper sensor function. The point clouds are reviewed for full coverage of the AOI, required point density and nominal pulse spacing, clustering, proper intensity values, full swath coverage within the planned field of view, and planned survey line overlap.

Geometric calibration quality control validates that the positional accuracy requirements of the project are met, and includes relative accuracy assessments for intra-swath (within) and inter-swath (between) accuracy, along with absolute accuracy assessments against project ground control.

Relative vertical accuracy assessments are normally made using the tie-lines generated in the Terramatch software, as these lines provide positional observations throughout the extent of individual swaths, and between neighboring swaths.

There is not a systematic method of testing when testing horizontal accuracy in LiDAR. The estimated Horizontal accuracy at one sigma based on the flying height for the project, is between 10cm and 20cm according to manufacturer specifications.

Absolute vertical accuracy assessments for the point cloud data are made against ground check point data. For the G15PD00057, South Terrebonne and Gulf Islands QL2 LiDAR, ground check point data consisted of the ground GPS base station, and real-time kinematic (RTK) GPS techniques.

Check point locations were collected at 1 – second intervals during the RTK survey. Points collected during the static pre-initialization and post-initialization were removed from the assessment so as not to bias the assessment.

Local TIN models of the elevation points are built around each ground check points. The tin model elevation is sampled at the horizontal position of the ground check point. The TIN model elevation and ground check point survey elevation values were used to calculate the fundamental vertical accuracy (FVA) of the swath point clouds. The FVA of the TIN tested RMSEz 0.078 meters and 0.152 meters at the 95% confidence level in open terrain. FVA of the DEM tested at an RMSEz of 0.078 meters and 0.154 meters at the 95% confidence level in open terrain. The full calculations for all check points can be found in Appendix B.

FVA of TIN

| | | |
|---|---|---|
| $RMSE_Z$ = | 0.078 | meters |
| NSSDA= | 0.152 | meters |

FVA of DEM

| | | |
|---|---|---|
| $RMSE_Z$ = | 0.078 | meters |
| NSSDA= | 0.154 | meters |

The tiled point cloud products were reviewed for full coverage of the AOI and proper classification. As part of the QC process, TINs are built in the Terramodeler software for each tile using the ground class and the hydro-flattening breaklines. The TINs are reviewed for non-ground features, and edited where necessary to remove any remaining non-ground features. Points were also reviewed for absolute elevation, and points falling below the selected orthometric elevation for water were removed from the ground class.

## 5.2 Breaklines

The final breaklines in ESRI 3D shapefile format were reviewed for topological consistency and correct elevation. Breaklines features are continuous and do not have overlaps or dangles.

## 5.3 Digital Elevation Models

Digital elevation models (DEMs) were reviewed for conformance with the SOW and the Base Mapping Specification version 1.2 guidelines. DEM files were loaded in the Global Mapper software and inspected visually for edge matching between tiles, void areas within the project AOI, and proper coding of the NODATA values. DEM file naming was verified for consistency with the USNG index.

# Appendix A. Flight Logs

# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 1/27/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 754.1 | | | | | | 165 | | | | | MWAZ | |
| **Hobbs ST** | 751.0 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 3.1 | | **B** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KPTN (Patterson, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | **remaining Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **B** | | | | | | 6,500 | | | 593 | | | | |
| | 1 | 33 | 150127_042925 | 4:47 | 4:41 | | 180 | 165 | 584 | 18 | 1.1 | 0.7 | |
| | 2 | 32 | 150127_044715 | 5:05 | 5:00 | | 0 | 146 | 574 | 16 | 1.3 | 0.7 | |
| | 3 | 31 | 150127_050542 | 5:23 | 5:17 | | 180 | 165 | 565 | 16 | 1.2 | 0.7 | |
| | 4 | 30 | 150127_052318 | 5:41 | 5:36 | | 0 | 148 | 555 | 17 | 1.1 | 0.7 | |
| | 5 | 29 | 150127_054116 | 5:58 | 5:53 | | 180 | 164 | 547 | 14 | 1.7 | 0.9 | |
| | 6 | 28 | 150127_055829 | 6:16 | 6:11 | | 0 | 149 | 537 | 15 | 1.3 | 0.7 | |
| | 7 | 27 | 150127_061635 | 6:33 | 6:27 | | 180 | 165 | 529 | 17 | 1.1 | 0.7 | |
| | 8 | 26 | 150127_063302 | 6:50 | 6:45 | | 0 | 148 | 520 | 17 | 1.2 | 0.7 | |
| | 9 | X01 | 150127_065039 | 7:00 | 6:54 | | 92 | 165 | 518 | 17 | 1.2 | 0.7 | **Cross Strip** |
| | 10 | X02 | 150127_070024 | 4:32 | 7:03 | | 270 | 165 | 515 | 16 | 1.3 | 0.7 | **Cross Strip** |
| | 11 | | | | | | | | | | | | |
| | 12 | | | | | | | | | | | | |
| | 13 | | | | | | | | | | | | |
| | 14 | | | | | | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | 16 | | | | | | | | | | | | |
| | 17 | | | | | | | | | | | | |
| | 18 | | | | | | | | | | | | |
| | 19 | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 21 | | | | | | | | | | | | |
| | 22 | | | | | | | | | | | | |
| | 23 | | | | | | | | | | | | |
| | 24 | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 2/13/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | | | | | | | 165 | | | | TEMP | SVEN | |
| **Hobbs ST** | | | LIFT | | | | **TAR ALT AGL (ft):** | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** | |
| **Flight Time** | 0.0 | | **D** | | | | 6,500 | TerreBonne | | 1.500 | 421C 13RF | KHUM(Houma, LA) | |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude:** | **Direction** | **Speed:** | | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | **ASL:** | | **kts:** | **Memory** | | **PDOP** | **HDOP** | |
| **D** | | | | | | 6,500 | | | 266 | | | | |
| | 1 | 162 | 150213_154657 | 15:46 | 15:49 | | 235 | 166 | 264 | 17 | 1.2 | 0.6 | |
| | 2 | 163 | 150213_155910 | 15:59 | 16:01 | | 055 | 165 | 263 | 17 | 1.2 | 0.6 | |
| | 3 | 164 | 150213_155346 | 15:53 | 15:56 | | 235 | 165 | 261 | 16 | 1.4 | 0.7 | |
| | 4 | 165 | 150213_160638 | 16:06 | 16:08 | | 55 | 165 | 260 | 16 | 1.5 | 0.7 | |
| | 5 | X10 | 150213_161150 | 16:11 | 16:13 | | 322 | 161 | 260 | 16 | 1.5 | 0.7 | **Cross Strip** |
| | 6 | UL001 | 150210_161700 | 16:17 | 16:18 | | 127 | 164 | 259 | 17 | 1.3 | 0.6 | **Cross Strip** |

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# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 2/13/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | | | | | | | 165 | | | | TEMP | SVEN | |
| **Hobbs ST** | | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 0.0 | | **B** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KHUM(Houma, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude:** | **Direction** | **Speed:** | | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | **ASL:** | | **kts:** | **Memory** | | **PDOP** | **HDOP** | |
| **B** | | | | | | 6,500 | | | | | | | |
| | 1 | UL001 | 150213_113757 | 11:38 | 11:39 | | 270 | 147 | 310 | 15 | 1.5 | 0.8 | **Cross Strip** |
| | 2 | 125 | 150213_121426 | 12:14 | 12:15 | | 0 | 153 | 298 | 16 | 1.2 | 0.7 | |
| | 3 | 124 | 150213_121917 | 12:19 | 12:21 | | 180 | 163 | 297 | 16 | 1.2 | 0.7 | |
| | 4 | 123 | 150213_122425 | 12:24 | 12:27 | | 0 | 155 | 295 | 16 | 1.2 | 0.7 | |
| | 5 | 122 | 150213_123103 | 12:31 | 12:34 | | 180 | 165 | 292 | 15 | 1.4 | 0.8 | |
| | 6 | 121 | 150213_123727 | 12:37 | 12:42 | | 0 | 153 | 289 | 15 | 1.3 | 0.7 | |
| | 7 | 120 | 150213_124527 | 12:45 | 12:50 | | 180 | 165 | 286 | 15 | 1.3 | 0.7 | |
| | | | | | | | | | | | | | **Crash on 119 restart Line in Air** |
| **C** | 1 | 119 | 150213_125346 | 12:45 | 12:59 | | 180 | 164 | 280 | 14 | 1.3 | 0.8 | |
| | 2 | 118 | 150213_133029 | 12:53 | 13:36 | | 0 | 156 | 276 | 14 | 1.3 | 0.8 | |
| | 3 | 117 | 150213_134001 | 13:30 | 13:46 | | 180 | 164 | 271 | 14 | 1.3 | 0.8 | |
| | 4 | 116 | 150213_134856 | 13:40 | 13:56 | | 0 | 153 | 267 | 14 | 1.4 | 0.8 | |
| | 5 | X03 | 150213_140123 | 5:35 | 14:02 | | 270 | 154 | 266 | 16 | 1.2 | 0.7 | **Cross Strip** |

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# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 2/13/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 808.7 | | | | | | 165 | | | | TEMP | SVEN | |
| **Hobbs ST** | 804.4 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 4.3 | | **A** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KGPT (Gulfport, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | **remaining Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **A** | | | | | | 6,500 | | | 379 | | | | |
| | 1 | 170 | 150213_045311 | 4:53 | 5:00 | | 98 | 163 | 375 | 16 | 1.1 | 0.7 | |
| | 2 | 171 | 150213_050506 | 5:05 | 5:06 | | 278 | 154 | 373 | 16 | 1.2 | 0.7 | |
| | 3 | X08 | 150213_051108 | 5:11 | 5:12 | | 05 | 165 | 373 | 16 | 1.2 | 0.7 | **Cross strip** |
| | 4 | 166 | 150213_051656 | 5:16 | 5:24 | | 278 | 155 | 369 | 16 | 1.2 | 0.7 | |
| | 5 | X09 | 150213_052835 | 5:28 | 5:30 | | 226 | 158 | 368 | 16 | 1.2 | 0.7 | **Cross strip** |
| | 6 | 169 | 150213_053402 | 5:34 | 5:41 | | 98 | 167 | 363 | 17 | 1.2 | 0.7 | |
| | 7 | 168 | 150213_054602 | 5:46 | 5:54 | | 278 | 153 | 358 | 17 | 1.2 | 0.7 | |
| | 8 | 167 | 150213_055751 | 5:57 | 6:05 | | 98 | 164 | 353 | 16 | 1.3 | 0.7 | |
| | 9 | X07 | 150213_060855 | 6:08 | 6:10 | | 01 | 166 | 352 | 18 | 1.1 | 0.6 | **Cross strip** |
| | 10 | 180 | 150213_061417 | 6:14 | 6:19 | | 90 | 166 | 349 | 19 | 1.0 | 0.6 | |
| | 11 | 179 | 150213_062311 | 6:23 | 6:29 | | 270 | 153 | 346 | 17 | 1.1 | 0.6 | |
| | 12 | 178 | 150213_063224 | 6:32 | 6:37 | | 90 | 165 | 342 | 18 | 1.1 | 0.6 | |
| | 13 | 177 | 150213_064214 | 6:42 | 6:48 | | 270 | 151 | 338 | 18 | 1.1 | 0.6 | |
| | 14 | 176 | 150213_065229 | 6:52 | 6:56 | | 90 | 166 | 336 | 18 | 1.1 | 0.6 | |
| | 15 | 175 | 150213_070034 | 7:00 | 7:04 | | 270 | 151 | 333 | 18 | 1.1 | 0.6 | |
| | 16 | 174 | 150213_070809 | 7:08 | 7:10 | | 90 | 165 | 332 | 18 | 1.2 | 0.6 | |
| | 17 | 173 | 150213_071357 | 7:13 | 7:15 | | 270 | 150 | 331 | 17 | 1.3 | 0.6 | |
| | 18 | 172 | 150213_071810 | 7:18 | 7:19 | | 90 | 164 | 330 | 17 | 0.1 | 0.6 | |
| | 19 | X06 | 150213_072350 | 7:23 | 7:25 | | 160 | 166 | 329 | 17 | 0.1 | 0.6 | **Cross strip** |
| | 20 | 159 | 150213_074421 | 7:44 | 7:49 | | 246 | 145 | 326 | 19 | 1.1 | 0.6 | |
| | 21 | 158 | 150213_075204 | 7:52 | 7:56 | | 96 | 167 | 323 | 18 | 1.3 | 0.6 | |
| | 22 | 157 | 150213_080030 | 8:00 | 8:06 | | 276 | 144 | 320 | 17 | 1.4 | 0.6 | |
| | 23 | 156 | 150213_081010 | 8:10 | 8:14 | | 96 | 166 | 317 | 18 | 1.2 | 0.6 | |
| | 24 | 161 | 150213_084111 | 8:41 | 8:44 | | 235 | 145 | 316 | 19 | 1.1 | 0.6 | |
| | 25 | 160 | 150213_083548 | 8:35 | 8:36 | | 276 | 13 | 315 | 18 | 1.4 | 0.6 | |
| | 26 | X11 | 150213_082542 | 8:25 | 8:27 | | 31 | 167 | 314 | 18 | 1.4 | 0.6 | **Cross strip** |

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# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 2/12/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 804.4 | | | | | | 165 | | | | TEMP | SVEN | |
| **Hobbs ST** | 800.2 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 4.2 | | **A** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KHUM(Houma, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | **Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **A** | | | | | | 6,500 | | | 445 | | | | |
| | 1 | 136 | 150212_120131 | 12:01 | 12:05 | | 197 | 162 | 443 | 15 | 1.2 | 0.7 | |
| | 2 | 137 | 150212_120904 | 12:09 | 12:14 | | 17 | 162 | 440 | 14 | 1.5 | 0.8 | |
| | 3 | 143 | 150212_121713 | 12:17 | 12:21 | | 197 | 165 | 437 | 16 | 1.3 | 0.7 | |
| | 4 | 142 | 150212_122425 | 12:24 | 12:29 | | 17 | 165 | 435 | 15 | 1.6 | 0.8 | |
| | 5 | 141 | 150212_123231 | 12:32 | 12:37 | | 197 | 165 | 431 | 15 | 1.6 | 0.8 | |
| | 6 | 140 | 150212_124101 | 12:41 | 12:46 | | 17 | 164 | 428 | 15 | 1.4 | 0.8 | |
| | 7 | 139 | 150212_125006 | 12:50 | 12:54 | | 198 | 165 | 425 | 15 | 1.4 | 0.8 | |
| | 8 | 138 | 150212_125856 | 12:58 | 13:04 | | 17 | 165 | 421 | 15 | 1.4 | 0.8 | |
| | 9 | X13 | 150212_131017 | 13:10 | 13:11 | | 106 | 168 | 420 | 14 | 1.3 | 0.8 | **Cross Strip** |
| | 10 | UL001 | 150212_131438 | 13:14 | 13:16 | | 254 | 135 | 420 | 15 | 1.2 | 0.7 | **Cross Strip** |
| | 11 | X14 | 150212_131804 | 13:18 | 13:19 | | 198 | 164 | 419 | 15 | 1.2 | 0.7 | **Cross Strip** |
| | 12 | 150 | 150212_132319 | 13:23 | 13:24 | | 288 | 143 | 418 | 14 | 1.4 | 0.8 | |
| | 13 | 151 | 150212_132808 | 13:28 | 13:29 | | 108 | 165 | 418 | 14 | 1.4 | 0.8 | |
| | 14 | 152 | 150212_133319 | 13:33 | 13:34 | | 288 | 143 | 417 | 14 | 1.3 | 0.8 | |
| | 15 | 133 | 150212_134109 | 13:41 | 13:46 | | 224 | 163 | 414 | 14 | 1.3 | 0.8 | |
| | 16 | 135 | 150212_135039 | 13:50 | 13:51 | | 45 | 167 | 413 | 14 | 1.3 | 0.8 | |
| | 17 | 134 | 150212_135505 | 13:55 | 13:56 | | 225 | 162 | 412 | 14 | 1.3 | 0.8 | |
| | 18 | 132 | 150212_140031 | 14:00 | 14:06 | | 45 | 165 | 409 | 15 | 1.4 | 0.8 | |
| | 19 | 131 | 150212_140952 | 14:09 | 14:15 | | 225 | 165 | 406 | 16 | 1.2 | 0.7 | |
| | 20 | 130 | 150212_142047 | 14:20 | 14:28 | | 45 | 162 | 401 | 16 | 1.1 | 0.6 | |
| | 21 | 129 | 150212_143213 | 14:32 | 14:40 | | 225 | 165 | 396 | 16 | 1.2 | 0.7 | |
| | 22 | 128 | 150212_144337 | 14:43 | 14:51 | | 45 | 165 | 392 | 16 | 1.3 | 0.7 | |
| | 23 | 127 | 150212_145454 | 14:54 | 15:02 | | 225 | 163 | 387 | 17 | 1.2 | 0.7 | |
| | 24 | 126 | 150212_150638 | 15:06 | 15:14 | | 45 | 165 | 383 | 17 | 1.1 | 0.6 | |
| | 25 | X15 | 150212_151845 | 15:18 | 15:20 | | 133 | 165 | 382 | 18 | 1.1 | 0.6 | **Cross Strip** |
| | 26 | X16 | 150212_152619 | 15:26 | 15:28 | | 310 | 151 | 380 | 18 | 1.1 | 0.6 | **Cross Strip** |

# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 2/11/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 2800.2 | | | | | | 165 | | | | TEMP | SVEN | |
| **Hobbs ST** | 2798.9 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 1.3 | | **A** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KHUM(Houma, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | **remaining Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **A** | | | | | | 6,500 | | | 459 | | | | |
| | 1 | 144 | | 6:42 | 6:43 | | 165 | 164 | 458 | 18 | 1.1 | 0.6 | |
| | 2 | 145 | | 6:50 | 6:53 | | 345 | 160 | 455 | 18 | 1.1 | 0.6 | |
| | 3 | 146 | | 6:57 | 7:00 | | 165 | 163 | 454 | 18 | 1.1 | 0.6 | |
| | 4 | 147 | | 7:04 | 7:08 | | 345 | 157 | 451 | 18 | 1.2 | 0.6 | |
| | 5 | 148 | | 7:12 | 7:15 | | 165 | 163 | 449 | 17 | 1.2 | 0.6 | |
| | 6 | 149 | | 7:20 | 7:24 | | 345 | 157 | 447 | 18 | 1.2 | 0.6 | |
| | 7 | X12 | | 7:28 | 7:29 | | 258 | 163 | 446 | 17 | 1.3 | 0.6 | **Cross Strip** |
| | 8 | | | | | | | | | | | | |
| | 9 | | | | | | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | 11 | | | | | | | | | | | | |
| | 12 | | | | | | | | | | | | |
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DAS Digital Aerial Solutions

# ALS80 LiDAR Flight Log

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 2/9/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 798.2 | | | | | | 165 | | | | TEMP | SVEN | |
| **Hobbs ST** | 796.1 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 2.1 | | **A** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KHUM(Houma, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | **remaining Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **A** | | | | | | 6,500 | | | 490 | | | | |
| | 1 | 116 | | 4:02 | 4:09 | | 180 | 163 | 486 | 16 | 1,3 | 0.7 | **Reflown On 02/13/2015 Do to Tide** |
| | 2 | 117 | | 4:13 | 4:20 | | 0 | 150 | 482 | 16 | 1.2 | 0.7 | Reflown On 02/13/2015 Do to Tide |
| | 3 | 118 | | 4:23 | 4:29 | | 180 | 164 | 478 | 16 | 1.2 | 0.7 | **Reflown On 02/13/2015 Do to Tide** |
| | 4 | 119 | | 4:33 | 4:39 | | 0 | 153 | 475 | 16 | 1.2 | 0.7 | **Reflown On 02/13/2015 Do to Tide** |
| | 5 | 120 | | 4:42 | 4:47 | | 180 | 165 | 472 | 14 | 1.8 | 0.9 | **Reflown On 02/13/2015 Do to Tide** |
| | 6 | 121 | | 4:51 | 4:55 | | 0 | 154 | 469 | 15 | 1.4 | 0.8 | **Reflown On 02/13/2015 Do to Tide** |
| | 7 | 122 | | 4:59 | 5:03 | | 180 | 163 | 467 | 15 | 1.4 | 0.8 | **Reflown On 02/13/2015 Do to Tide** |
| | 8 | 123 | | 5:07 | 5:10 | | 0 | 155 | 465 | 17 | 1.3 | 0.7 | **Reflown On 02/13/2015 Do to Tide** |
| | 9 | 124 | | 5:14 | 5:16 | | 180 | 165 | 463 | 17 | 1.2 | 0.7 | **Reflown On 02/13/2015 Do to Tide** |
| | 10 | 125 | | 5:20 | 5:21 | | 0 | 165 | 461 | 17 | 1.2 | 0.7 | **Reflown On 02/13/2015 Do to Tide** |
| | 11 | X03 | | 5:26 | 5:27 | | 270 | 164 | 461 | 16 | 1.2 | 0.7 | **Reflown On 02/13/2015 Do to Tide** |
| | 12 | UL001 | | 5:29 | 5:31 | | 90 | 165 | 460 | 16 | 1.2 | 0.7 | **Reflown On 02/13/2015 Do to Tide** |
| | 13 | X04 | | 5:35 | 5:37 | | 250 | 163 | 459 | 17 | 1.3 | 0.7 | **Reflown On 02/13/2015 Do to Tide** |
| | | | | | | | | | | | | | |
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DAS Digital Aerial Solutions

# ALS80 LiDAR Flight Log

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 2/6/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 787.9 | | | | | | 165 | | | | TEMP | SVEN | |
| **Hobbs ST** | 783.4 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 4.5 | | **A** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KHUM(Houma, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | **remaining Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **A** | | | | | | 6,500 | | | 745 | | | | |
| | 1 | 93 | 150206_122720 | 12:27 | 12:39 | | 180 | 165 | 737 | 14 | 1.5 | 0.8 | |
| | 2 | 94 | 150206_124251 | 12:42 | 12:54 | | 0 | 165 | 730 | 16 | 1.2 | 0.7 | |
| | 3 | 95 | 150206_125816 | 12:58 | 13:09 | | 180 | 165 | 722 | 15 | 1.4 | 0.7 | |
| | 4 | 96 | 150206_131346 | 13:13 | 13:25 | | 0 | 160 | 715 | 15 | 1.3 | 0.8 | |
| | 5 | 97 | 150206_132856 | 13:29 | 13:40 | | 180 | 163 | 708 | 15 | 1.3 | 0.8 | |
| | 6 | 98 | 150206_134425 | 13:44 | 13:55 | | 0 | 166 | 700 | 15 | 1.1 | 0.7 | |
| | 7 | 99 | 150206_135926 | 13:59 | 14:10 | | 180 | 163 | 693 | 15 | 1.3 | 0.8 | |
| | 8 | 100 | 150206_141434 | 14:14 | 14:25 | | 0 | 164 | 686 | 14 | 1.3 | 0.8 | |
| | 9 | 101 | 150206_142926 | 14:29 | 14:40 | | 180 | 165 | 679 | 16 | 1.2 | 0.7 | |
| | 10 | 102 | 150206_144419 | 14:44 | 14:55 | | 0 | 166 | 672 | 15 | 1.2 | 0.7 | |
| | 11 | 103 | 150206_145846 | 14:58 | 15:09 | | 180 | 165 | 665 | 16 | 1.2 | 0.7 | |
| | 12 | 104 | 150206_151428 | 15:18 | 15:24 | | 0 | 165 | 659 | 15 | 1.4 | 0.7 | |
| | 13 | 105 | 150206_152806 | 15:28 | 15:38 | | 180 | 165 | 652 | 17 | 1.1 | 0.6 | |
| | 14 | 106 | 150206_154209 | 15:42 | 15:52 | | 0 | 165 | 646 | 18 | 1.1 | 0.6 | |
| | 15 | 107 | 150206_155538 | 15:55 | 16:05 | | 180 | 165 | 640 | 18 | 1.1 | 0.6 | |
| | 16 | X03 | 150206_161314 | 16:13 | 16:17 | | 270 | 167 | 637 | 17 | 1.1 | 0.6 | **Cross Strip** |
| | 17 | X02 | 150206_162253 | 16:22 | 16:27 | | 90 | 164 | 635 | 16 | 1.3 | 0.6 | **Cross Strip** |
| | | | | | | | | | | | | | |
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# ALS80 LiDAR Flight Log

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 1/31/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | **Base PID:** | | **Pilot/s** | |
| **Hobbs End** | 776.4 | | | | | | 165 | | | AU3275 | | SVEN | |
| **Hobbs ST** | 772.7 | | LIFT | | | | **TAR ALT AGL (ft):** | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** | |
| **Flight Time** | 3.7 | | **B** | | | | 6,500 | TerreBonne | | 1.500 | 421C 13RF | KPTN (Petterson, LA) | |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | remaining **Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **B** | | | | | | 6,500 | | | 745 | | | | |
| | 1 | 82 | 150131_131549 | 12:27 | 12:39 | | 180 | 165 | 737 | 14 | 1.5 | 0.8 | |
| | 2 | 83 | 150131_133340 | 12:42 | 12:54 | | 0 | 165 | 730 | 16 | 1.2 | 0.7 | |
| | 3 | 84 | 150131_134815 | 12:58 | 13:09 | | 180 | 165 | 722 | 15 | 1.4 | 0.7 | |
| | 4 | 85 | 150131_140243 | 13:13 | 13:25 | | 0 | 160 | 715 | 15 | 1.3 | 0.8 | |
| | 5 | 86 | 150131_141655 | 13:29 | 13:40 | | 180 | 163 | 708 | 15 | 1.3 | 0.8 | |
| | 6 | 87 | 150131_143102 | 13:44 | 13:55 | | 0 | 166 | 700 | 15 | 1.1 | 0.7 | |
| | 7 | 88 | 150131_144528 | 13:59 | 14:10 | | 180 | 163 | 693 | 15 | 1.3 | 0.8 | |
| | 8 | 89 | 150131_150153 | 14:14 | 14:25 | | 0 | 164 | 686 | 14 | 1.3 | 0.8 | |
| | 9 | 90 | 150131_151720 | 14:29 | 14:40 | | 180 | 165 | 679 | 16 | 1.2 | 0.7 | |
| | 10 | 91 | 150131_153240 | 14:44 | 14:55 | | 0 | 166 | 672 | 15 | 1.2 | 0.7 | |
| | 11 | 92 | 150131_154759 | 14:58 | 15:09 | | 180 | 165 | 665 | 16 | 1.2 | 0.7 | |
| | 12 | X03 | 150131_160758 | 16:13 | 16:17 | | 270 | 167 | 637 | 17 | 1.1 | 0.6 | **Cross Strip** |
| | 13 | X02 | 150131_161650 | 16:22 | 16:27 | | 90 | 164 | 635 | 16 | 1.3 | 0.6 | **Cross Strip** |

# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 1/31/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 2772.7 | | | | | | 165 | | | | AU3275 | SVEN | |
| **Hobbs ST** | 2768.5 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 4.2 | | **A** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KPTN (Petterson, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | **remaining Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **A** | | | | | | 6,500 | | | | | | | |
| | 1 | 66 | 150131_072609 | 7:26 | 7:41 | | 180 | 164 | 687 | 18 | 1.1 | 0.6 | |
| | 2 | 67 | 150131_074527 | 7:45 | 8:00 | | 0 | 163 | 676 | 18 | 1.2 | 0.6 | |
| | 3 | 68 | 150131_080544 | 8:05 | 8:21 | | 180 | 165 | 3665 | 18 | 1.2 | 0.6 | |
| | 4 | 75 | 150131_082521 | 8:25 | 8:40 | | 0 | 165 | 646 | 18 | 1.1 | 0.6 | |
| | 5 | 76 | 150131_084345 | 8:43 | 8:58 | | 180 | 161 | 644 | 17 | 1.3 | 0.7 | |
| | 6 | 77 | 150131_090256 | 9:02 | 9:17 | | 0 | 166 | 634 | 18 | 1.2 | 0.6 | |
| | 7 | 78 | 150131_092205 | 9:22 | 9:36 | | 180 | 165 | 625 | 18 | 1.5 | 0.6 | |
| | 8 | X19 | 150131_094120 | 9:41 | 9:43 | | 270 | 165 | 615 | 18 | 1.6 | 0.6 | **Cross Strip** |
| | 9 | 79 | 150131_094949 | 9:49 | 10:02 | | 0 | 166 | 613 | 19 | 1.2 | 0.6 | |
| | 10 | 80 | 150131_100642 | 10:06 | 10:18 | | 180 | 163 | 605 | 18 | 1.2 | 0.6 | |
| | 11 | 81 | 150131_102438 | 10:24 | 10:38 | | 0 | 165 | 596 | 18 | 1.2 | 0.6 | |
| | 12 | X01 | 150131_104247 | 10:42 | 10:46 | | 166 | 166 | 587 | 20 | 1.0 | 0.6 | **Cross Strip** |
| | 13 | X02 | 150131_105259 | 10:52 | 10:56 | | 163 | 163 | 585 | 19 | 1.0 | 0.6 | **Cross Strip** |

# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 1/30/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 2768.5 | | | | | | 165 | | | | AU3275 | SVEN | |
| **Hobbs ST** | 2766.2 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 2.3 | | **A** | | | | 6,530 | | TerreBonne | | 1.500 | 421C 13RF | KPTN (Patterson, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | **remaining Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **A** | | | | | | | | | | | | | |
| | 1 | 62 | 150130_163355 | 16:33 | 16:48 | 6,515 | 180 | 167 | 739 | 17 | 1.2 | 0.6 | **Clear below 20k** |
| | 2 | 63 | 150130_165333 | 16:53 | 17:08 | 6,501 | 0 | 162 | 728 | 16 | 1.3 | 0.6 | **Clear thin smoke** |
| | 3 | 64 | 150130_171227 | 17:12 | 17:27 | 6,497 | 180 | 167 | 716 | 16 | 1.5 | 0.7 | |
| | 4 | 65 | 150130_173116 | 17:31 | 17:47 | 6,494 | 0 | 166 | 705 | 17 | 1.3 | 0.6 | |
| | 5 | X01 | 150130_175200 | 17:52 | 17:55 | 6,505 | 270 | 165 | 696 | 17 | 1.3 | 0.6 | **Cross Strip** |
| | 6 | X02 | 150130_180242 | 18:02 | 18:05 | 6,507 | 90 | 165 | 693 | 18 | 1.1 | 0.6 | **Cross Strip** |
| | 7 | X03 | 150130_181156 | 18:11 | 18:15 | 6,500 | 270 | 163 | 690 | 18 | 1.1 | 0.6 | **Cross Strip** |

# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 1/30/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 766.2 | | | | | | 165 | | | | AU3275 | SVEN | |
| **Hobbs ST** | 761.8 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 4.4 | | **A** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KPTN (Patterson, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude:** | **Direction** | **Speed:** | | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | **ASL:** | | **kts:** | **Memory** | | **PDOP** | **HDOP** | |
| **A** | | | | | | 6,500 | | | 330 | | | | |
| | 1 | 51 | 150130_104656 | 10:47 | 11:01 | | 180 | 165 | 320 | 19 | 1.0 | 0.6 | |
| | 2 | 52 | 150130_110532 | 11:05 | 11:21 | | 0 | 160 | 308 | 19 | 1.0 | 0.6 | |
| | 3 | 53 | 150130_112445 | 11:24 | 11:40 | | 180 | 168 | 297 | 18 | 1.0 | 0.6 | |
| | 4 | 54 | 150130_114401 | 11:44 | 12:00 | | 0 | 159 | 286 | 16 | 1.2 | 0.7 | |
| | 5 | 55 | 150130_120349 | 12:03 | 12:20 | | 180 | 163 | 294 | 16 | 1.1 | 0.6 | |
| | 6 | 56 | 150130_122337 | 12:23 | 12:40 | | 0 | 165 | 263 | 16 | 1.1 | 0.7 | |
| | 7 | 57 | 150130_124338 | 12:43 | 13:00 | | 180 | 165 | 251 | 15 | 1.2 | 0.7 | |
| | 8 | 58 | 150130_130344 | 13:03 | 13:20 | | 0 | 165 | 239 | 15 | 1.3 | 0.7 | |
| | 9 | 59 | 150130_132335 | 13:23 | 13:40 | | 180 | 165 | 228 | 15 | 1.5 | 0.7 | |
| | 10 | 60 | 150130_134324 | 13:43 | 13:59 | | 0 | 164 | 216 | 15 | 1.4 | 0.7 | |
| | 11 | 61 | 150213_114643 | 14:04 | 14:19 | | 180 | 166 | 203 | 15 | 1.3 | 0.7 | |
| | 12 | X03 | | 14:23 | 14:24 | | 275 | 165 | 203 | 14 | 1.3 | 0.7 | **Cross(System Error at end of line)** |
| | 13 | X02 | | 14:35 | 14:37 | | 90 | 160 | 203 | 14 | 1.3 | 0.7 | **Cross Strip** |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | **At the end of cross strip X03 , system displayed** |
| | | | | | | | | | | | | | **error stating that the shutter was left opened** |
| | | | | | | | | | | | | | |
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| | 1 | | | | | | | | | | | | |
| | 2 | | | | | | | | | | | | |
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# ALS80 LiDAR Flight Log

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 1/28/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 761.5 | | | | | | 165 | | | | | SVEN | |
| **Hobbs ST** | 758.4 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 3.1 | | **B** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude:** | **Direction** | **Speed:** | | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | **ASL:** | | **kts:** | **Memory** | | **PDOP** | **HDOP** | |
| **B** | | | | | | 6,500 | | | 404 | | | | |
| | 1 | 1 | 150128_095008 | 9:54 | 9:51 | | 180 | 164 | 40 | 18 | 1.5 | 0.6 | |
| | 2 | 2 | 150128_095448 | 9:59 | 9:55 | | 0 | | 402 | 18 | 1.5 | 0.6 | |
| | 3 | 3 | 150128_095926 | 10:03 | 10:00 | | 180 | 163 | 402 | 19 | 1.2 | 0.6 | |
| | 4 | 4 | 150128_100358 | 10:08 | 10:05 | | 0 | 162 | 401 | 19 | 1.2 | 0.6 | |
| | 5 | 5 | 150128_100838 | 10:13 | 10:04 | | 180 | 165 | 400 | 19 | 1.2 | 0.6 | |
| | 6 | 6 | 150128_101316 | 10:18 | 10:14 | | 0 | 164 | 399 | 18 | 1.3 | 0.6 | |
| | 7 | 7 | 150128_101819 | 10:23 | 10:20 | | 180 | 165 | 398 | 19 | 1.1 | 0.6 | |
| | 8 | 8 | 150128_102333 | 10:29 | 10:25 | | 0 | 160 | 397 | 18 | 1.2 | 0.6 | |
| | 9 | 9 | 150128_102932 | 10:36 | 10:32 | | 180 | 165 | 395 | 18 | 1.2 | 0.6 | |
| | 10 | X05 | 150128_103639 | 10:43 | 10:39 | | 314 | 158 | 393 | 18 | 1.1 | 0.6 | |
| | 11 | X03 | 150128_104331 | 10:55 | 10:45 | | 90 | 160 | 392 | 19 | 1.1 | 0.6 | |
| | 12 | 46 | 150128_105555 | 11:16 | 11:12 | | 0 | 165 | 380 | 19 | 1.0 | 0.6 | |
| | 13 | 47 | 150128_111614 | 11:36 | 11:32 | | 180 | 165 | 369 | 18 | 1.1 | 0.6 | |
| | 14 | 48 | 150128_113648 | 11:57 | 11:53 | | 0 | 165 | 357 | 18 | 1.1 | 0.6 | |
| | 15 | 49 | 150128_115701 | 12:17 | 12:13 | | 180 | 166 | 346 | 16 | 1.2 | 0.7 | |
| | 16 | 50 | 150128_121719 | 12:38 | 12:32 | | 0 | 165 | 334 | 17 | 1.1 | 0.6 | |
| | 17 | X01 | 150128_123830 | 12:46 | 12:39 | | 91 | 160 | 333 | 15 | 1.5 | 0.8 | **Cross Strip** |
| | 18 | X02 | 150128_124616 | 18:47 | 12:49 | | 270 | 166 | 330 | 15 | 1.5 | 0.8 | **Cross Strip** |
| | 19 | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 21 | | | | | | | | | | | | |
| | 22 | | | | | | | | | | | | |
| | 23 | | | | | | | | | | | | |
| | 24 | | | | | | | | | | | | |
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DAS
Digital Aerial Solutions

# ALS60 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS60** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 1/28/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 951.2 | | | | | | 165 | | | | | MWAZ | |
| **Hobbs ST** | 947.7 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 3.5 | | **B** | | | | 4,570 | | TerreBonne | | 1.500 | 421C 13RF | KPTN (Patterson, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude:** | **Direction** | **Speed:** | | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | **ASL:** | | **kts:** | **Memory** | | **PDOP** | **HDOP** | |
| **B** | | | | | | 4,570 | | | | | | | |
| | 1 | 137 | 150128_095758 | 9:57 | 10:15 | | 180 | 138 | 108 | 18 | 1.4 | 0.6 | |
| | 2 | 136 | 150128_101945 | 10:19 | 10:37 | | 0 | 139 | 102 | 19 | 1.1 | 0.6 | |
| | 3 | 135 | 150128_104131 | 10:41 | 10:59 | | 180 | 141 | 97 | 19 | 1.1 | 0.6 | |
| | 4 | 134 | 150128_110346 | 11:03 | 11:21 | | 0 | 143 | 92 | 19 | 1.0 | 0.6 | |
| | 5 | 133 | 150128_112529 | 11:25 | 11:43 | | 180 | 140 | 87 | 18 | 1.1 | 0.6 | |
| | 6 | X19 | 150128_114824 | 11:48 | 11:49 | | 90 | 131 | 81 | 14 | 1.3 | 0.7 | **Cross Strip** |
| | 7 | 132 | 150128_115626 | 11:56 | 12:14 | | 0 | 138 | 81 | 14 | 1.3 | 0.7 | |
| | 8 | X01 | 150128_121930 | 12:19 | 12:20 | | 270 | 141 | 76 | 17 | 1.1 | 0.6 | **Cross Strip** |
| | 9 | 131 | 150128_122726 | 12:27 | 12:45 | | 180 | 142 | 76 | 16 | 1.2 | 0.7 | |
| | 10 | | | | | | | | | | | | |
| | 11 | | | | | | | | | | | | |
| | 12 | | | | | | | | | | | | |
| | 13 | | | | | | | | | | | | |
| | 14 | | | | | | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | 16 | | | | | | | | | | | | |
| | 17 | | | | | | | | | | | | |
| | 18 | | | | | | | | | | | | |
| | 19 | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 21 | | | | | | | | | | | | |
| | 22 | | | | | | | | | | | | |
| | 23 | | | | | | | | | | | | |
| | 24 | | | | | | | | | | | | |
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DAS Digital Aerial Solutions

# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 1/28/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 758.4 | | | | | | 165 | | | | | SVEN | |
| **Hobbs ST** | 754.1 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 4.3 | | **A** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude:** | **Direction** | **Speed:** | | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | **ASL:** | | **kts:** | **Memory** | | **PDOP** | **HDOP** | |
| **A** | | | | | | 6,500 | | | 515 | | | | |
| | 1 | 25 | 150128_043237 | 4:46 | 4:43 | | 180 | 164 | 507 | 16 | 1.3 | 0.7 | |
| | 2 | 24 | 150128_044659 | 5:01 | 4:58 | | 0 | 159 | 500 | 16 | 1.3 | 0.7 | |
| | 3 | 23 | 150128_050116 | 5:15 | 5:12 | | 180 | 165 | 492 | 16 | 1.2 | 0.7 | |
| | 4 | 22 | 150128_051513 | 5:29 | 5:26 | | 0 | 160 | 485 | 16 | 1.2 | 0.7 | |
| | 5 | 21 | 150128_052939 | 5:44 | 5:40 | | 180 | 166 | 478 | 15 | 1.3 | 0.7 | |
| | 6 | 20 | 150128_054406 | 5:58 | 5:55 | | 0 | 163 | 470 | 16 | 1.2 | 0.7 | |
| | 7 | 19 | 150128_055858 | 6:13 | 6:10 | | 180 | 166 | 462 | 15 | 1.3 | 0.7 | |
| | 8 | 18 | 150128_061340 | 6:28 | 6:25 | | 0 | 164 | 454 | 17 | 1.1 | 0.7 | |
| | 9 | 17 | 150128_062839 | 6:43 | 6:39 | | 180 | 165 | 447 | 17 | 1.2 | 0.7 | |
| | 10 | 16 | 150128_064332 | 6:58 | 6:54 | | 0 | 165 | 439 | 17 | 1.2 | 0.7 | |
| | 11 | 15 | 150128_065829 | 7:13 | 7:09 | | 180 | 165 | 431 | 16 | 1.3 | 0.7 | |
| | 12 | 14 | 150128_071314 | 7:24 | 7:21 | | 0 | 165 | 426 | 17 | 1.1 | 0.6 | |
| | 13 | 13 | 150128_072459 | 7:35 | 7:32 | | 180 | 166 | 421 | 17 | 1.1 | 0.6 | |
| | 14 | 12 | 150128_073541 | 7:46 | 7:42 | | 0 | 165 | 417 | 18 | 1.1 | 0.6 | |
| | 15 | 11 | 150128_074614 | 7:56 | 7:53 | | 180 | 164 | 412 | 18 | 1.1 | 0.6 | |
| | 16 | 10 | 150128_075659 | 8:09 | 8:03 | | 0 | 165 | 408 | 18 | 1.1 | 0.6 | |
| | 17 | X02 | 150128_080905 | 8:19 | 8:12 | | 90 | 160 | 406 | 17 | 1.2 | 0.7 | **Cross Strip** |
| | 18 | X01 | 150128_081925 | 9:50 | 8:21 | | 270 | 165 | 404 | 16 | 1.3 | 0.7 | **Cross Strip** |
| | 19 | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 21 | | | | | | | | | | | | |
| | 22 | | | | | | | | | | | | |
| | 23 | | | | | | | | | | | | |
| | 24 | | | | | | | | | | | | |
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# ALS80 LiDAR Flight Log

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project** | **TerreBonne_LA_Lidar2015** | | | **ALS80** | SN | | | | | | | **Sensor Operator/s** | |
| | | | | | | | | | | - | | Bertin Evina-Ze | |
| **Date/Julian:** | 1/26/2015 | | | **Mem Drive MM70** | | | **TAR AIRSPD (KNTS)** | | | | **Base PID:** | **Pilot/s** | |
| **Hobbs End** | 751.0 | | | | | | 165 | | | | | SVEN | |
| **Hobbs ST** | 746.6 | | LIFT | | | | **TAR ALT AGL (ft):** | | **Flight Plan(s):** | | **Base Height:** | **Aircraft** | **Airport Idnt:** |
| **Flight Time** | 4.4 | | **A** | | | | 6,500 | | TerreBonne | | 1.500 | 421C 13RF | KPTN (Patterson, LA) |

| **Lift** | | **Flight Line** | **Mission Line** | **UTC time:** | | **GPS Altitude: ASL:** | **Direction** | **Speed: kts:** | **Memory** | **S/Vs:** | **Position Acc.** | | **Comments and Conditions:** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **B:** | **E:** | | | | | | **PDOP** | **HDOP** | |
| **A** | | | | | | | | | 724 | | | | |
| | 1 | 45 | 150126_035315 | 4:13 | 4:09 | 6,550 | 180 | 165 | 713 | 19 | 1.2 | 0.6 | |
| | 2 | 44 | 150126_041319 | 4:34 | 4:31 | | 0 | 156 | 700 | 19 | 1.2 | 0.6 | |
| | 3 | 43 | 150126_043410 | 4:55 | 4:50 | | 180 | 163 | 688 | 18 | 1.2 | 0.7 | |
| | 4 | 42 | 150126_045531 | 5:13 | 5:10 | | 0 | 159 | 678 | 16 | 1.3 | 0.7 | |
| | 5 | 41 | 150126_051308 | 5:29 | 5:27 | | 180 | 165 | 668 | 16 | 1.2 | 0.7 | |
| | 6 | 40 | 150126_052949 | 5:47 | 5:44 | | 0 | 155 | 658 | 16 | 1.1 | 0.7 | |
| | 7 | 39 | 150126_054700 | 6:04 | 6:00 | | 180 | 165 | 648 | 14 | 1.7 | 0.9 | |
| | 8 | 38 | 150126_060416 | 6:22 | 6:15 | | 0 | 155 | 637 | 15 | 1.3 | 0.7 | |
| | 9 | 37 | 150126_062209 | 6:39 | 6:35 | | 180 | 165 | 628 | 17 | 1.2 | 0.7 | |
| | 10 | 36 | 150126_063929 | 6:56 | 6:53 | | 0 | 153 | 615 | 17 | 1.2 | 0.7 | |
| | 11 | 35 | 150126_065637 | 7:12 | 7:09 | | 180 | 165 | 609 | 16 | 1.3 | 0.7 | |
| | 12 | 34 | 150126_071245 | 7:40 | 7:35 | | 0 | 156 | 599 | 17 | 1.1 | 0.6 | |
| | 13 | X01 | 150126_074054 | 7:30 | 7:45 | | 92 | 165 | 596 | 17 | 1.1 | 0.6 | **Cross Strip** |
| | 14 | X02 | 150126_073052 | 4:29 | 7:34 | | 270 | 144 | 593 | 19 | 1.0 | 0.6 | **Cross Strip** |
| | 15 | | | | | | | | | | | | |
| | 16 | | | | | | | | | | | | |
| | 17 | | | | | | | | | | | | |
| | 18 | | | | | | | | | | | | |
| | 19 | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
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# Appendix B. Vertical Accuracy Calculations

## Project Information

Prepared By: Kenneth L. Coffey
Project Name: South Terrebonne and Gulf Islands, LA
Sensor Info: ALS80 & ALS60
Required Nominal Pulse Spacing: 0.7
Vendor Name: Digital Aerial Solutions .LLC
Units: Meters
Percent of Extent Tolerance: Extents Not Checked
Date of Aquisition: Start: 1/26/2015 Finish: 2/13/2015

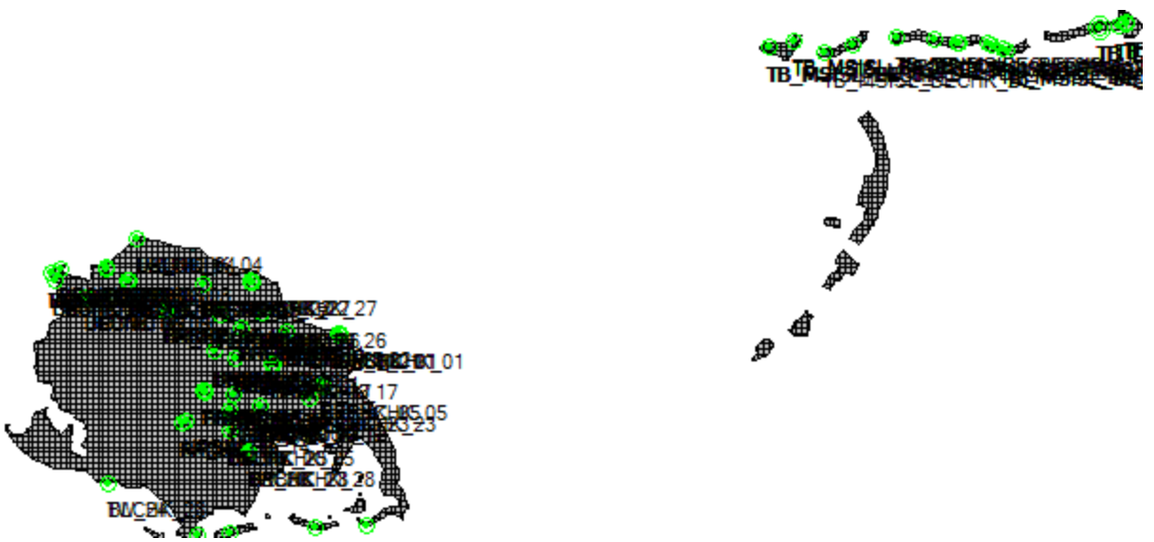
## Metadata Information

Tile Index:
Path: Z:\Accuracy_Reports\LiDAR_Terrebonne\Index\S_Terrebonne_Gulf_Islands_TileGrid_BufferMod.shp
Number of Polys: 0
Intensity:
Tile Index Attribute: Not Specified
Path to Data: Not Specified

DEM:
Tile Index Attribute: NAME
Path to Data: Z:\Accuracy_Reports\LiDAR_Terrebonne\DEMs

LAS:
Tile Index Attribute: NAME
Path to Data: Z:\Accuracy_Reports\LiDAR_Terrebonne\LAS

# Tiled-Data Area



## LiDAR Accuracy Assessment Summary

| LC Type | # of Points | FVA | SVA | CVA |
|---|---|---|---|---|
| LAS | | | | |
| ALL | 161 | | | 0.305 |
| BRUSH LAND | 35 | | 0.312 | |
| FOREST | 24 | | 0.312 | |
| TALL WEED | 31 | | 0.350 | |
| BARE EARTH | 41 | 0.152 | | |
| URBAN | 30 | | 0.122 | |
| Total | 161 | | | |
| DEM | | | | |
| ALL | 161 | | | 0.283 |
| BRUSH LAND | 35 | | 0.291 | |
| FOREST | 24 | | 0.302 | |
| TALL WEED | 31 | | 0.337 | |
| BARE EARTH | 41 | 0.154 | | |
| URBAN | 30 | | 0.118 | |
| Total | 161 | | | |

Units: Meters

## Coordinates and Offsets of Analyzed Locations

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 1) | ☑ | TB_DAUPHIN_BLCHK_01 | | | | | |
| | | | 962770.39 | 3356205.544 | 1.585 | 1.683 | 1.685 |
| | | | | | BRUSH LAND | 0.098 | 0.1 |
| 2) | ☑ | TB_DAUPHIN_BLCHK_02 | | | | | |
| | | | 968129.632 | 3356675.951 | 1.452 | 1.698 | 1.708 |
| | | | | | BRUSH LAND | 0.246 | 0.256 |
| 3) | ☑ | TB_DAUPHIN_BLCHK_03 | | | | | |
| | | | 970453.893 | 3357331.334 | 1.724 | 1.963 | 1.947 |
| | | | | | BRUSH LAND | 0.239 | 0.223 |
| 4) | ☑ | TB_DAUPHIN_FRSTCHK_01 | | | | | |
| | | | 970420.221 | 3357279.244 | 1.74 | 1.752 | 1.767 |
| | | | | | FOREST | 0.012 | 0.027 |
| 5) | ☑ | TB_DAUPHIN_TWCHK_01 | | | | | |
| | | | 962756.291 | 3356237.568 | 1.046 | 1.121 | 1.133 |
| | | | | | TALL WEED | 0.075 | 0.087 |
| 6) | ☑ | TB_DAUPHIN_TWCHK_02 | | | | | |
| | | | 968160.78 | 3356648.107 | 1.44 | 1.5 | 1.518 |
| | | | | | TALL WEED | 0.06 | 0.078 |
| 7) | ☑ | TB_MSISL_BL_01 | | | | | |
| | | | 871527.561 | 3350609.296 | 0.699 | 1.01 | 1.007 |
| | | | | | BRUSH LAND | 0.311 | 0.308 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 8) | ☑ | TB_MSISL_BL_02 | | | | | |
| | | | 878341.596 | 3352356.054 | 0.896 | 1.173 | 1.201 |
| | | | | | BRUSH LAND | 0.277 | 0.305 |
| 9) | ☑ | TB_MSISL_BL_03 | | | | | |
| | | | 923692.273 | 3351926.95 | 1.317 | 1.445 | 1.467 |
| | | | | | BRUSH LAND | 0.128 | 0.15 |
| 10) | ☑ | TB_MSISL_BL_04 | | | | | |
| | | | 917074.263 | 3352979.907 | 2.174 | 2.304 | 2.278 |
| | | | | | BRUSH LAND | 0.13 | 0.104 |
| 11) | ☑ | TB_MSISL_BL_05 | | | | | |
| | | | 937262.789 | 3349623.817 | 1.774 | 1.956 | 1.946 |
| | | | | | BRUSH LAND | 0.182 | 0.172 |
| 12) | ☑ | TB_MSISL_FRST_01 | | | | | |
| | | | 871542.347 | 3350603.985 | 0.752 | 1.051 | 1.066 |
| | | | | | FOREST | 0.299 | 0.314 |
| 13) | ☑ | TB_MSISL_FRST_02 | | | | | |
| | | | 878340.31 | 3352316.69 | 0.892 | 1.262 | 1.273 |
| | | | | | FOREST | 0.37 | 0.381 |
| 14) | ☑ | TB_MSISL_FRST_03 | | | | | |
| | | | 923823.755 | 3351939.821 | 1.383 | 1.448 | 1.437 |
| | | | | | FOREST | 0.065 | 0.054 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 15) | ☑ | TB_MSISL_TW_01 | | | | | |
| | | | 871412.646 | 3350641.617 | 0.484 | 0.832 | 0.832 |
| | | | | | TALL WEED | 0.348 | 0.348 |
| 16) | ☑ | TB_MSISL_TW_02 | | | | | |
| | | | 878322.939 | 3352480.73 | 0.691 | 1.017 | 1.057 |
| | | | | | TALL WEED | 0.326 | 0.366 |
| 17) | ☑ | TB_MSISL_TW_03 | | | | | |
| | | | 923699.038 | 3351918.448 | 0.749 | 1.185 | 1.101 |
| | | | | | TALL WEED | 0.436 | 0.352 |
| 18) | ☑ | TB_MSISL_TW_04 | | | | | |
| | | | 937268.842 | 3349618.627 | 2.071 | 2.184 | 2.191 |
| | | | | | TALL WEED | 0.113 | 0.12 |
| 19) | ☑ | TB_MSISL_TW_05 | | | | | |
| | | | 935846.174 | 3349983.818 | 1.956 | 2.077 | 2.075 |
| | | | | | TALL WEED | 0.121 | 0.119 |
| 20) | ☑ | TB_MSISL_TW_06 | | | | | |
| | | | 931787.72 | 3351892.119 | 0.72 | 0.85 | 0.843 |
| | | | | | TALL WEED | 0.13 | 0.123 |
| 21) | ☑ | BLCHK_01 | | | | | |
| | | | 752447.806 | 3270995.299 | 0.359 | 0.358 | 0.386 |
| | | | | | BRUSH LAND | -0.001 | 0.027 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | ID | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
|---|---|---|---|---|---|---|
| | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 22) | BLCHK_03 | | | | | |
| | | 687777.459 | 3289482.305 | 1.199 | 1.318 | 1.322 |
| | | | | BRUSH LAND | 0.119 | 0.123 |
| 23) | BLCHK_04 | | | | | |
| | | 672394.036 | 3288034.489 | 2.148 | 2.431 | 2.409 |
| | | | | BRUSH LAND | 0.283 | 0.261 |
| 24) | BLCHK_05 | | | | | |
| | | 673428.284 | 3285977.789 | 0.558 | 0.635 | 0.646 |
| | | | | BRUSH LAND | 0.077 | 0.088 |
| 25) | BLCHK_06 | | | | | |
| | | 682176.572 | 3281384.464 | 1.322 | 1.405 | 1.406 |
| | | | | BRUSH LAND | 0.083 | 0.084 |
| 26) | BLCHK_07 | | | | | |
| | | 693709.06 | 3285984.963 | 0.99 | 1.016 | 1.051 |
| | | | | BRUSH LAND | 0.026 | 0.061 |
| 27) | BLCHK_08 | | | | | |
| | | 725026.003 | 3273109.173 | 2.305 | 2.423 | 2.409 |
| | | | | BRUSH LAND | 0.118 | 0.104 |
| 28) | BLCHK_09 | | | | | |
| | | 730533.83 | 3251219.074 | 0.242 | 0.436 | 0.563 |
| | | | | BRUSH LAND | 0.194 | 0.321 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | ID | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
|---|---|---|---|---|---|---|
| | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 29) | BLCHK_10 | | | | | |
| | | 708581.102 | 3246390.433 | 0.24 | 0.589 | 0.571 |
| | | | | BRUSH LAND | 0.349 | 0.331 |
| 30) | BLCHK_11 | | | | | |
| | | 715044.765 | 3255214.445 | -1.361 | -1.32 | -1.355 |
| | | | | BRUSH LAND | 0.041 | 0.006 |
| 31) | BLCHK_12 | | | | | |
| | | 717780.876 | 3266408.465 | 1.687 | 1.848 | 1.862 |
| | | | | BRUSH LAND | 0.161 | 0.175 |
| 32) | BLCHK_13 | | | | | |
| | | 733839.333 | 3262751.253 | 1.925 | 1.936 | 1.926 |
| | | | | BRUSH LAND | 0.011 | 0.001 |
| 33) | BLCHK_14 | | | | | |
| | | 703890.964 | 3277901.199 | 0.646 | 0.653 | 0.678 |
| | | | | BRUSH LAND | 0.007 | 0.032 |
| 34) | BLCHK_15 | | | | | |
| | | 714467.596 | 3285036.367 | 2.77 | 2.856 | 2.865 |
| | | | | BRUSH LAND | 0.086 | 0.095 |
| 35) | BLCHK_16 | | | | | |
| | | 722105.593 | 3250419.137 | 0.324 | 0.259 | 0.268 |
| | | | | BRUSH LAND | -0.065 | -0.056 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | ID | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
|---|---|---|---|---|---|---|
| | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 36) | BLCHK_17 | | | | | |
| | | 723452.873 | 3264705.259 | 0.637 | 0.682 | 0.654 |
| | | | | BRUSH LAND | 0.045 | 0.017 |
| 37) | BLCHK_18 | | | | | |
| | | 737750.971 | 3271820.105 | 0.796 | 0.891 | 0.888 |
| | | | | BRUSH LAND | 0.095 | 0.092 |
| 38) | BLCHK_19 | | | | | |
| | | 722971.618 | 3254347.405 | 0.055 | -0.047 | -0.049 |
| | | | | BRUSH LAND | -0.102 | -0.104 |
| 39) | BLCHK_20 | | | | | |
| | | 721863.567 | 3244348.816 | 0.498 | 0.595 | 0.635 |
| | | | | BRUSH LAND | 0.097 | 0.137 |
| 40) | BLCHK_21 | | | | | |
| | | 730781.498 | 3276964.607 | 0.747 | 0.858 | 0.875 |
| | | | | BRUSH LAND | 0.111 | 0.128 |
| 41) | BLCHK_22 | | | | | |
| | | 728123.78 | 3285695.975 | 1.372 | 1.322 | 1.316 |
| | | | | BRUSH LAND | -0.05 | -0.056 |
| 42) | BLCHK_23 | | | | | |
| | | 727374.496 | 3238519.691 | 0.691 | 0.655 | 0.664 |
| | | | | BRUSH LAND | -0.036 | -0.027 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 43) | ☑ | BLCHK_24 | | | | | |
| | | | 712904.454 | 3215515.066 | 0.394 | 0.49 | 0.511 |
| | | | | | BRUSH LAND | 0.096 | 0.117 |
| 44) | ☑ | BLCHK_25 | | | | | |
| | | | 759849.942 | 3218380.577 | 0.247 | 0.483 | 0.451 |
| | | | | | BRUSH LAND | 0.236 | 0.204 |
| 45) | ☑ | BLCHK_26 | | | | | |
| | | | 745565.061 | 3217638.921 | 0.467 | 0.599 | 0.677 |
| | | | | | BRUSH LAND | 0.132 | 0.21 |
| 46) | ☑ | BLCHK_27 | | | | | |
| | | | 722137.977 | 3215879.197 | 1.222 | 1.254 | 1.165 |
| | | | | | BRUSH LAND | 0.032 | -0.057 |
| 47) | ☑ | BLCHK_28 | | | | | |
| | | | 688491.346 | 3230013.361 | 0.462 | 0.529 | 0.541 |
| | | | | | BRUSH LAND | 0.067 | 0.079 |
| 48) | ☑ | FRST_01 | | | | | |
| | | | 752514.04 | 3271053.405 | 0.378 | 0.479 | 0.471 |
| | | | | | FOREST | 0.101 | 0.093 |
| 49) | ☑ | FRST_03 | | | | | |
| | | | 687758.45 | 3289453.68 | 0.426 | 0.552 | 0.559 |
| | | | | | FOREST | 0.126 | 0.133 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | ID | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
|---|---|---|---|---|---|---|
| | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 50) | FRST_04 | | | | | |
| | | 675231.691 | 3289194.666 | 0.697 | 0.809 | 0.807 |
| | | | | FOREST | 0.112 | 0.11 |
| 51) | FRST_05 | | | | | |
| | | 672374.709 | 3288035.315 | 1.706 | 1.883 | 1.888 |
| | | | | FOREST | 0.177 | 0.182 |
| 52) | FRST_06 | | | | | |
| | | 673416.142 | 3285984.907 | 0.416 | 0.719 | 0.719 |
| | | | | FOREST | 0.303 | 0.303 |
| 53) | FRST_08 | | | | | |
| | | 694258.215 | 3285903.609 | 0.791 | 0.801 | 0.806 |
| | | | | FOREST | 0.01 | 0.015 |
| 54) | FRST_09 | | | | | |
| | | 724978.068 | 3273060.912 | 2.312 | 2.286 | 2.344 |
| | | | | FOREST | -0.026 | 0.032 |
| 55) | FRST_10 | | | | | |
| | | 730566.431 | 3251210.822 | 0.407 | 0.25 | 0.253 |
| | | | | FOREST | -0.157 | -0.154 |
| 56) | FRST_11 | | | | | |
| | | 719362.746 | 3276438.258 | 2.475 | 2.466 | 2.392 |
| | | | | FOREST | -0.009 | -0.083 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 57) | ☑ | FRST_12 | | | | | |
| | | | 714916.855 | 3255314.049 | 0.004 | 0.051 | 0.057 |
| | | | | | FOREST | 0.047 | 0.053 |
| 58) | ☑ | FRST_13 | | | | | |
| | | | 717796.098 | 3266416.774 | 1.714 | 1.61 | 1.63 |
| | | | | | FOREST | -0.104 | -0.084 |
| 59) | ☑ | FRST_14 | | | | | |
| | | | 733829.98 | 3262749.368 | 1.957 | 1.885 | 1.89 |
| | | | | | FOREST | -0.072 | -0.067 |
| 60) | ☑ | FRST_15 | | | | | |
| | | | 703902.376 | 3277881.108 | 0.646 | 0.599 | 0.629 |
| | | | | | FOREST | -0.047 | -0.017 |
| 61) | ☑ | FRST_16 | | | | | |
| | | | 714462.823 | 3285075.714 | 2.944 | 2.947 | 2.951 |
| | | | | | FOREST | 0.003 | 0.007 |
| 62) | ☑ | FRST_17 | | | | | |
| | | | 722098.526 | 3250447.125 | 0.538 | 0.473 | 0.462 |
| | | | | | FOREST | -0.065 | -0.076 |
| 63) | ☑ | FRST_18 | | | | | |
| | | | 723431.972 | 3264707.148 | 0.382 | 0.419 | 0.394 |
| | | | | | FOREST | 0.037 | 0.012 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | ID | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
|---|---|---|---|---|---|---|
| | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 64) | FRST_19 | | | | | |
| | | 737697.36 | 3271859.452 | 0.886 | 0.924 | 0.921 |
| | | | | FOREST | 0.038 | 0.035 |
| 65) | FRST_20 | | | | | |
| | | 723039.461 | 3254398.421 | 0.124 | -0.026 | -0.024 |
| | | | | FOREST | -0.15 | -0.148 |
| 66) | FRST_21 | | | | | |
| | | 730804.46 | 3276976.176 | 0.53 | 0.506 | 0.519 |
| | | | | FOREST | -0.024 | -0.011 |
| 67) | FRST_22 | | | | | |
| | | 727992.353 | 3285643.147 | 0.98 | 0.91 | 0.919 |
| | | | | FOREST | -0.07 | -0.061 |
| 68) | TW_01 | | | | | |
| | | 752437.473 | 3271003.057 | 0.24 | 0.358 | 0.349 |
| | | | | TALL WEED | 0.118 | 0.109 |
| 69) | TW_03 | | | | | |
| | | 687777.935 | 3289443.007 | 0.224 | 0.505 | 0.455 |
| | | | | TALL WEED | 0.281 | 0.231 |
| 70) | TW_04 | | | | | |
| | | 696474.902 | 3297768.97 | 0.881 | 0.968 | 0.959 |
| | | | | TALL WEED | 0.087 | 0.078 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | ID | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
|---|---|---|---|---|---|---|
| | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 71) | TW_05 | | | | | |
| | | 672371.472 | 3288017.597 | 2.118 | 2.312 | 2.297 |
| | | | | TALL WEED | 0.194 | 0.179 |
| 72) | TW_06 | | | | | |
| | | 694282.897 | 3285902.869 | 0.587 | 0.648 | 0.642 |
| | | | | TALL WEED | 0.061 | 0.055 |
| 73) | TW_07 | | | | | |
| | | 725031.721 | 3273108.352 | 2.129 | 2.157 | 2.124 |
| | | | | TALL WEED | 0.028 | -0.005 |
| 74) | TW_08 | | | | | |
| | | 730533.111 | 3251231.148 | 0.192 | 0.274 | 0.253 |
| | | | | TALL WEED | 0.082 | 0.061 |
| 75) | TW_09 | | | | | |
| | | 708667.252 | 3246637.093 | 0.44 | 0.579 | 0.581 |
| | | | | TALL WEED | 0.139 | 0.141 |
| 76) | TW_10 | | | | | |
| | | 714957.659 | 3255208.676 | -0.576 | -0.493 | -0.492 |
| | | | | TALL WEED | 0.083 | 0.084 |
| 77) | TW_11 | | | | | |
| | | 717808.547 | 3266400.161 | 1.614 | 1.602 | 1.595 |
| | | | | TALL WEED | -0.012 | -0.019 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | ID | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
|---|---|---|---|---|---|---|
| | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 78) | TW_12 | | | | | |
| | | 703885.282 | 3277895.15 | 0.769 | 0.689 | 0.684 |
| | | | | TALL WEED | -0.08 | -0.085 |
| 79) | TW_13 | | | | | |
| | | 714476.961 | 3285032.312 | 2.82 | 2.872 | 2.861 |
| | | | | TALL WEED | 0.052 | 0.041 |
| 80) | TW_14 | | | | | |
| | | 723452.312 | 3264701.849 | 0.806 | 0.79 | 0.783 |
| | | | | TALL WEED | -0.016 | -0.023 |
| 81) | TW_15 | | | | | |
| | | 737711.452 | 3271870.969 | 1.095 | 1.081 | 1.084 |
| | | | | TALL WEED | -0.014 | -0.011 |
| 82) | TW_16 | | | | | |
| | | 723087.295 | 3254369.88 | 0.195 | 0.11 | 0.103 |
| | | | | TALL WEED | -0.085 | -0.092 |
| 83) | TW_17 | | | | | |
| | | 721868.054 | 3244346.851 | 0.657 | 0.637 | 0.621 |
| | | | | TALL WEED | -0.02 | -0.036 |
| 84) | TW_18 | | | | | |
| | | 730877.732 | 3276890.277 | 1.052 | 1.239 | 1.231 |
| | | | | TALL WEED | 0.187 | 0.179 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 85) | ☑ | TW_19 | | | | | |
| | | | 728127.463 | 3285738.375 | 1.306 | 1.209 | 1.207 |
| | | | | | TALL WEED | -0.097 | -0.099 |
| 86) | ☑ | TW_20 | | | | | |
| | | | 727332.242 | 3238495.706 | 0.431 | 0.535 | 0.593 |
| | | | | | TALL WEED | 0.104 | 0.162 |
| 87) | ☑ | TW_21 | | | | | |
| | | | 745601.863 | 3217468.245 | 1.227 | 1.341 | 1.344 |
| | | | | | TALL WEED | 0.114 | 0.117 |
| 88) | ☑ | TW_22 | | | | | |
| | | | 722162.598 | 3215876.149 | 0.716 | 0.663 | 0.641 |
| | | | | | TALL WEED | -0.053 | -0.075 |
| 89) | ☑ | TW_23 | | | | | |
| | | | 712962.695 | 3215590.984 | 0.283 | 0.489 | 0.461 |
| | | | | | TALL WEED | 0.206 | 0.178 |
| 90) | ☑ | TW_24 | | | | | |
| | | | 688497.949 | 3230011.224 | 0.379 | 0.52 | 0.518 |
| | | | | | TALL WEED | 0.141 | 0.139 |
| 91) | ☑ | TB_DAUPHIN_BECHK_01 | | | | | |
| | | | 962807.1 | 3356264.526 | 0.856 | 0.936 | 0.922 |
| | | | | | BARE EARTH | 0.08 | 0.066 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | ID | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
|---|---|---|---|---|---|---|
| | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 92) | TB_DAUPHIN_BECHK_02 | | | | | |
| | | 962925.031 | 3356168.338 | 0.49 | 0.594 | 0.621 |
| | | | | BARE EARTH | 0.104 | 0.131 |
| 93) | TB_DAUPHIN_BECHK_03 | | | | | |
| | | 968142.89 | 3356657.662 | 1.347 | 1.447 | 1.441 |
| | | | | BARE EARTH | 0.1 | 0.094 |
| 94) | TB_DAUPHIN_BECHK_04 | | | | | |
| | | 970437.566 | 3357315.636 | 1.476 | 1.5 | 1.495 |
| | | | | BARE EARTH | 0.024 | 0.019 |
| 95) | TB_DAUPHIN_URBNCHK_03 | | | | | |
| | | 968163.324 | 3356628.826 | 1.243 | 1.324 | 1.326 |
| | | | | URBAN | 0.081 | 0.083 |
| 96) | TB_DAUPHIN_URBNCHK_01 | | | | | |
| | | 962937.263 | 3356156.809 | 0.784 | 0.88 | 0.892 |
| | | | | URBAN | 0.096 | 0.108 |
| 97) | TB_DAUPHIN_URBNCHK_02 | | | | | |
| | | 970429.466 | 3357286.662 | 1.603 | 1.613 | 1.618 |
| | | | | URBAN | 0.01 | 0.015 |
| 98) | TB_MSISL_BECHK_01 | | | | | |
| | | 871373.048 | 3350642.047 | 0.709 | 0.86 | 0.86 |
| | | | | BARE EARTH | 0.151 | 0.151 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 99) | ☑ | TB_MSISL_BECHK_04 | | | | | |
| | | | 878342.149 | 3352508.646 | 0.896 | 1.049 | 1.046 |
| | | | | | BARE EARTH | 0.153 | 0.15 |
| 100) | ☑ | TB_MSISL_BECHK_06 | | | | | |
| | | | 923831.238 | 3351934.367 | 2.107 | 2.22 | 2.203 |
| | | | | | BARE EARTH | 0.113 | 0.096 |
| 101) | ☑ | TB_MSISL_BECHK_09 | | | | | |
| | | | 894557.022 | 3351406.155 | 0.494 | 0.348 | 0.349 |
| | | | | | BARE EARTH | -0.146 | -0.145 |
| 102) | ☑ | TB_MSISL_BECHK_10 | | | | | |
| | | | 917082.89 | 3352980.165 | 1.813 | 1.858 | 1.825 |
| | | | | | BARE EARTH | 0.045 | 0.012 |
| 103) | ☑ | TB_MSISL_BECHK_12 | | | | | |
| | | | 937243.022 | 3349614.144 | 2.985 | 2.941 | 3.001 |
| | | | | | BARE EARTH | -0.044 | 0.016 |
| 104) | ☑ | TB_MSISL_BECHK13 | | | | | |
| | | | 935862.023 | 3349994.975 | 1.66 | 1.695 | 1.66 |
| | | | | | BARE EARTH | 0.035 | 0 |
| 105) | ☑ | TB_MSISL_BECHK_15 | | | | | |
| | | | 932706.36 | 3351130.162 | 3.434 | 3.489 | 3.484 |
| | | | | | BARE EARTH | 0.055 | 0.05 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 106) | ☑ | TB_MSISL_BECHK_19 | | | | | |
| | | | 906750.051 | 3353187.932 | 1.055 | 1.096 | 1.092 |
| | | | | | BARE EARTH | 0.041 | 0.037 |
| 107) | ☑ | TB_MSISL_BECHK_21 | | | | | |
| | | | 886721.282 | 3348982.919 | 1.133 | 1.292 | 1.307 |
| | | | | | BARE EARTH | 0.159 | 0.174 |
| 108) | ☑ | BECHK_01 | | | | | |
| | | | 752424.178 | 3271020.094 | 0.396 | 0.464 | 0.443 |
| | | | | | BARE EARTH | 0.068 | 0.047 |
| 109) | ☑ | BECHK_03 | | | | | |
| | | | 687805.878 | 3289482.818 | 1.154 | 1.231 | 1.231 |
| | | | | | BARE EARTH | 0.077 | 0.077 |
| 110) | ☑ | BECHK_04 | | | | | |
| | | | 696411.213 | 3297775.767 | 0.975 | 0.998 | 0.994 |
| | | | | | BARE EARTH | 0.023 | 0.019 |
| 111) | ☑ | BECHK_05 | | | | | |
| | | | 747655.043 | 3256805.846 | 0.574 | 0.52 | 0.515 |
| | | | | | BARE EARTH | -0.054 | -0.059 |
| 112) | ☑ | BECHK_06 | | | | | |
| | | | 675154.116 | 3289230.431 | 0.673 | 0.78 | 0.776 |
| | | | | | BARE EARTH | 0.107 | 0.103 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 113) | ☑ | BECHK_07 | | | | | |
| | | | 672382.573 | 3288015.008 | 2.255 | 2.282 | 2.297 |
| | | | | | BARE EARTH | 0.027 | 0.042 |
| 114) | ☑ | BECHK_08 | | | | | |
| | | | 673499.418 | 3285891.538 | 0.919 | 0.977 | 0.972 |
| | | | | | BARE EARTH | 0.058 | 0.053 |
| 115) | ☑ | BECHK_09 | | | | | |
| | | | 682157.012 | 3281495.568 | 1.395 | 1.412 | 1.418 |
| | | | | | BARE EARTH | 0.017 | 0.023 |
| 116) | ☑ | BECHK_10 | | | | | |
| | | | 694269.831 | 3285902.742 | 0.71 | 0.726 | 0.729 |
| | | | | | BARE EARTH | 0.016 | 0.019 |
| 117) | ☑ | BECHK_11 | | | | | |
| | | | 725044.179 | 3273123.821 | 2.018 | 1.949 | 1.953 |
| | | | | | BARE EARTH | -0.069 | -0.065 |
| 118) | ☑ | BECHK_12 | | | | | |
| | | | 730576.564 | 3251224.994 | 0.281 | 0.237 | 0.231 |
| | | | | | BARE EARTH | -0.044 | -0.05 |
| 119) | ☑ | BECHK_13 | | | | | |
| | | | 719347.206 | 3276459.144 | 2.579 | 2.536 | 2.51 |
| | | | | | BARE EARTH | -0.043 | -0.069 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 120) | ☑ | BECHK_14 | | | | | |
| | | | 708596.821 | 3246466.217 | 0.836 | 0.877 | 0.872 |
| | | | | | BARE EARTH | 0.041 | 0.036 |
| 121) | ☑ | BECHK_15 | | | | | |
| | | | 714985.282 | 3255207.572 | -0.695 | -0.657 | -0.66 |
| | | | | | BARE EARTH | 0.038 | 0.035 |
| 122) | ☑ | BECHK_16 | | | | | |
| | | | 717801.27 | 3266389.061 | 1.599 | 1.48 | 1.474 |
| | | | | | BARE EARTH | -0.119 | -0.125 |
| 123) | ☑ | BECHK_17 | | | | | |
| | | | 733869.218 | 3262759.687 | 2.055 | 2.01 | 2.007 |
| | | | | | BARE EARTH | -0.045 | -0.048 |
| 124) | ☑ | BECHK_18 | | | | | |
| | | | 703865.053 | 3277885.552 | 0.827 | 0.789 | 0.796 |
| | | | | | BARE EARTH | -0.038 | -0.031 |
| 125) | ☑ | BECHK_19 | | | | | |
| | | | 714448.763 | 3285085.149 | 2.915 | 2.896 | 2.906 |
| | | | | | BARE EARTH | -0.019 | -0.009 |
| 126) | ☑ | BECHK_20 | | | | | |
| | | | 722139.28 | 3250404.232 | 0.637 | 0.564 | 0.556 |
| | | | | | BARE EARTH | -0.073 | -0.081 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 127) | ☑ | BECHK_21 | | | | | |
| | | | 723442.213 | 3264706.538 | 0.677 | 0.664 | 0.677 |
| | | | | | BARE EARTH | -0.013 | 0 |
| 128) | ☑ | BECHK_22 | | | | | |
| | | | 737706.539 | 3271825.143 | 0.886 | 0.838 | 0.841 |
| | | | | | BARE EARTH | -0.048 | -0.045 |
| 129) | ☑ | BECHK_23 | | | | | |
| | | | 744220.98 | 3253628.127 | 0.479 | 0.441 | 0.423 |
| | | | | | BARE EARTH | -0.038 | -0.056 |
| 130) | ☑ | BECHK_24 | | | | | |
| | | | 723024.164 | 3254382.689 | 0.06 | -0.076 | -0.064 |
| | | | | | BARE EARTH | -0.136 | -0.124 |
| 131) | ☑ | BECHK_25 | | | | | |
| | | | 721880.846 | 3244277.46 | 0.648 | 0.555 | 0.567 |
| | | | | | BARE EARTH | -0.093 | -0.081 |
| 132) | ☑ | BECHK_26 | | | | | |
| | | | 730858.042 | 3276945.238 | 0.502 | 0.467 | 0.466 |
| | | | | | BARE EARTH | -0.035 | -0.036 |
| 133) | ☑ | BECHK_27 | | | | | |
| | | | 728162.291 | 3285720.584 | 1.29 | 1.208 | 1.207 |
| | | | | | BARE EARTH | -0.082 | -0.083 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 134) | ☑ | BECHK_28 | | | | | |
| | | | 727346.748 | 3238433.408 | 0.608 | 0.544 | 0.545 |
| | | | | | BARE EARTH | -0.064 | -0.063 |
| 135) | ☑ | URBNCHK_01 | | | | | |
| | | | 752166.483 | 3271160.889 | 1.297 | 1.343 | 1.344 |
| | | | | | URBAN | 0.046 | 0.047 |
| 136) | ☑ | URBNCHK_03 | | | | | |
| | | | 687745.489 | 3289485.004 | 1.843 | 1.873 | 1.835 |
| | | | | | URBAN | 0.03 | -0.008 |
| 137) | ☑ | URBNCHK_04 | | | | | |
| | | | 696446.772 | 3297784.904 | 1.648 | 1.683 | 1.69 |
| | | | | | URBAN | 0.035 | 0.042 |
| 138) | ☑ | URBNCHK_05 | | | | | |
| | | | 747603.987 | 3256939.553 | 0.59 | 0.535 | 0.515 |
| | | | | | URBAN | -0.055 | -0.075 |
| 139) | ☑ | URBNCHK_06 | | | | | |
| | | | 675239.556 | 3289177.034 | 0.846 | 0.943 | 0.95 |
| | | | | | URBAN | 0.097 | 0.104 |
| 140) | ☑ | URBNCHK_07 | | | | | |
| | | | 672399.327 | 3287991.828 | 2.127 | 2.184 | 2.186 |
| | | | | | URBAN | 0.057 | 0.059 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 141) | ☑ | URBNCHK_08 | | | | | |
| | | | 673470.231 | 3285887.739 | 1.4 | 1.459 | 1.46 |
| | | | | | URBAN | 0.059 | 0.06 |
| 142) | ☑ | URBNCHK_09 | | | | | |
| | | | 682099.899 | 3281410.108 | 1.782 | 1.791 | 1.804 |
| | | | | | URBAN | 0.009 | 0.022 |
| 143) | ☑ | URBNCHK_10 | | | | | |
| | | | 694278.954 | 3285886.336 | 1.186 | 1.154 | 1.176 |
| | | | | | URBAN | -0.032 | -0.01 |
| 144) | ☑ | URBNCHK_11 | | | | | |
| | | | 724986.189 | 3273069.246 | 2.28 | 2.22 | 2.216 |
| | | | | | URBAN | -0.06 | -0.064 |
| 145) | ☑ | URBNCHK_12 | | | | | |
| | | | 730561.352 | 3251240.92 | 0.977 | 0.915 | 0.919 |
| | | | | | URBAN | -0.062 | -0.058 |
| 146) | ☑ | URBNCHK_13 | | | | | |
| | | | 719337.538 | 3276462.193 | 2.306 | 2.245 | 2.258 |
| | | | | | URBAN | -0.061 | -0.048 |
| 147) | ☑ | URBNCHK_14 | | | | | |
| | | | 709637.082 | 3247243.089 | 1.045 | 1.043 | 1.04 |
| | | | | | URBAN | -0.002 | -0.005 |

## Coordinates and Offsets of Analyzed Locations (Continued)

| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 148) | ☑ | URBNCHK_15 | | | | | |
| | | | 714772.935 | 3255299.13 | 1.44 | 1.488 | 1.458 |
| | | | | | URBAN | 0.048 | 0.018 |
| 149) | ☑ | URBNCHK_16 | | | | | |
| | | | 717790.873 | 3266345.336 | 2.043 | 1.9 | 1.884 |
| | | | | | URBAN | -0.143 | -0.159 |
| 150) | ☑ | URBNCHK_17 | | | | | |
| | | | 733851.15 | 3262751.028 | 2.036 | 2 | 1.966 |
| | | | | | URBAN | -0.036 | -0.07 |
| 151) | ☑ | URBNCHK_18 | | | | | |
| | | | 703856.264 | 3277868.418 | 1.074 | 1.056 | 1.04 |
| | | | | | URBAN | -0.018 | -0.034 |
| 152) | ☑ | URBNCHK_19 | | | | | |
| | | | 714445.331 | 3285102.673 | 3.202 | 3.188 | 3.185 |
| | | | | | URBAN | -0.015 | -0.017 |
| 153) | ☑ | URBNCHK_20 | | | | | |
| | | | 722117.397 | 3250430.145 | 0.487 | 0.414 | 0.398 |
| | | | | | URBAN | -0.073 | -0.089 |
| 154) | ☑ | URBNCHK_21 | | | | | |
| | | | 723408.76 | 3264714.201 | 1.297 | 1.312 | 1.305 |
| | | | | | URBAN | 0.015 | 0.008 |

## Coordinates and Offsets of Analyzed Locations (Continued)

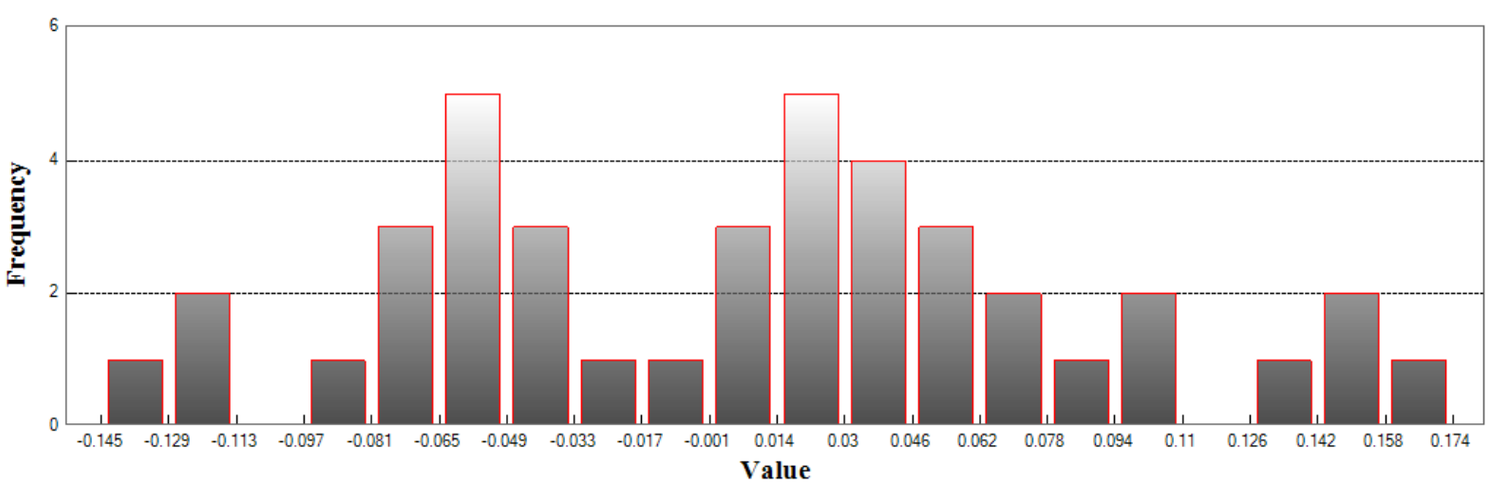
| | | ID | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Survey X | Survey Y | Z1 | Z DEM | Z LAS |
| | | | | | LC Type | ΔZ DEM | ΔZ LAS |
| 155) | ☑ | URBNCHK_22 | | | | | |
| | | | 737731.594 | 3271796.877 | 1.479 | 1.417 | 1.405 |
| | | | | | URBAN | -0.062 | -0.074 |
| 156) | ☑ | URBNCHK_23 | | | | | |
| | | | 744218.23 | 3253599.101 | 0.662 | 0.65 | 0.64 |
| | | | | | URBAN | -0.012 | -0.022 |
| 157) | ☑ | URBNCHK_24 | | | | | |
| | | | 722951.912 | 3254372.085 | 0.427 | 0.35 | 0.345 |
| | | | | | URBAN | -0.077 | -0.082 |
| 158) | ☑ | URBNCHK_25 | | | | | |
| | | | 721892.015 | 3244355.694 | 0.612 | 0.54 | 0.557 |
| | | | | | URBAN | -0.072 | -0.055 |
| 159) | ☑ | URBNCHK_26 | | | | | |
| | | | 730924.275 | 3276884.789 | 1.265 | 1.19 | 1.189 |
| | | | | | URBAN | -0.075 | -0.076 |
| 160) | ☑ | URBNCHK_27 | | | | | |
| | | | 727815.526 | 3286007.293 | 1.17 | 1.034 | 1.037 |
| | | | | | URBAN | -0.136 | -0.133 |
| 161) | ☑ | URBNCHK_28 | | | | | |
| | | | 727336.761 | 3238412.193 | 0.783 | 0.698 | 0.692 |
| | | | | | URBAN | -0.085 | -0.091 |

# LAS

Fundamental Vertical Accuracy

LandCover Type: BARE EARTH
Minimum DZ: -0.145
Maximum DZ: 0.174
Mean DZ: 0.007
Mean Magnitude DZ: 0.253
Number Observations: 41
Standard Deviation DZ: 0.078
RMSE Z: 0.078
95% Confidence Level Z: 0.152
Units: Meters

# Histogram




Min: -0.145
Max: 0.174
Number Of Bins: 20
Bin Interval: 0.016

# LAS (Continued)

Supplemental Vertical Accuracy

LandCover Type: BRUSH LAND

Minimum DZ: -0.104

Maximum DZ: 0.331

Mean DZ: 0.115

Mean Magnitude DZ: 0.363

Number Observations: 35

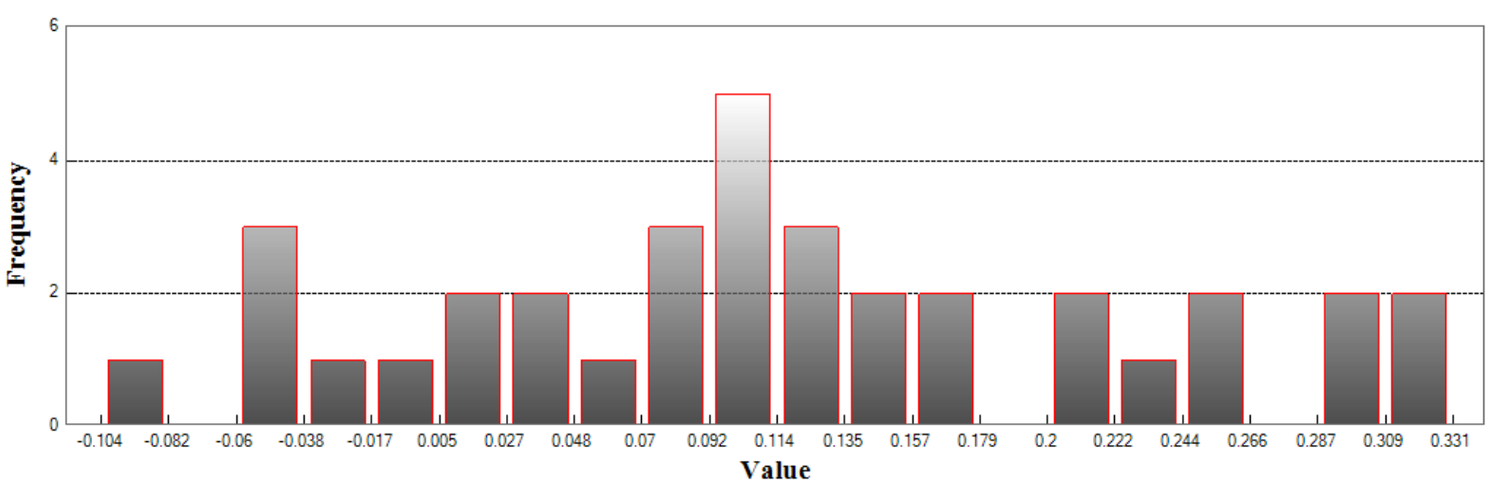
Standard Deviation DZ: 0.115

RMSE Z: 0.162

95th Percentile: 0.312

Units: Meters

# Histogram




Min: -0.104

Max: 0.331

Number Of Bins: 20

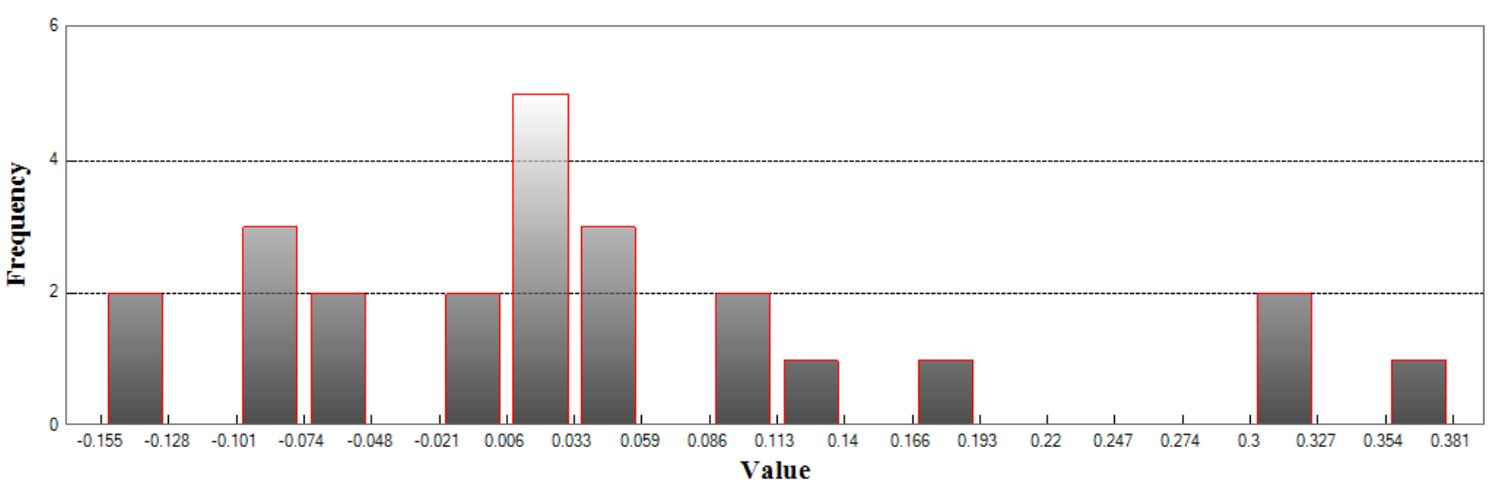
Bin Interval: 0.022

# LAS (Continued)

Supplemental Vertical Accuracy

LandCover Type: FOREST
Minimum DZ: -0.154
Maximum DZ: 0.381
Mean DZ: 0.044
Mean Magnitude DZ: 0.32
Number Observations: 24
Standard Deviation DZ: 0.139
RMSE Z: 0.143
95th Percentile: 0.312
Units: Meters

# Histogram



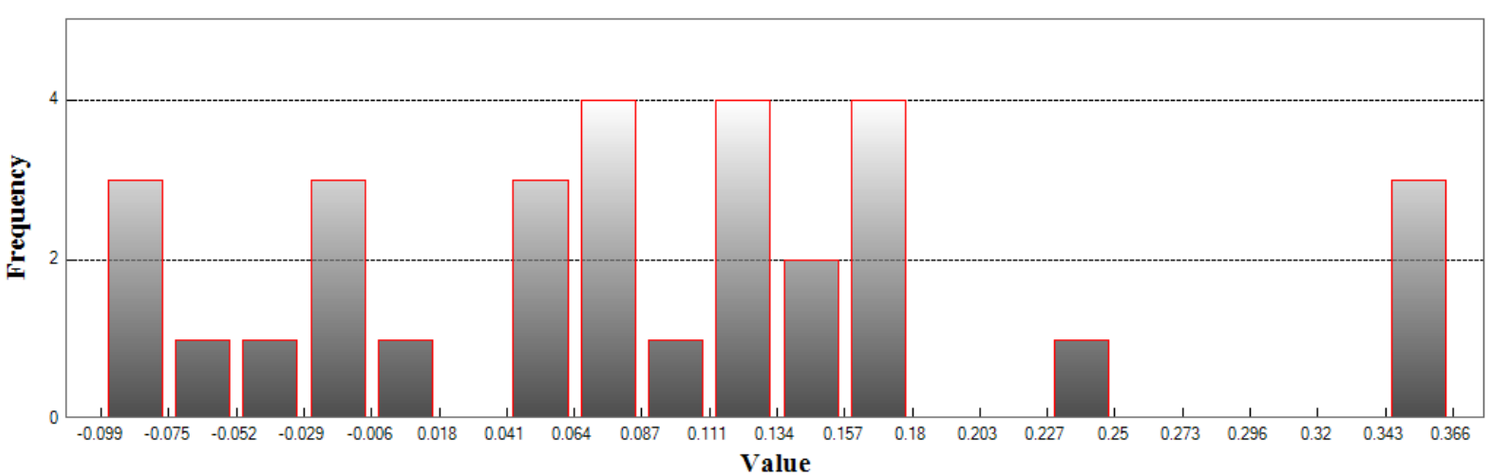

Min: -0.154
Max: 0.381
Number Of Bins: 20
Bin Interval: 0.027

# LAS (Continued)

Supplemental Vertical Accuracy

LandCover Type: TALL WEED
Minimum DZ: -0.099
Maximum DZ: 0.366
Mean DZ: 0.094
Mean Magnitude DZ: 0.35
Number Observations: 31
Standard Deviation DZ: 0.124
RMSE Z: 0.154
95th Percentile: 0.35
Units: Meters

# Histogram



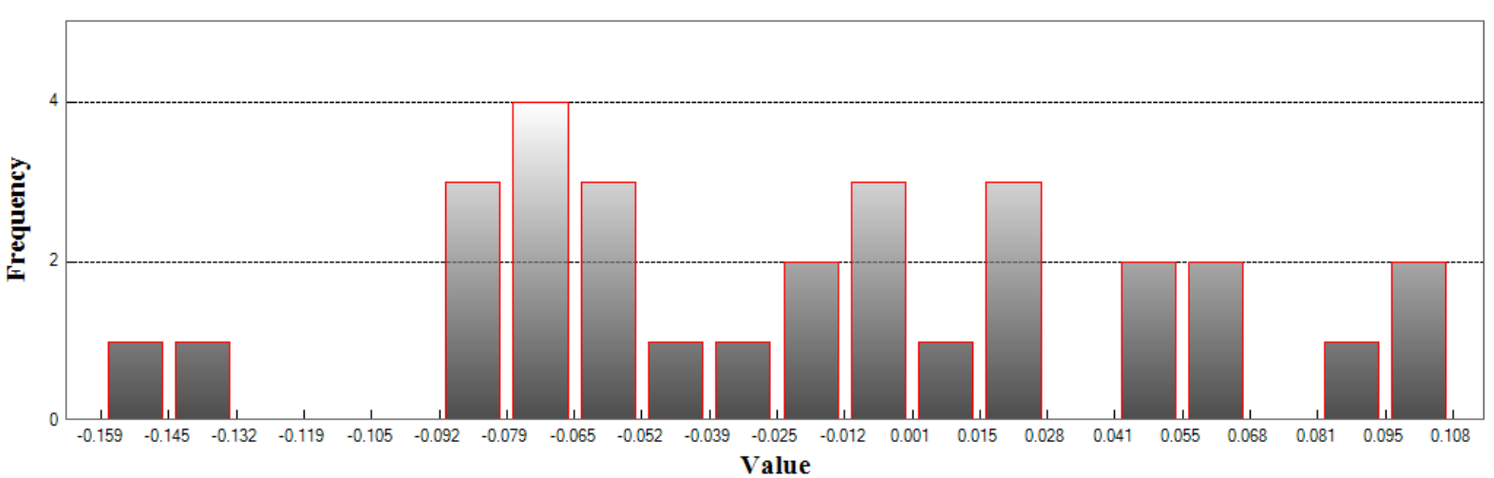

Min: -0.099
Max: 0.366
Number Of Bins: 20
Bin Interval: 0.023

# LAS (Continued)

Supplemental Vertical Accuracy

LandCover Type: URBAN
Minimum DZ: -0.159
Maximum DZ: 0.108
Mean DZ: -0.02
Mean Magnitude DZ: 0.24
Number Observations: 30
Standard Deviation DZ: 0.067
RMSE Z: 0.069
95th Percentile: 0.122
Units: Meters

# Histogram



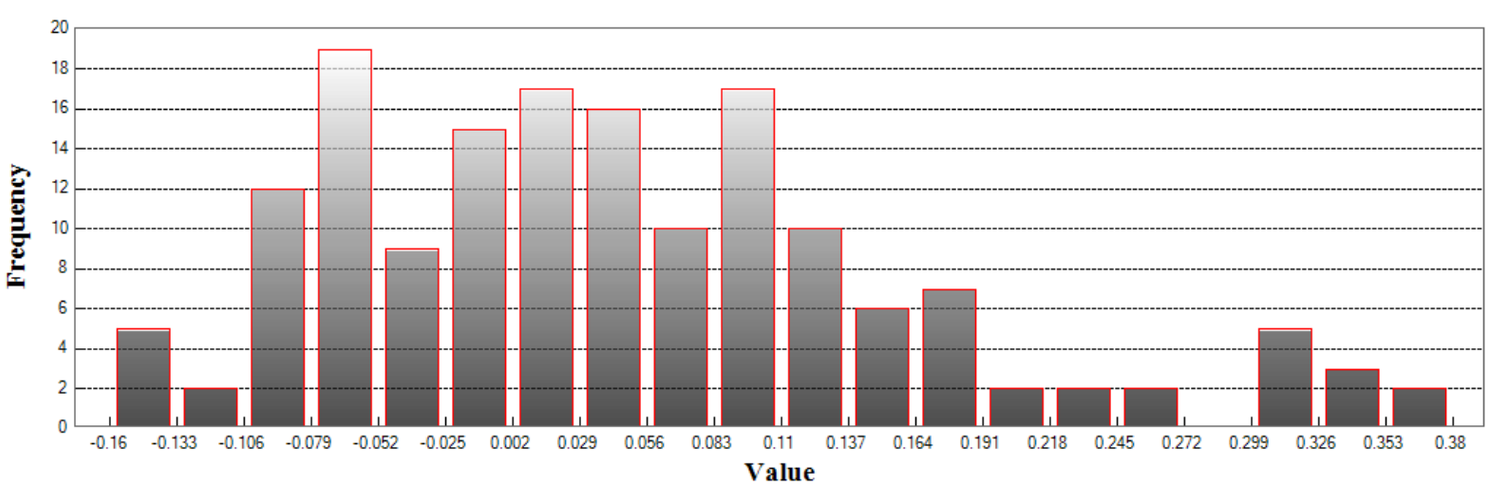

Min: -0.159
Max: 0.108
Number Of Bins: 20
Bin Interval: 0.013

# LAS (Continued)

Consolidated Vertical Accuracy

LandCover Type: ALL
Minimum DZ: -0.159
Maximum DZ: 0.381
Mean DZ: 0.047
Mean Magnitude DZ: 0.307
Number Observations: 161
Standard Deviation DZ: 0.116
RMSE Z: 0.125
95th Percentile: 0.305
Units: Meters

# Histogram




Min: -0.159
Max: 0.381
Number Of Bins: 20
Bin Interval: 0.027

# DEM

Fundamental Vertical Accuracy

LandCover Type: BARE EARTH

Minimum DZ: -0.146

Maximum DZ: 0.159

Mean DZ: 0.008

Mean Magnitude DZ: 0.258

Number Observations: 41

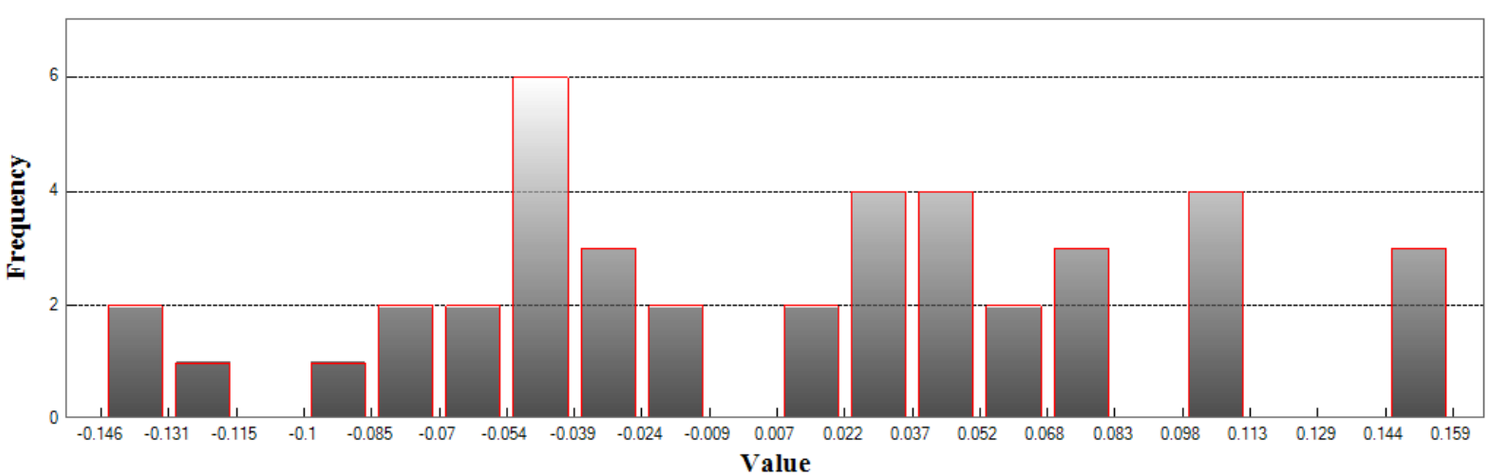
Standard Deviation DZ: 0.079

RMSE Z: 0.078

95% Confidence Level Z: 0.154

Units: Meters

# Histogram




Min: -0.146

Max: 0.159

Number Of Bins: 20

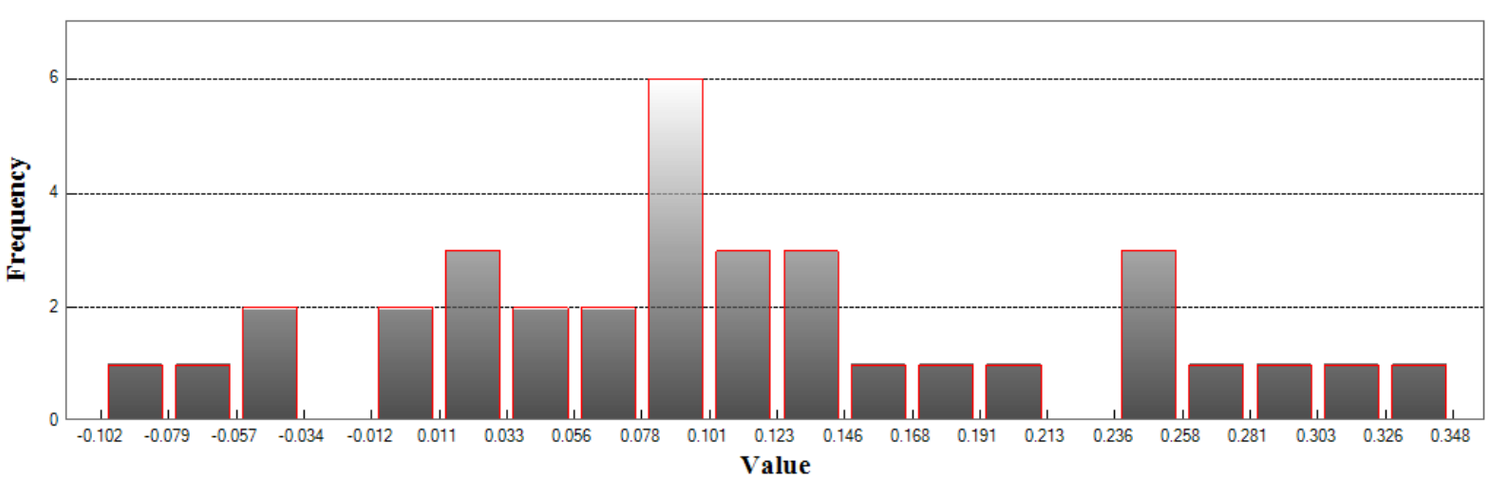
Bin Interval: 0.015

# DEM (Continued)

Supplemental Vertical Accuracy

LandCover Type: BRUSH LAND
Minimum DZ: -0.102
Maximum DZ: 0.349
Mean DZ: 0.109
Mean Magnitude DZ: 0.352
Number Observations: 35
Standard Deviation DZ: 0.109
RMSE Z: 0.153
95th Percentile: 0.291
Units: Meters

# Histogram



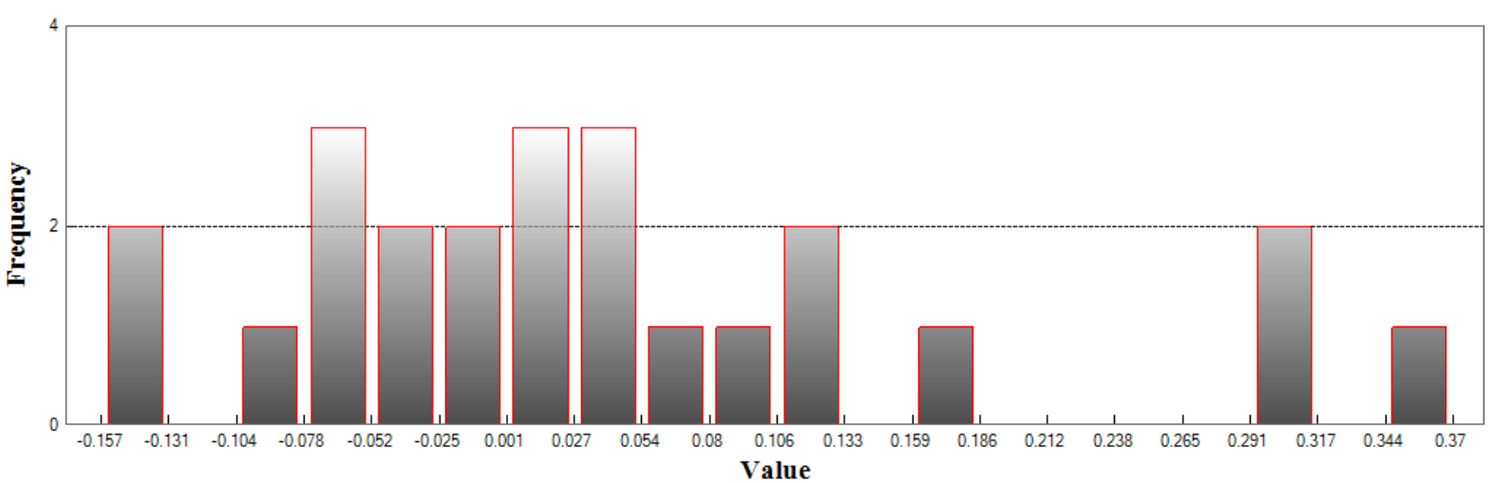

Min: -0.102
Max: 0.349
Number Of Bins: 20
Bin Interval: 0.023

# DEM (Continued)

Supplemental Vertical Accuracy

LandCover Type: FOREST
Minimum DZ: -0.157
Maximum DZ: 0.37
Mean DZ: 0.041
Mean Magnitude DZ: 0.318
Number Observations: 24
Standard Deviation DZ: 0.137
RMSE Z: 0.14
95th Percentile: 0.302
Units: Meters

# Histogram



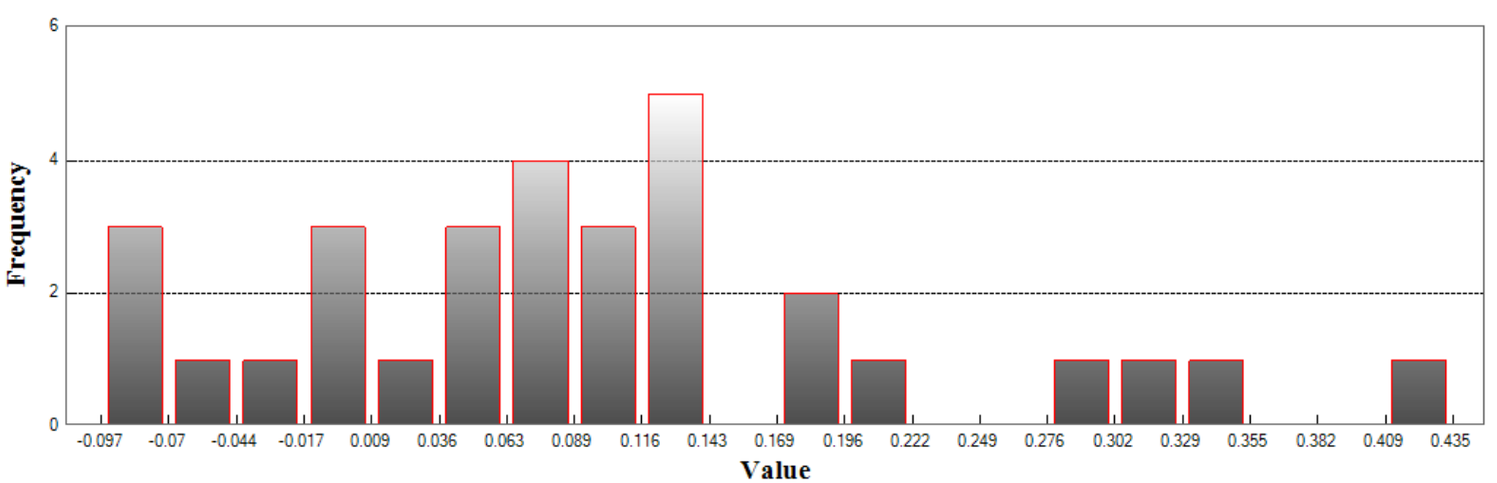

Min: -0.157
Max: 0.37
Number Of Bins: 20
Bin Interval: 0.026

# DEM (Continued)

Supplemental Vertical Accuracy

LandCover Type: TALL WEED
Minimum DZ: -0.097
Maximum DZ: 0.436
Mean DZ: 0.1
Mean Magnitude DZ: 0.353
Number Observations: 31
Standard Deviation DZ: 0.127
RMSE Z: 0.16
95th Percentile: 0.337
Units: Meters

# Histogram



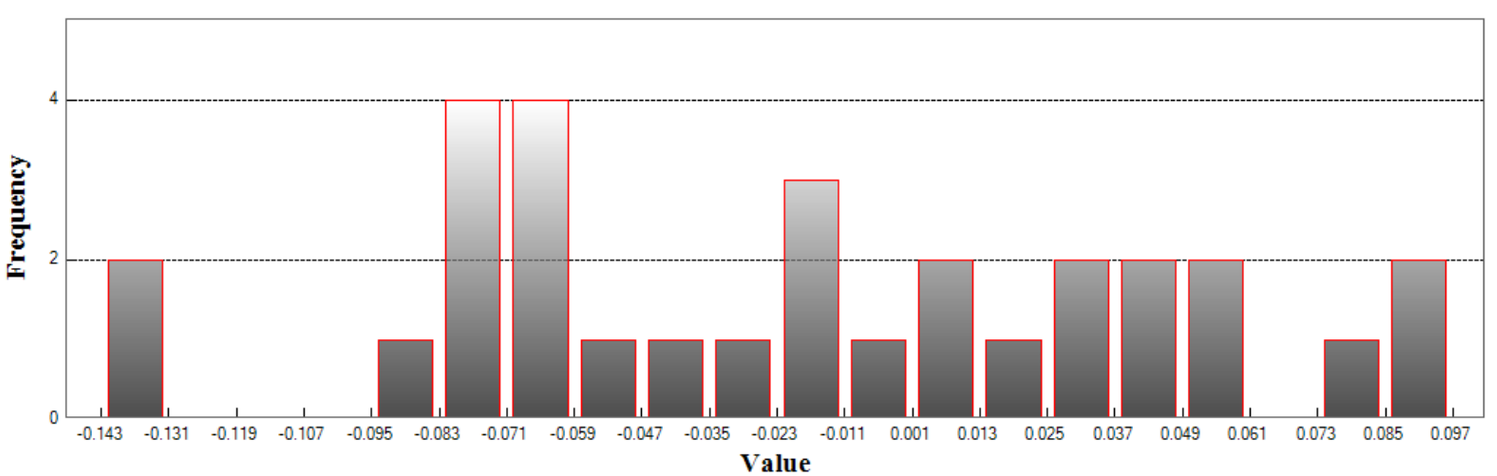

Min: -0.097
Max: 0.436
Number Of Bins: 20
Bin Interval: 0.027

# DEM (Continued)

Supplemental Vertical Accuracy

LandCover Type: URBAN
Minimum DZ: -0.143
Maximum DZ: 0.097
Mean DZ: -0.016
Mean Magnitude DZ: 0.235
Number Observations: 30
Standard Deviation DZ: 0.064
RMSE Z: 0.065
95th Percentile: 0.118
Units: Meters

# Histogram



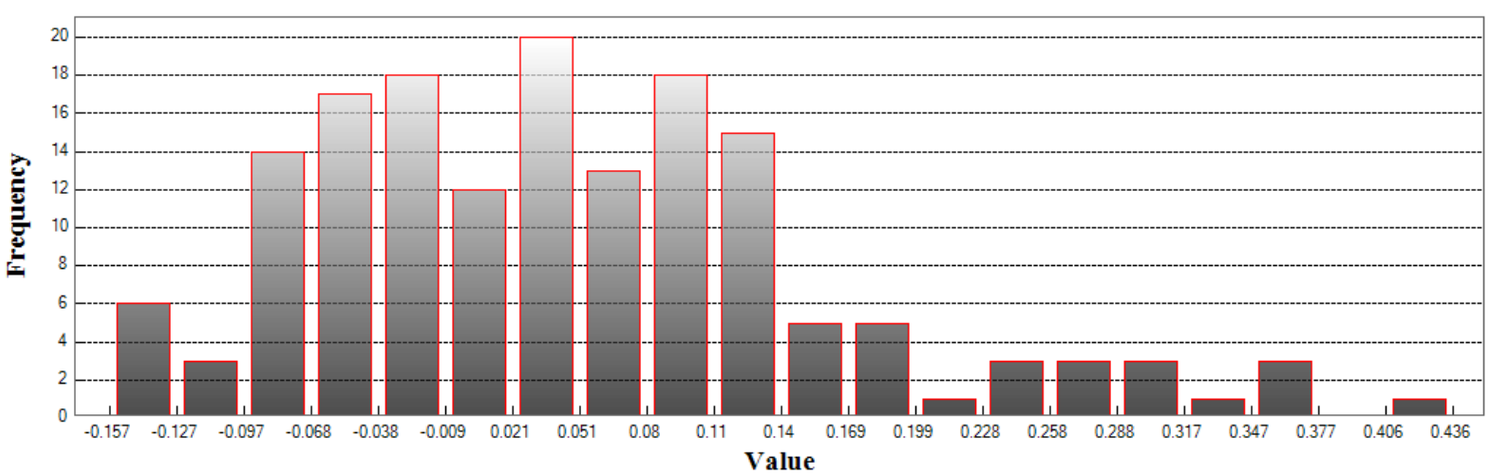

Min: -0.143
Max: 0.097
Number Of Bins: 20
Bin Interval: 0.012

# DEM (Continued)

Consolidated Vertical Accuracy

LandCover Type: ALL
Minimum DZ: -0.157
Maximum DZ: 0.436
Mean DZ: 0.048
Mean Magnitude DZ: 0.305
Number Observations: 161
Standard Deviation DZ: 0.115
RMSE Z: 0.124
95th Percentile: 0.283
Units: Meters

# Histogram




Min: -0.157
Max: 0.436
Number Of Bins: 20
Bin Interval: 0.03