



# North Carolina Department of Public Safety

## Emergency Management North Carolina Geodetic Survey

Pat McCrory, Governor  
Frank L. Perry, Secretary

Michael A. Sprayberry, Director

### LiDar Quality Control Report – 2015 Statewide LiDAR Project

The North Carolina Geodetic survey performed a vertical quality control (QC) survey in Phase three (3) of the statewide LiDAR elevation project. The purpose of the survey was to test the elevation points contained in a dataset that was obtained by utilizing airborne Light Detection and Ranging (LiDAR) technology. The attached report contains the results of the vertical QC survey.

The QC test points were collected utilizing the North Carolina Continuous Operating Reference System (NCCORS) and the North Carolina Real Time Network. (NCRTN), and with conventional survey methods in areas unsuitable for GNSS observations.

The field survey data that was used to generate the attached report was performed by five (5) firms that are licensed by the NC Board of Examiners for Engineers and Surveyors. Each of these firms provided a signed and sealed report that included all of the data that they collected under the responsible charge of a North Carolina Professional Land Surveyor. Some of the quality control points were collected by the North Carolina Geodetic survey (NCGS) under the supervision of Joe Scott (L-3254). The review of the field data and the generation of the final QC report were performed under the supervision of Gary Thompson (L-2694).

The GNSS portion of the survey (performed by NCGS) was performed to the following parameters:

<b>Class of survey:</b>	Class C
<b>Positional accuracy:</b>	Vertical 0.04 USft Horizontal 0.03 USft
<b>Type of field procedure:</b>	North Carolina Real Time Network (NCRTN)
<b>Dates of survey:</b>	December 18, 2015
<b>Horizontal datum/epoch:</b>	North American Datum 83(2011) epoch 2010.0
<b>Vertical datum/epoch</b>	North American Vertical Datum of 1988 (NAVD88)
<b>Published fixed control used:</b>	North Carolina Continuously Operating Reference Station (CORS) Network and NCRTN
<b>Geoid model:</b>	Geoid12A
<b>Combined grid factor:</b>	See attached control datasheets
<b>Units:</b>	US Survey Feet

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**2015 Phase 3 NC LiDAR Independent Quality Control Summary  
Non-Vegetated Area**

County	NVA Type	NVA		NVA Mean DZ	NVA Mean Magnitude DZ	NVA Observations	NVA Standard Deviation DZ	NVA RMSE Z	95% Confidence Level Z
		Minimum DZ	Maximum DZ						
Alamance	2U, 2B	-0.455	0.272	-0.071	0.374	29	0.174	0.185	0.363
Caswell	2U, 2B	-0.291	0.261	-0.092	0.363	32	0.125	0.153	0.300
Chatham	2U, 2B	-0.524	0.197	-0.099	0.362	40	0.145	0.174	0.344
Durham	2U, 2B	-0.443	0.459	-0.046	0.390	22	0.202	0.203	0.398
Granville	2U, 2B	-0.299	0.195	0.015	0.298	37	0.109	0.108	0.212
Guilford	2U, 2B	-0.380	0.191	-0.115	0.377	39	0.129	0.172	0.337
Harnett	2U, 2B	-0.822	0.415	-0.175	0.485	34	0.239	0.293	0.575
Lee	2U, 2B	-0.312	0.135	-0.090	0.353	20	0.119	0.147	0.288
Orange	2U, 2B	-0.468	0.033	-0.183	0.430	31	0.111	0.213	0.418
Person	2U, 2B	-0.487	0.047	-0.134	0.370	31	0.106	0.170	0.333
Randolph	2U, 2B	-0.260	0.200	-0.009	0.296	46	0.109	0.108	0.211
Rockingham	2U, 2B	-0.413	0.184	-0.145	0.403	37	0.123	0.189	0.371
Wake	2U, 2B	-0.397	0.504	-0.012	0.427	51	0.220	0.218	0.428

**Vegetated Area**

County	VVA Class	VVA		VVA Mean DZ	VVA Mean Magnitude DZ	VVA Observations	VVA Standard Deviation DZ	VVA RMSE Z	95th Percentile
		Minimum DZ	Maximum DZ						
Alamance	2L, 2M, 2H	-0.066	0.540	0.132	0.382	20	0.161	0.205	0.523
Caswell	2L, 2M, 2H	-0.176	0.850	0.109	0.458	20	0.283	0.297	0.607
Chatham	2L, 2M, 2H	-0.541	0.444	0.025	0.415	40	0.212	0.211	0.375
Durham	2L, 2M, 2H	-0.301	0.800	0.120	0.446	22	0.252	0.274	0.510
Granville	2L, 2M, 2H	-0.273	0.723	0.188	0.474	25	0.234	0.297	0.584
Guilford	2L, 2M, 2H	-0.278	0.816	0.164	0.482	31	0.244	0.290	0.566
Harnett	2L, 2M, 2H	-0.569	0.348	-0.013	0.419	29	0.221	0.218	0.357
Lee	2L, 2M, 2H	-0.334	0.258	0.013	0.370	19	0.171	0.167	0.266
Orange	2L, 2M, 2H	-0.273	0.560	0.080	0.442	20	0.231	0.239	0.439
Person	2L, 2M, 2H	-0.194	0.472	0.097	0.409	20	0.196	0.214	0.459
Randolph	2L, 2M, 2H	-0.232	0.811	0.198	0.485	38	0.234	0.305	0.641
Rockingham	2L, 2M, 2H	-0.332	0.377	0.020	0.413	27	0.206	0.204	0.367
Wake	2L, 2M, 2H	-0.488	0.797	0.130	0.486	37	0.279	0.304	0.576

All values except observations in US Feet

Phase 3 Overall Results			
Non-Vegetated Area		Vegetated Area	
Minimum DZ:	-0.822	Minimum DZ:	-0.569
Maximum DZ:	0.504	Maximum DZ:	0.850
Mean DZ:	-0.084	Mean DZ:	0.099
Mean Magnitude DZ:	0.382	Mean Magnitude DZ:	0.443
Observations:	449	Observations:	348
Standard Deviation DZ:	0.165	Standard Deviation DZ:	0.237
RMSE Z:	0.185	RMSE Z:	0.256
95% Confidence Level Z:	0.363	95th Percentile:	0.502

Claude T Bowers Building  
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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gtm\GIS\LIDAR2015\Phase 3 QC\county\_files\alamance\_files.shp

Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified

Path to Data: Not Specified

Number of Data Files Matching Attribute: Not Specified

### DEM:

Tile Index Attribute: Not Specified

Path to Data: Not Specified

Number of Data Files Matching Attribute: Not Specified

### LAS:

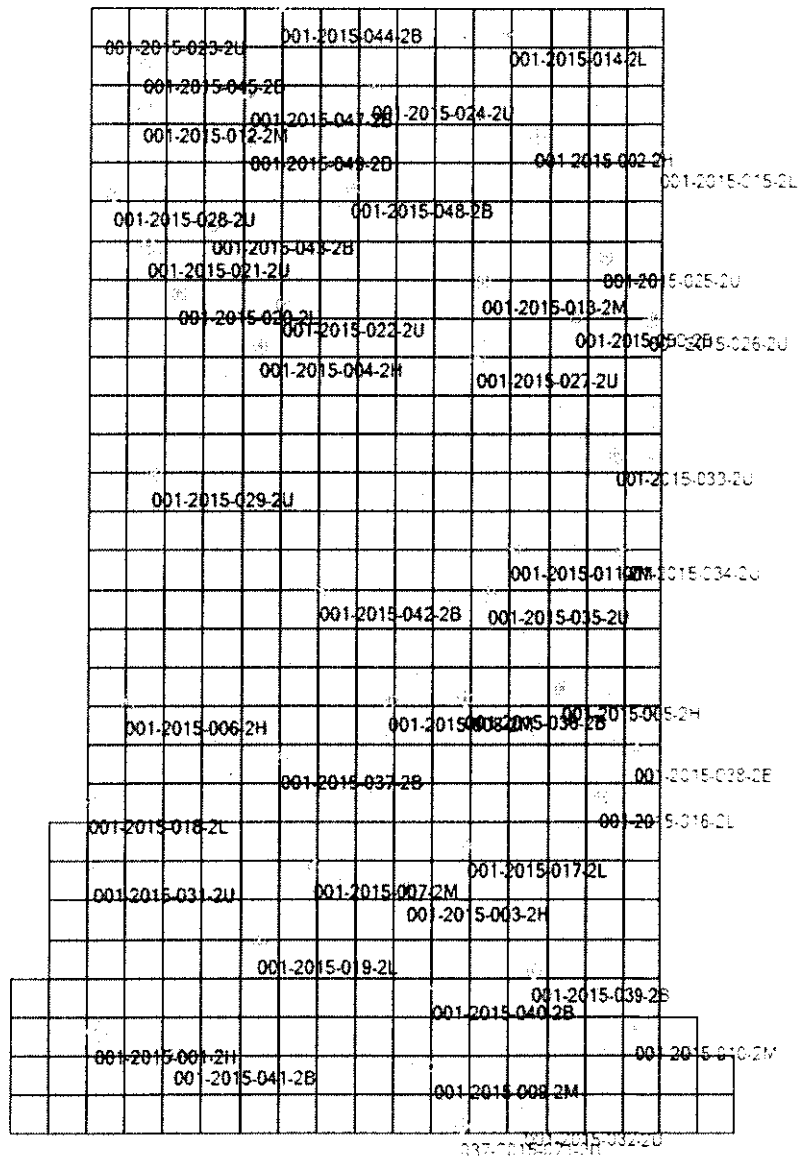
Tile Index Attribute: LiDARTiles

Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery2\_08242015\V2\Classified\_LAS

Number of Data Files Matching Attribute: 452 out of 452



### Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	49			
2H	6		0.454	0.454
2M	7		0.153	0.153
2L	7		0.443	0.443
2U	15	0.370	0.325	
2B	14	0.355	0.352	
Total	49			

Units: US Survey Feet

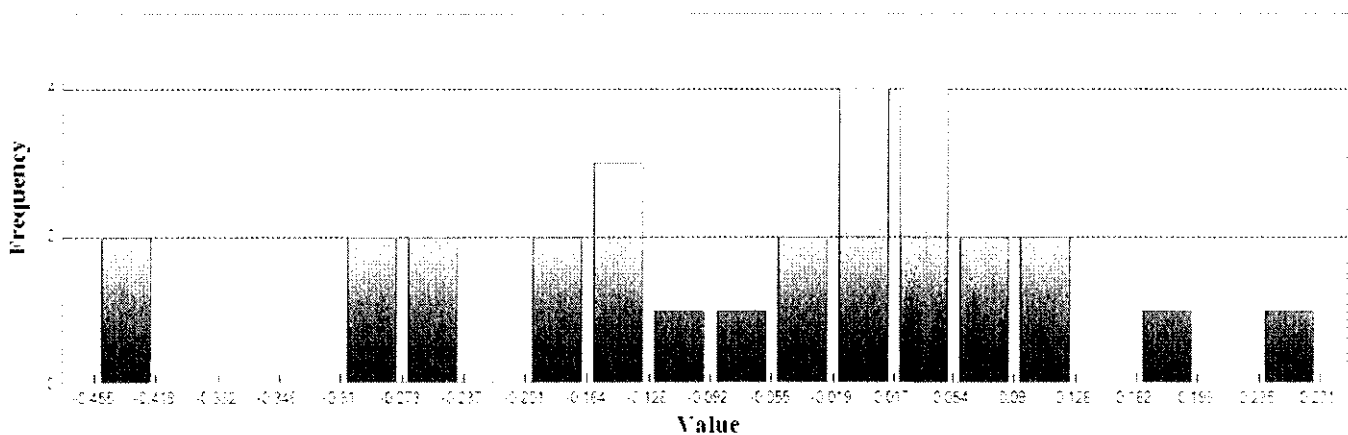


## LAS

### Non-vegetated Vertical Accuracy

LandCover Type: 2U, 2B  
Minimum DZ: -0.455  
Maximum DZ: 0.272  
Mean DZ: -0.071  
Mean Magnitude DZ: 0.374  
Number Observations: 29  
Standard Deviation DZ: 0.174  
RMSE Z: 0.185  
95% Confidence Level Z: 0.363  
Units: US Survey Feet

## Histogram



Min: -0.455

Max: 0.272

Number Of Bins: 20

Bin Interval: 0.036

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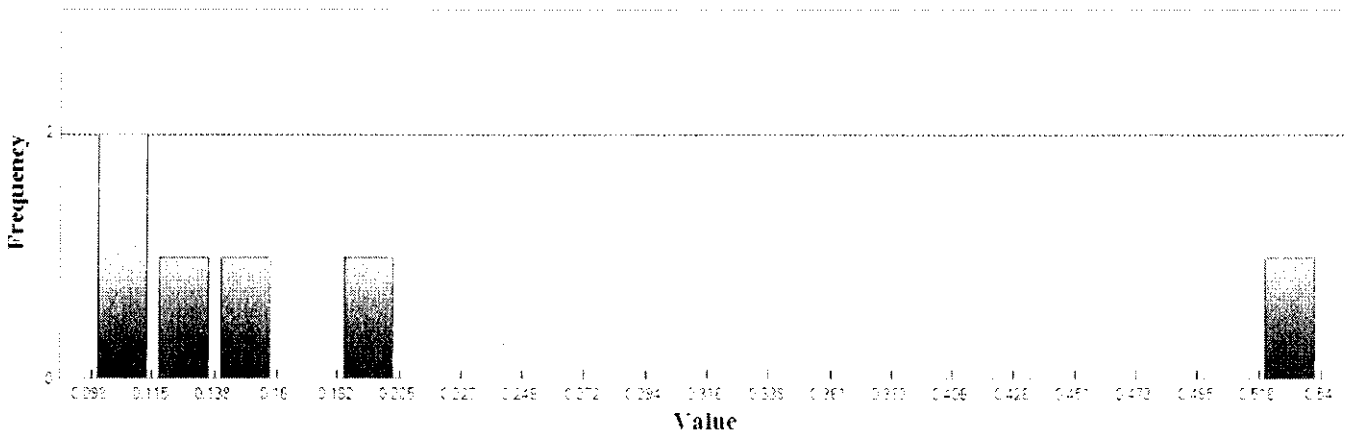


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: 0.093  
Maximum DZ: 0.54  
Mean DZ: 0.202  
Mean Magnitude DZ: 0.45  
Number Observations: 6  
Standard Deviation DZ: 0.169  
RMSE Z: 0.254  
95th Percentile: 0.454  
Units: US Survey Feet

## Histogram



Min: 0.093

Max: 0.54

Number Of Bins: 20

Bin Interval: 0.022



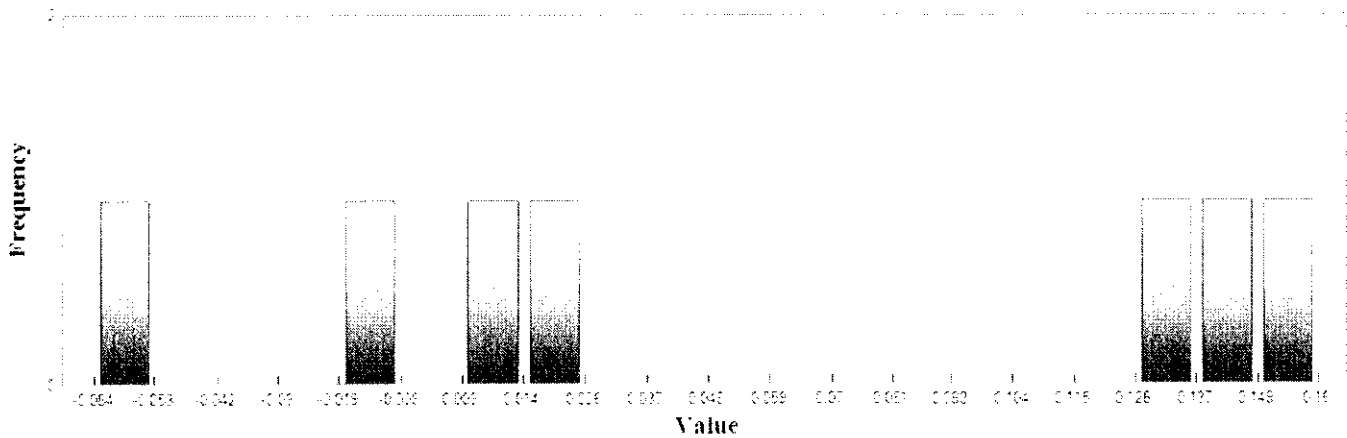


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.064  
Maximum DZ: 0.159  
Mean DZ: 0.055  
Mean Magnitude DZ: 0.278  
Number Observations: 7  
Standard Deviation DZ: 0.088  
RMSE Z: 0.098  
95th Percentile: 0.153  
Units: US Survey Feet

## Histogram



Min: -0.064

Max: 0.159

Number Of Bins: 20

Bin Interval: 0.011

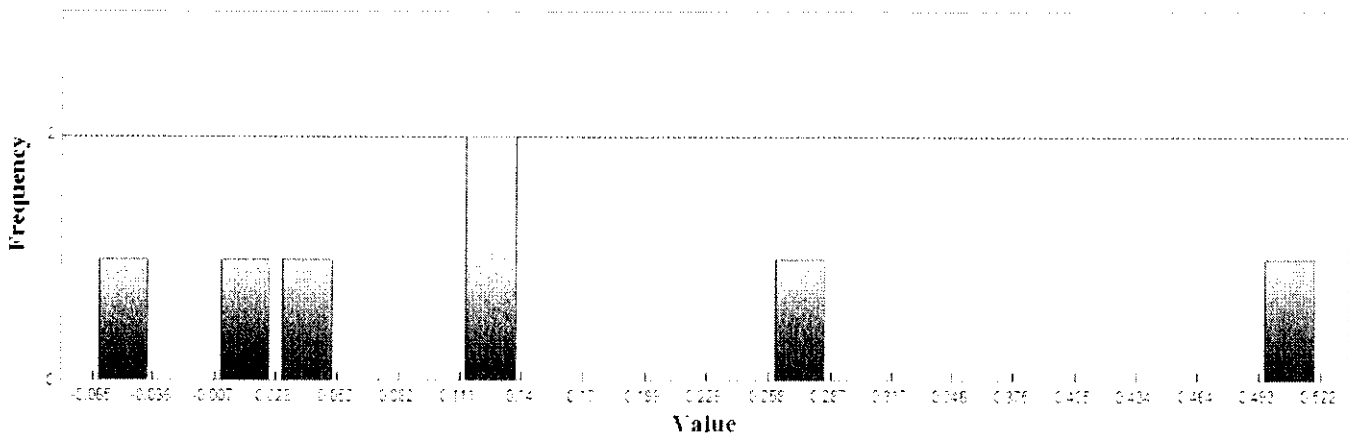


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.066  
Maximum DZ: 0.522  
Mean DZ: 0.147  
Mean Magnitude DZ: 0.408  
Number Observations: 7  
Standard Deviation DZ: 0.195  
RMSE Z: 0.233  
95th Percentile: 0.443  
Units: US Survey Feet

## Histogram



Min: -0.066  
Max: 0.522  
Number Of Bins: 20  
Bin Interval: 0.029

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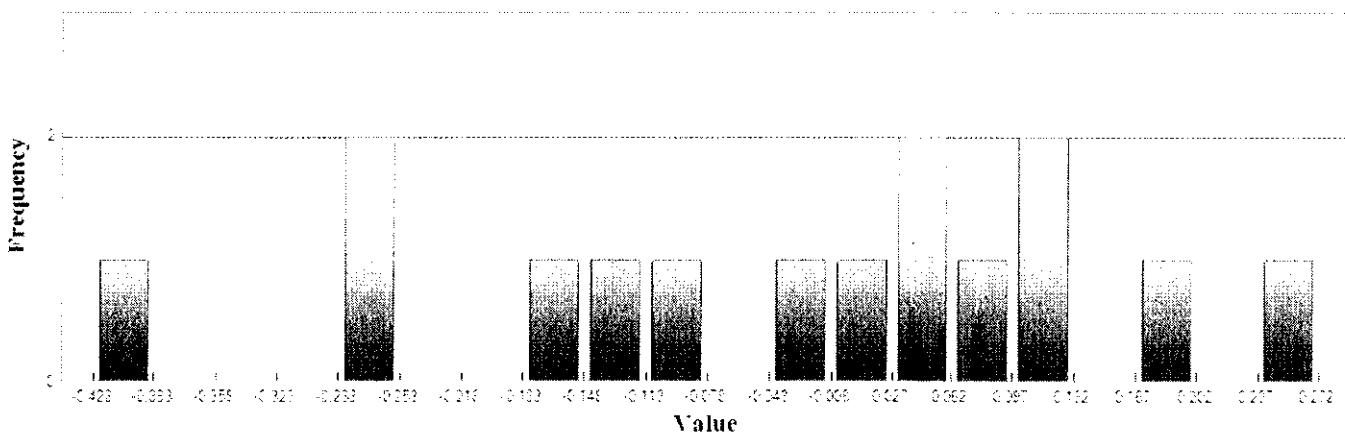


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.429  
Maximum DZ: 0.272  
Mean DZ: -0.037  
Mean Magnitude DZ: 0.39  
Number Observations: 15  
Standard Deviation DZ: 0.192  
RMSE Z: 0.189  
95th Percentile: 0.325  
Units: US Survey Feet

## Histogram



Min: -0.429  
Max: 0.272  
Number Of Bins: 20  
Bin Interval: 0.035

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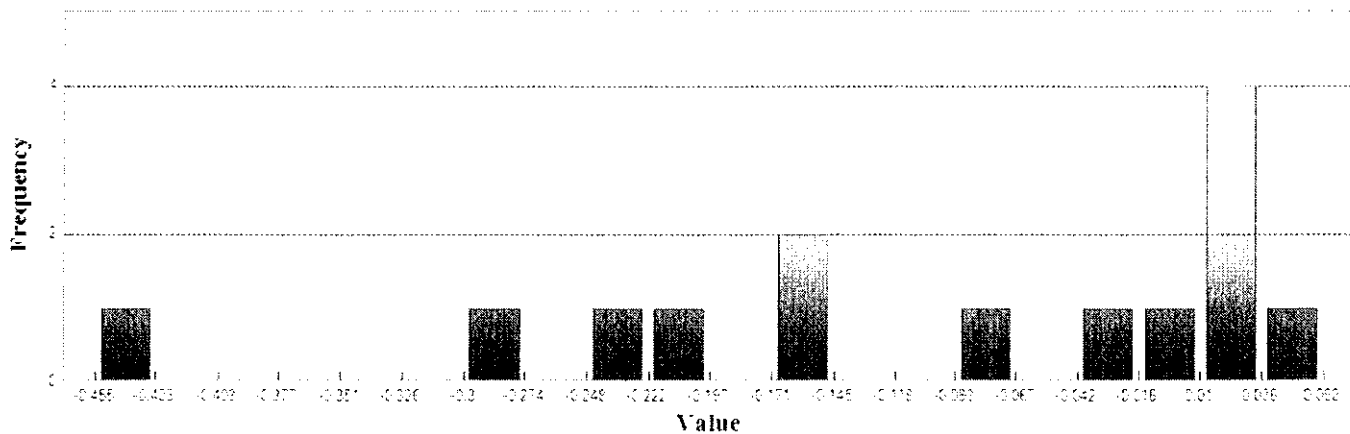


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.455  
Maximum DZ: 0.062  
Mean DZ: -0.108  
Mean Magnitude DZ: 0.356  
Number Observations: 14  
Standard Deviation DZ: 0.151  
RMSE Z: 0.181  
95th Percentile: 0.352  
Units: US Survey Feet

## Histogram



Min: -0.455  
Max: 0.062  
Number Of Bins: 20  
Bin Interval: 0.026



## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2H, 2M, 2L

Minimum DZ: -0.066

Maximum DZ: 0.54

Mean DZ: 0.132

Mean Magnitude DZ: 0.382

Number Observations: 20

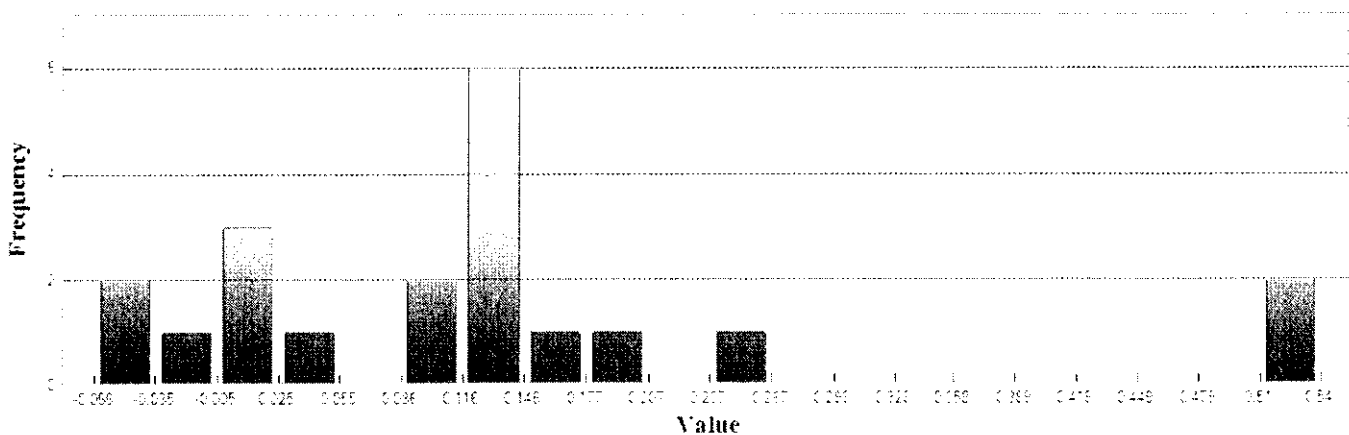
Standard Deviation DZ: 0.161

RMSE Z: 0.205

95th Percentile: 0.523

Units: US Survey Feet

## Histogram



Min: -0.066

Max: 0.54

Number Of Bins: 20

Bin Interval: 0.03

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LIDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gim\GIS\LIDAR2015\Phase 3 QC\county\_tiles\caswell\_tiles.shp

Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified

Path to Data: Not Specified

Number of Data Files Matching Attribute: Not Specified

### DEM:

Tile Index Attribute: Not Specified

Path to Data: Not Specified

Number of Data Files Matching Attribute: Not Specified

### LAS:

Tile Index Attribute: LIDARTiles

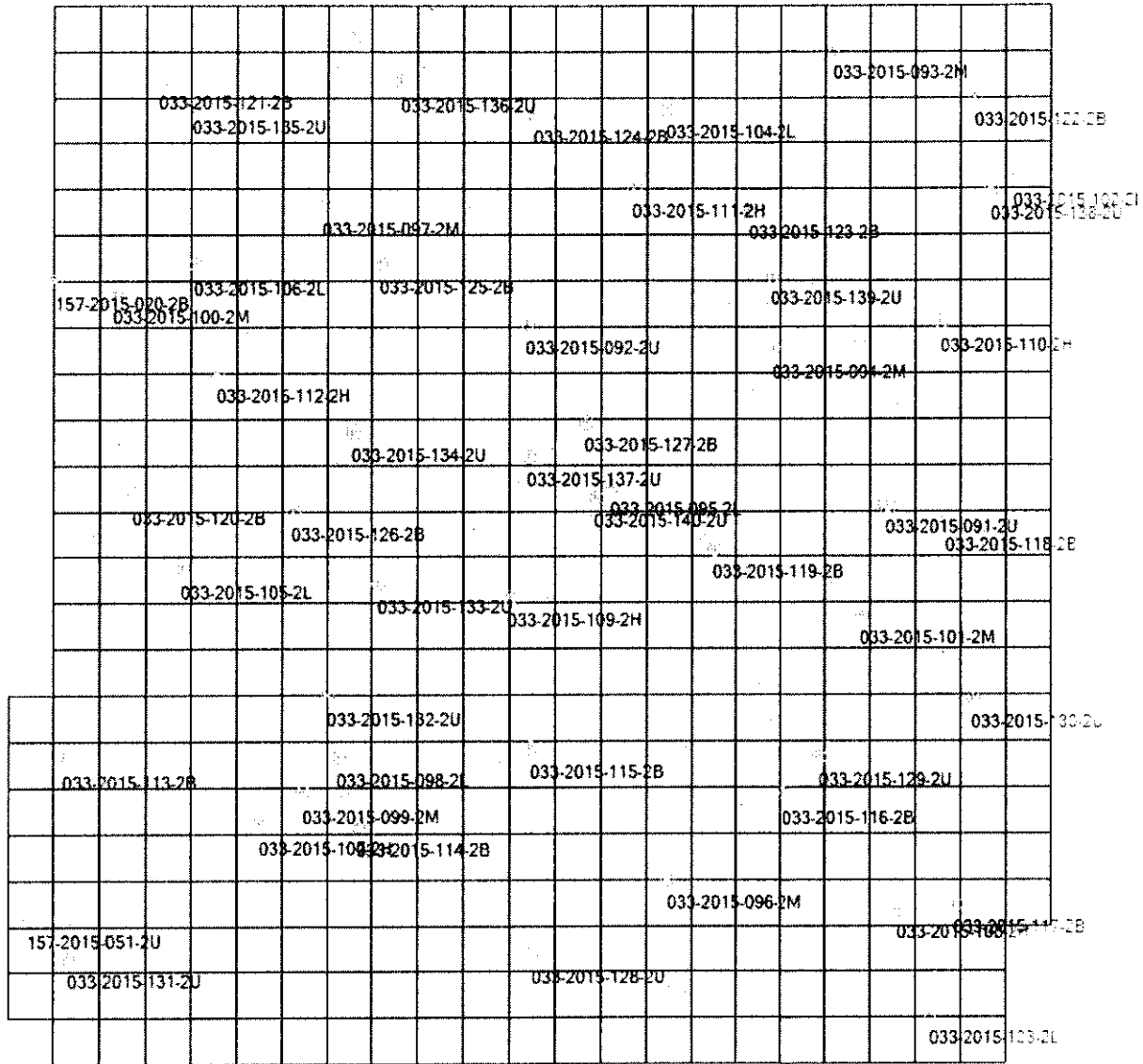
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery1\_1.3\_08122015\V2\Classified\_LAS

Number of Data Files Matching Attribute: 510 out of 510

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Tiled-Data Area





LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	52			
2U	16	0.267	0.249	
2M	7		0.523	0.523
2L	7		0.729	0.729
2H	6		0.223	0.223
2B	16	0.331	0.276	
Total	52			

Units: US Survey Feet



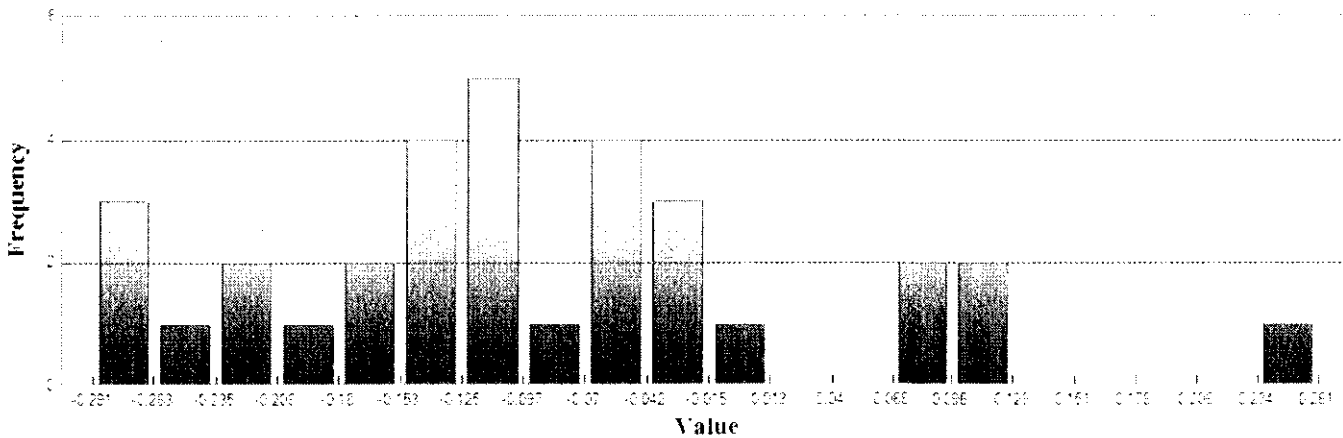


## LAS

### Non-vegetated Vertical Accuracy

LandCover Type: 2U, 2B  
Minimum DZ: -0.291  
Maximum DZ: 0.261  
Mean DZ: -0.092  
Mean Magnitude DZ: 0.363  
Number Observations: 32  
Standard Deviation DZ: 0.125  
RMSE Z: 0.153  
95% Confidence Level Z: 0.3  
Units: US Survey Feet

## Histogram



Min: -0.291  
Max: 0.261  
Number Of Bins: 20  
Bin Interval: 0.028

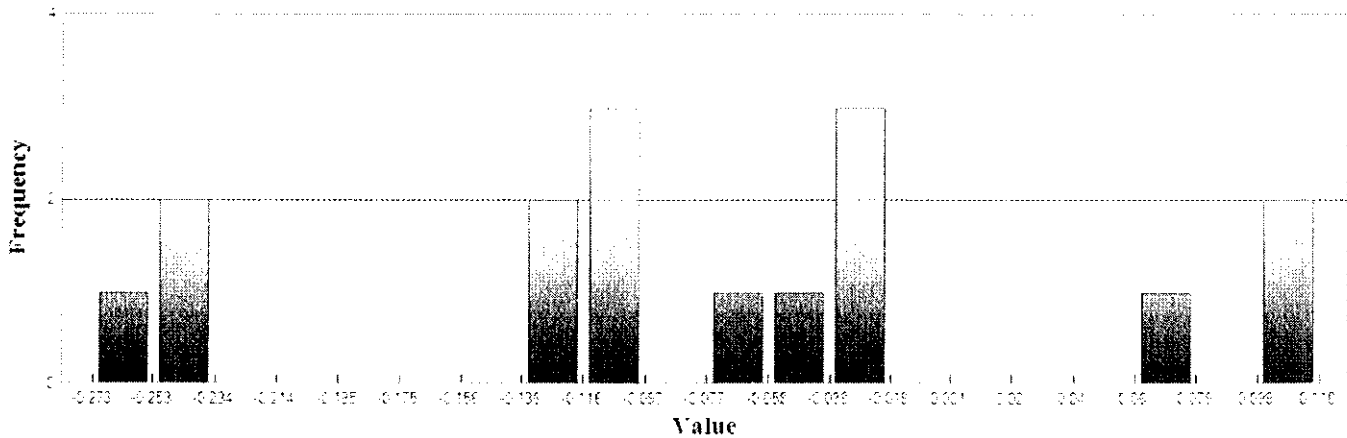


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.273  
Maximum DZ: 0.118  
Mean DZ: -0.078  
Mean Magnitude DZ: 0.339  
Number Observations: 16  
Standard Deviation DZ: 0.115  
RMSE Z: 0.136  
95th Percentile: 0.249  
Units: US Survey Feet

## Histogram



Min: -0.273  
Max: 0.118  
Number Of Bins: 20  
Bin Interval: 0.02

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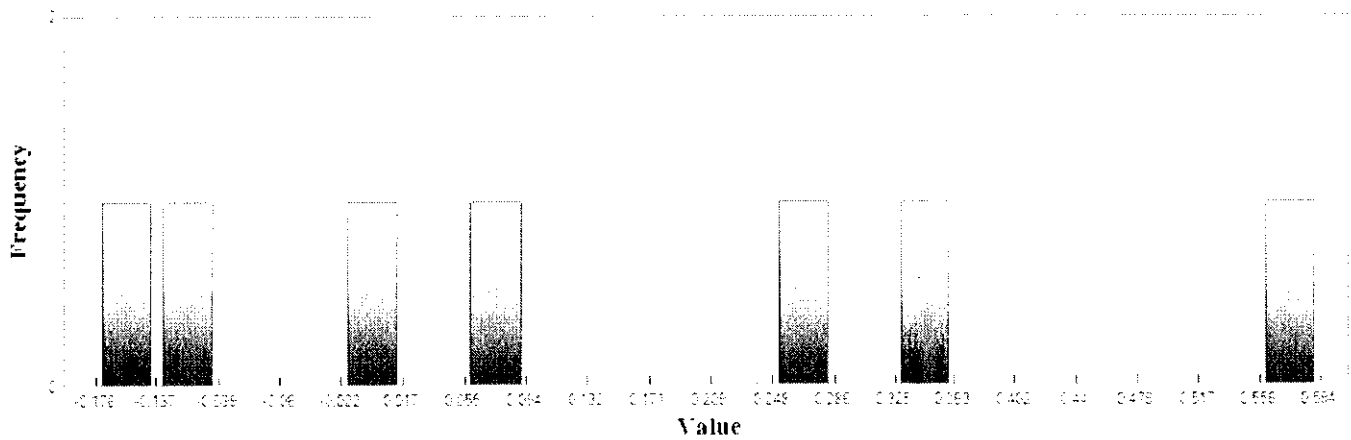


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.176  
Maximum DZ: 0.595  
Mean DZ: 0.141  
Mean Magnitude DZ: 0.475  
Number Observations: 7  
Standard Deviation DZ: 0.276  
RMSE Z: 0.292  
95th Percentile: 0.523  
Units: US Survey Feet

## Histogram



Min: -0.176  
Max: 0.595  
Number Of Bins: 20  
Bin Interval: 0.039

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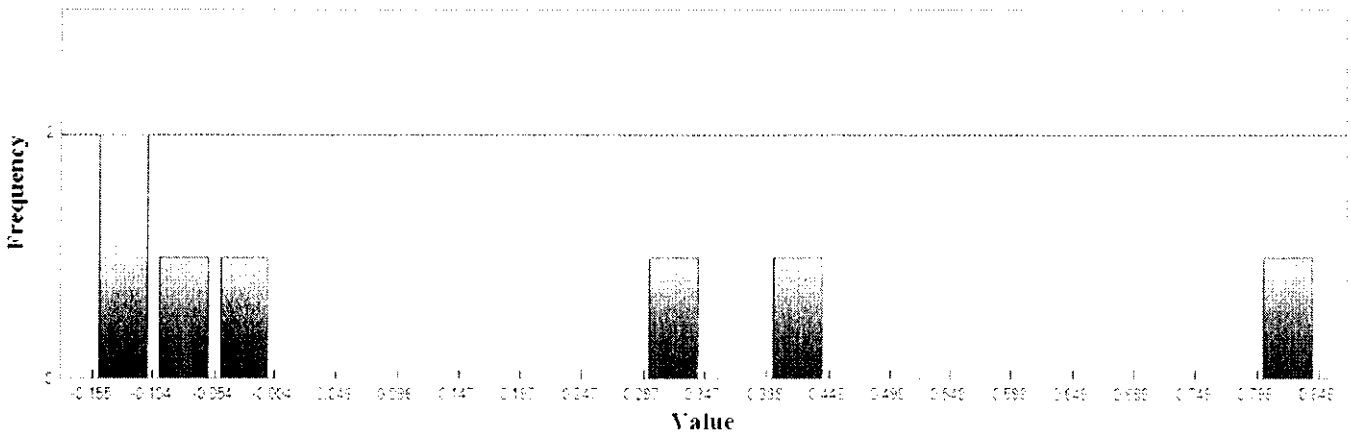


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.154  
Maximum DZ: 0.85  
Mean DZ: 0.176  
Mean Magnitude DZ: 0.532  
Number Observations: 7  
Standard Deviation DZ: 0.375  
RMSE Z: 0.389  
95th Percentile: 0.729  
Units: US Survey Feet

## Histogram



Min: -0.154

Max: 0.85

Number Of Bins: 20

Bin Interval: 0.05

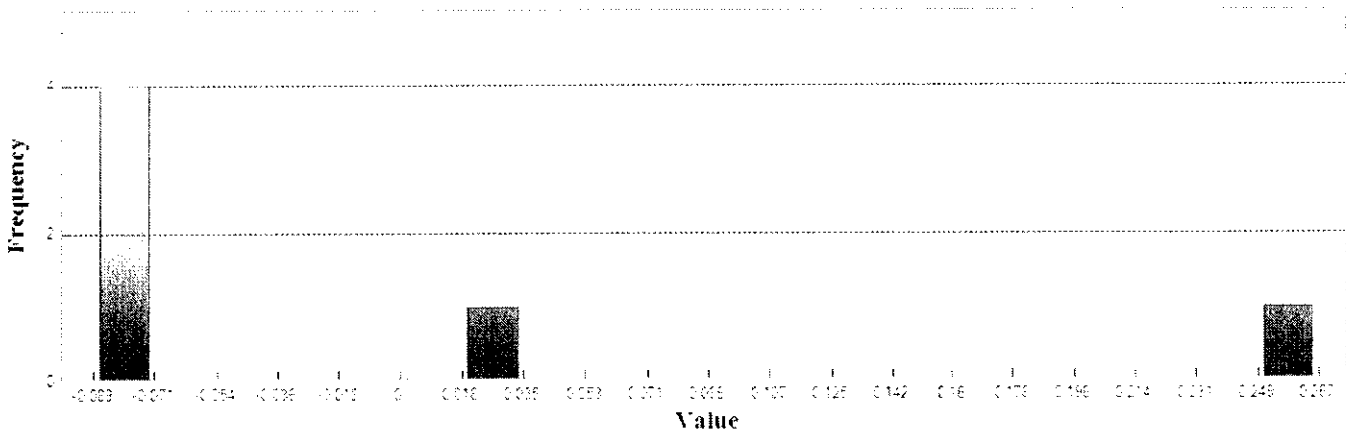


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.089  
Maximum DZ: 0.267  
Mean DZ: -0.007  
Mean Magnitude DZ: 0.326  
Number Observations: 6  
Standard Deviation DZ: 0.142  
RMSE Z: 0.13  
95th Percentile: 0.223  
Units: US Survey Feet

## Histogram



Min: -0.089

Max: 0.267

Number Of Bins: 20

Bin Interval: 0.018

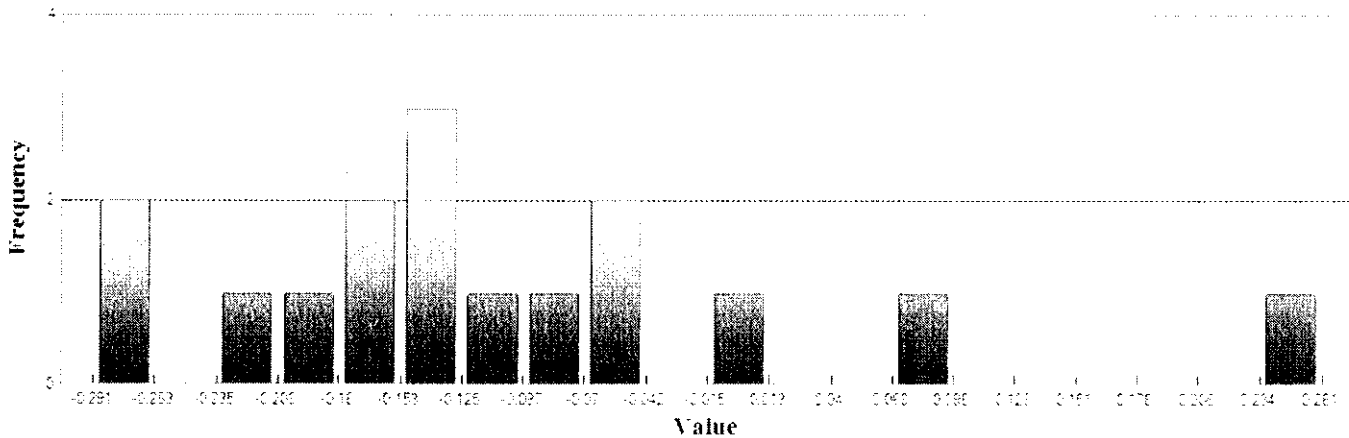


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.291  
Maximum DZ: 0.261  
Mean DZ: -0.106  
Mean Magnitude DZ: 0.386  
Number Observations: 16  
Standard Deviation DZ: 0.136  
RMSE Z: 0.169  
95th Percentile: 0.276  
Units: US Survey Feet

## Histogram



Min: -0.291  
Max: 0.261  
Number Of Bins: 20  
Bin Interval: 0.028

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## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2M, 2L, 2H

Minimum DZ: -0.176

Maximum DZ: 0.85

Mean DZ: 0.109

Mean Magnitude DZ: 0.458

Number Observations: 20

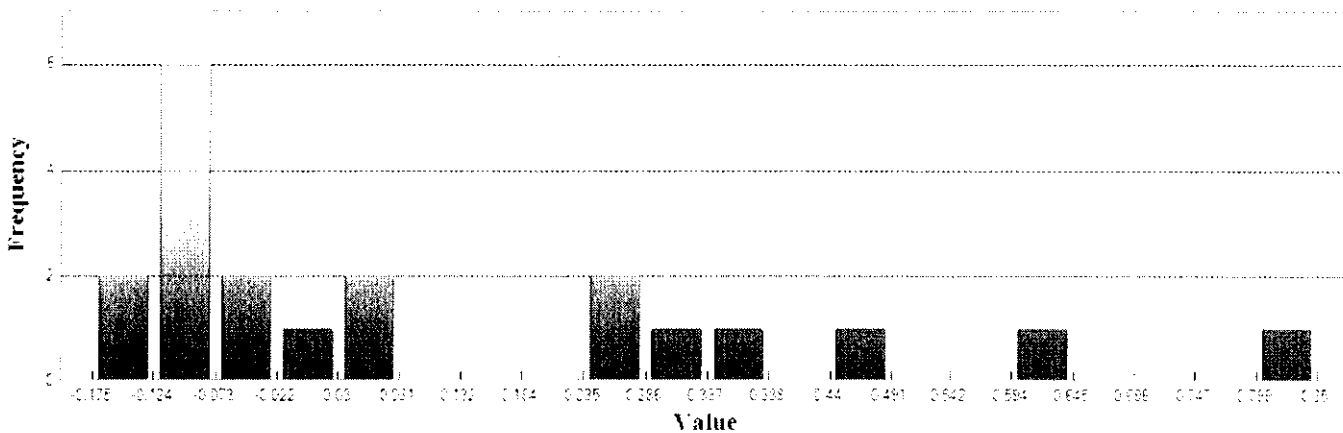
Standard Deviation DZ: 0.283

RMSE Z: 0.297

95th Percentile: 0.607

Units: US Survey Feet

## Histogram



Min: -0.176

Max: 0.85

Number Of Bins: 20

Bin Interval: 0.051

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LIDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Aquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gtm\GIS\LIDAR2015\Phase 3 QC\county\_tiles\chatham\_files.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### LAS:

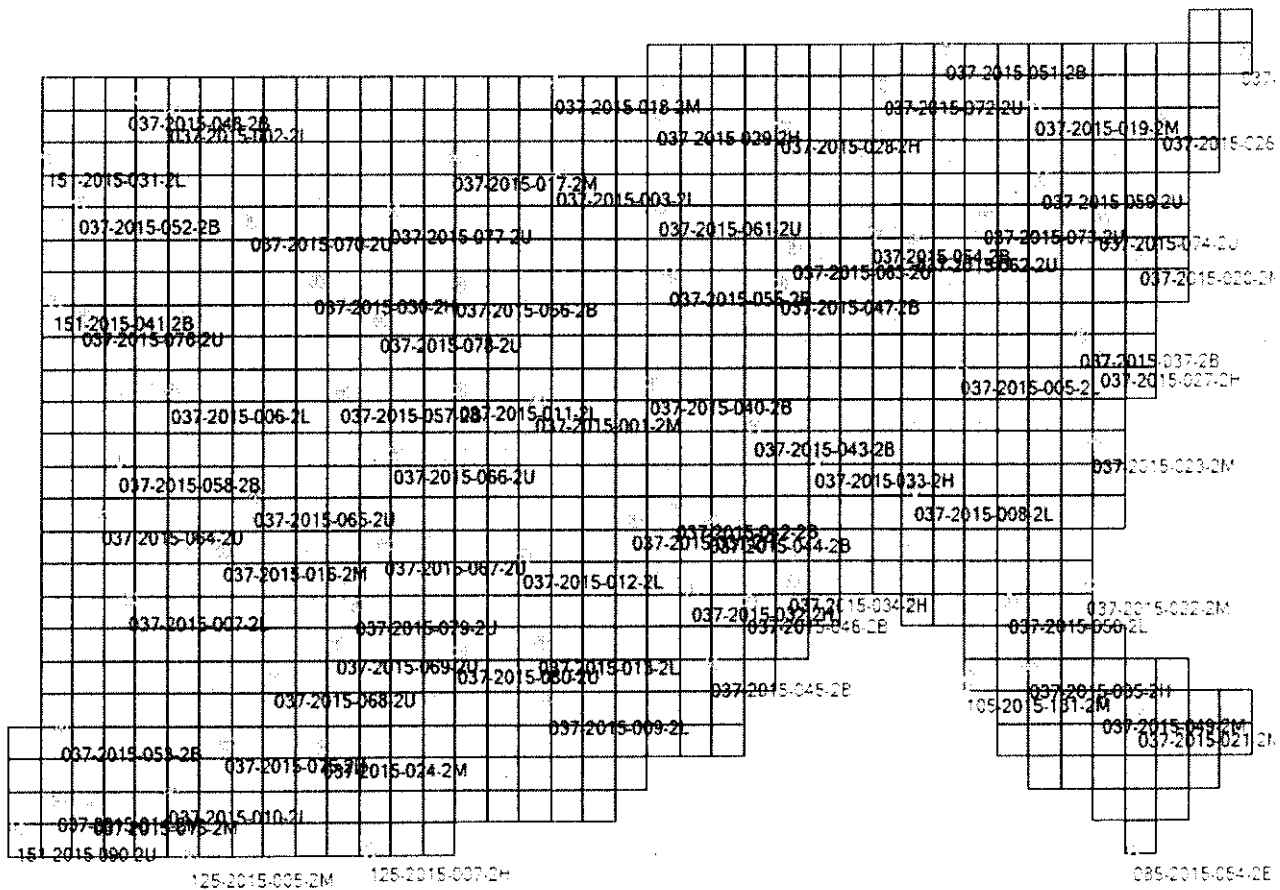
Tile Index Attribute: LIDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery4\_10192015\Delivery4\_01272016\_Redc  
Number of Data Files Matching Attribute: 797 out of 797



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### Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	80			
2M	15		0.307	0.307
2H	12		0.488	0.488
2L	13		0.302	0.302
2B	19	0.279	0.299	
2U	21	0.388	0.338	
Total	80			

Units: US Survey Feet

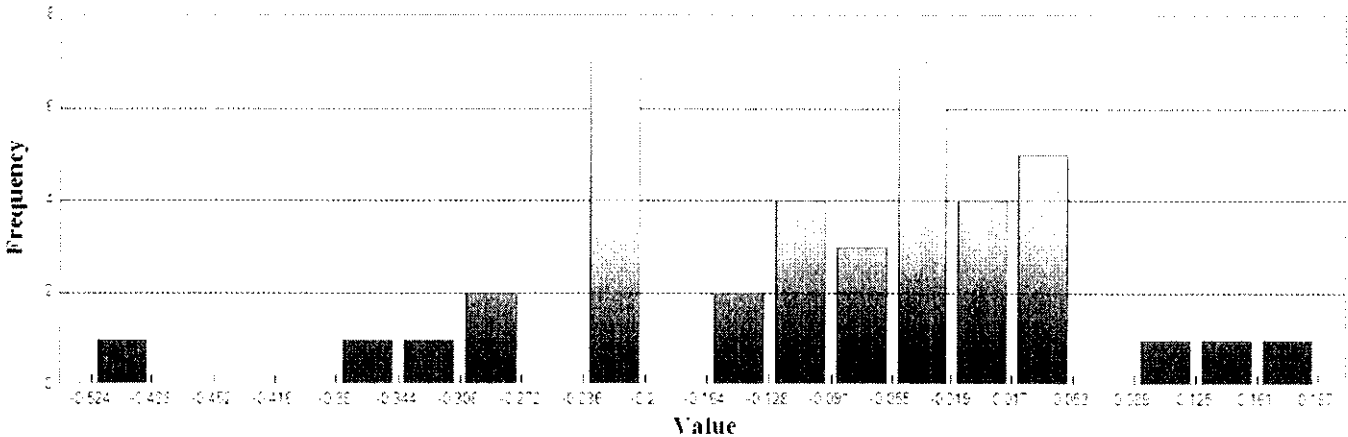


# LAS

## Non-vegetated Vertical Accuracy

LandCover Type: 2B, 2U  
Minimum DZ: -0.524  
Maximum DZ: 0.197  
Mean DZ: -0.099  
Mean Magnitude DZ: 0.362  
Number Observations: 40  
Standard Deviation DZ: 0.145  
RMSE Z: 0.174  
95% Confidence Level Z: 0.341  
Units: US Survey Feet

# Histogram



Min: -0.524  
Max: 0.197  
Number Of Bins: 20  
Bin Interval: 0.036

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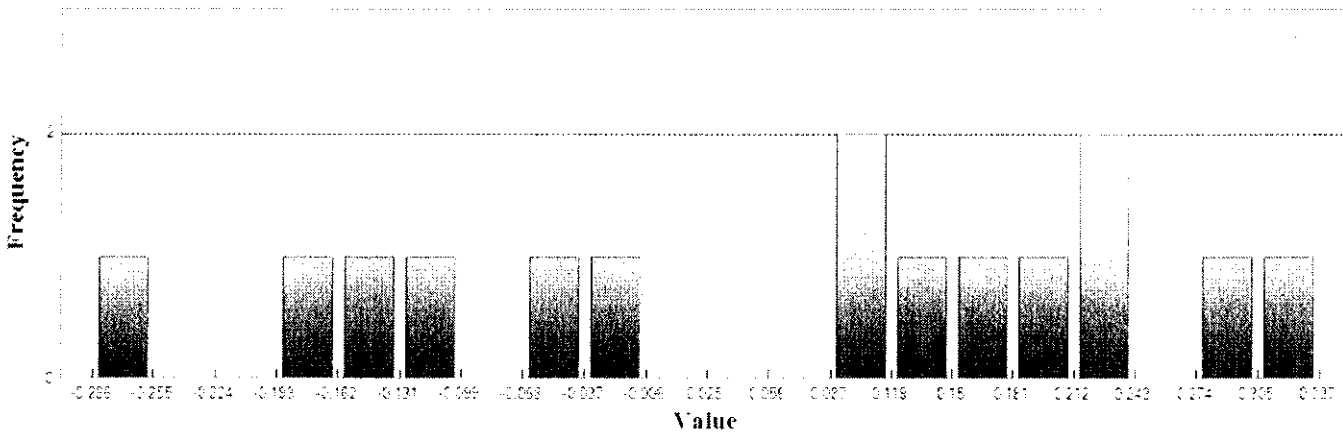


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.287  
Maximum DZ: 0.336  
Mean DZ: 0.068  
Mean Magnitude DZ: 0.416  
Number Observations: 15  
Standard Deviation DZ: 0.188  
RMSE Z: 0.194  
95th Percentile: 0.307  
Units: US Survey Feet

## Histogram



Min: -0.287  
Max: 0.336  
Number Of Bins: 20  
Bin Interval: 0.031

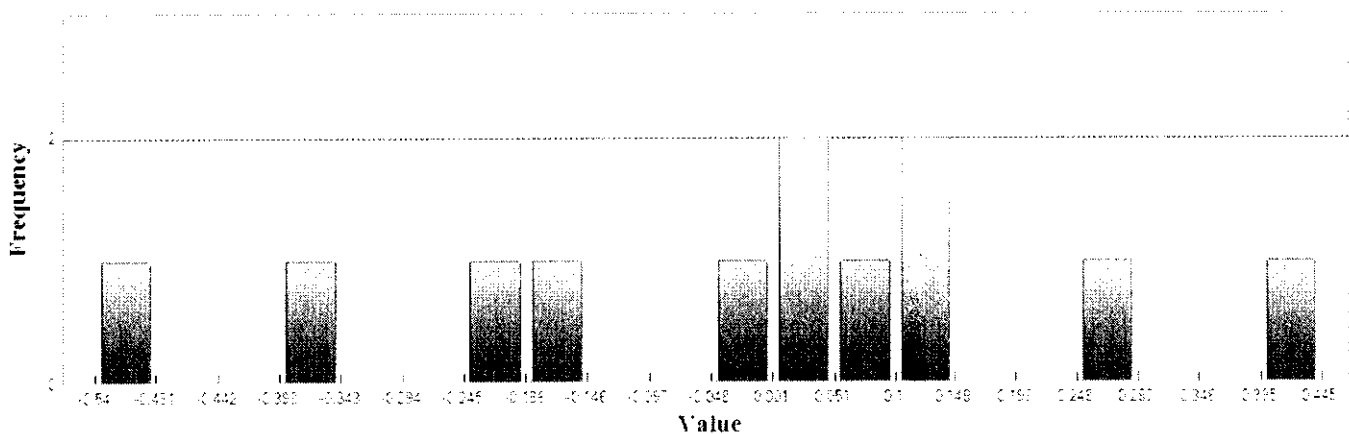


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.541  
Maximum DZ: 0.444  
Mean DZ: -0.018  
Mean Magnitude DZ: 0.454  
Number Observations: 12  
Standard Deviation DZ: 0.275  
RMSE Z: 0.264  
95th Percentile: 0.488  
Units: US Survey Feet

## Histogram



Min: -0.541  
Max: 0.444  
Number Of Bins: 20  
Bin Interval: 0.049

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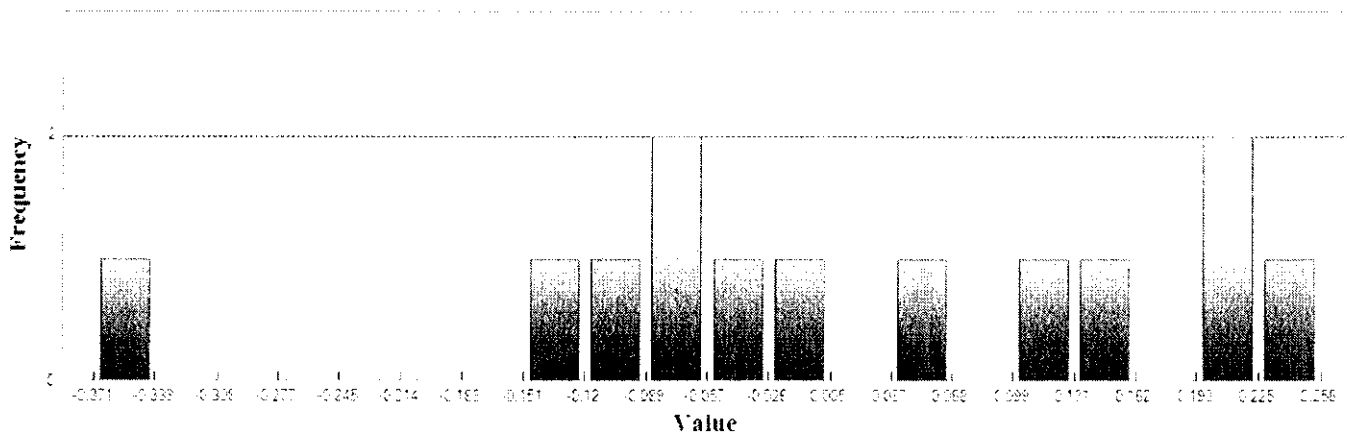


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.371  
Maximum DZ: 0.256  
Mean DZ: 0.015  
Mean Magnitude DZ: 0.375  
Number Observations: 13  
Standard Deviation DZ: 0.177  
RMSE Z: 0.171  
95th Percentile: 0.302  
Units: US Survey Feet

## Histogram



Min: -0.371  
Max: 0.256  
Number Of Bins: 20  
Bin Interval: 0.031

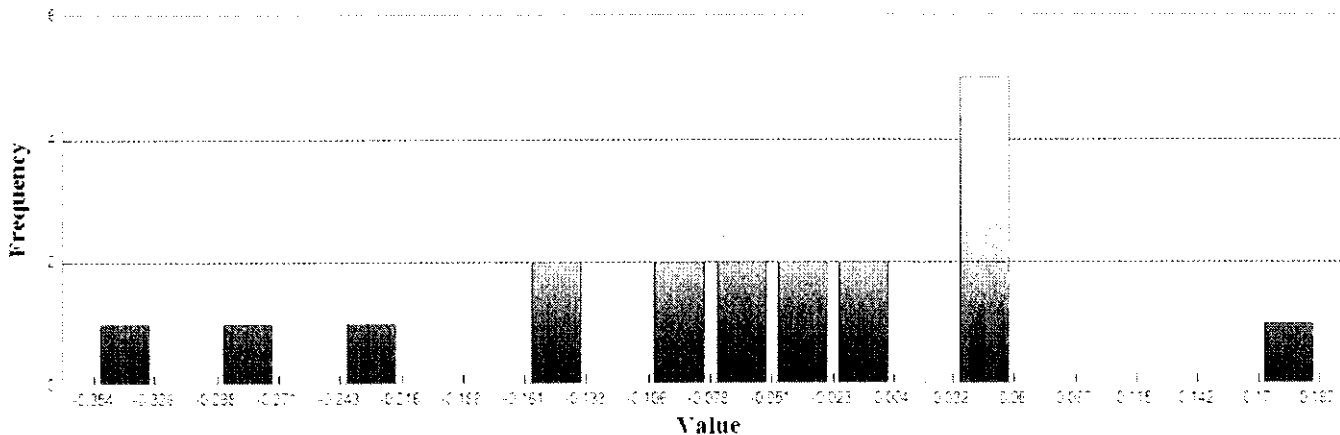


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.354  
Maximum DZ: 0.197  
Mean DZ: -0.062  
Mean Magnitude DZ: 0.322  
Number Observations: 19  
Standard Deviation DZ: 0.132  
RMSE Z: 0.143  
95th Percentile: 0.299  
Units: US Survey Feet

## Histogram



Min: -0.354

Max: 0.197

Number Of Bins: 20

Bin Interval: 0.028

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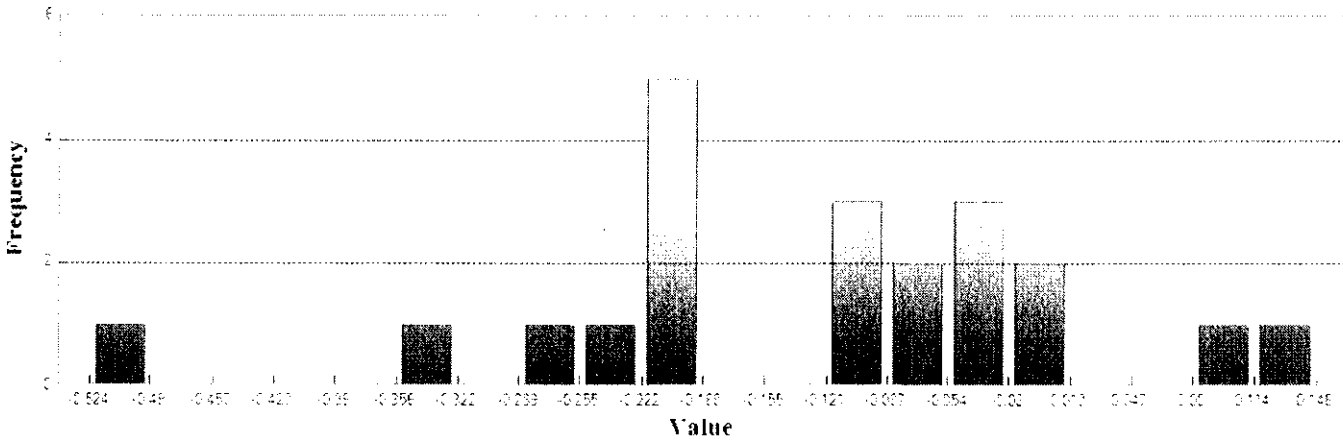


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.524  
Maximum DZ: 0.147  
Mean DZ: -0.133  
Mean Magnitude DZ: 0.395  
Number Observations: 21  
Standard Deviation DZ: 0.15  
RMSE Z: 0.198  
95th Percentile: 0.338  
Units: US Survey Feet

## Histogram



Min: -0.524  
Max: 0.147  
Number Of Bins: 20  
Bin Interval: 0.034





## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2M, 2H, 2L

Minimum DZ: -0.541

Maximum DZ: 0.444

Mean DZ: 0.025

Mean Magnitude DZ: 0.415

Number Observations: 40

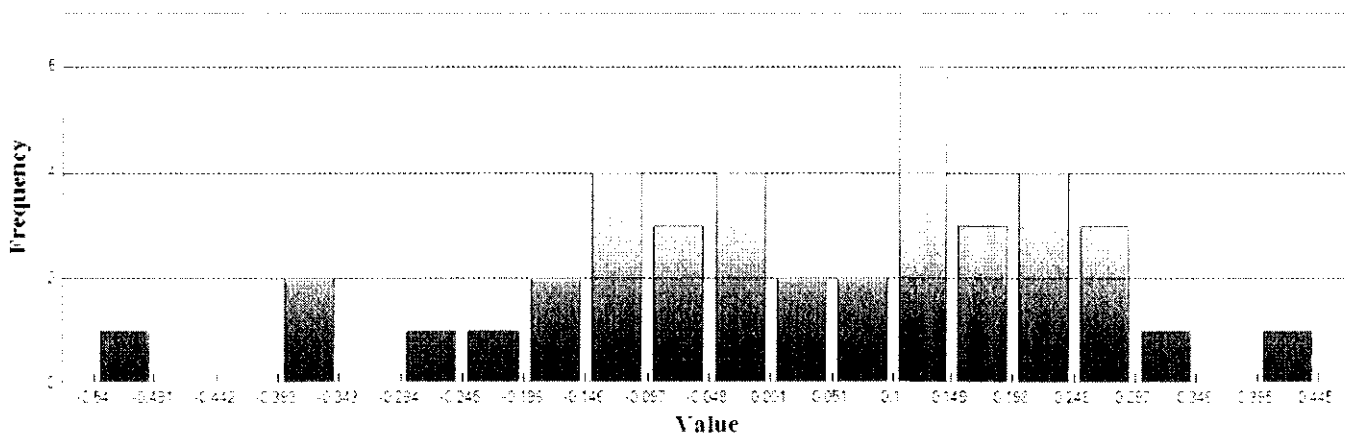
Standard Deviation DZ: 0.212

RMSE Z: 0.211

95th Percentile: 0.375

Units: US Survey Feet

## Histogram



Min: -0.541

Max: 0.444

Number Of Bins: 20

Bin Interval: 0.049

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gim\GIS\LiDAR2015\Phase 3 QC\county\_files\durham\_files.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

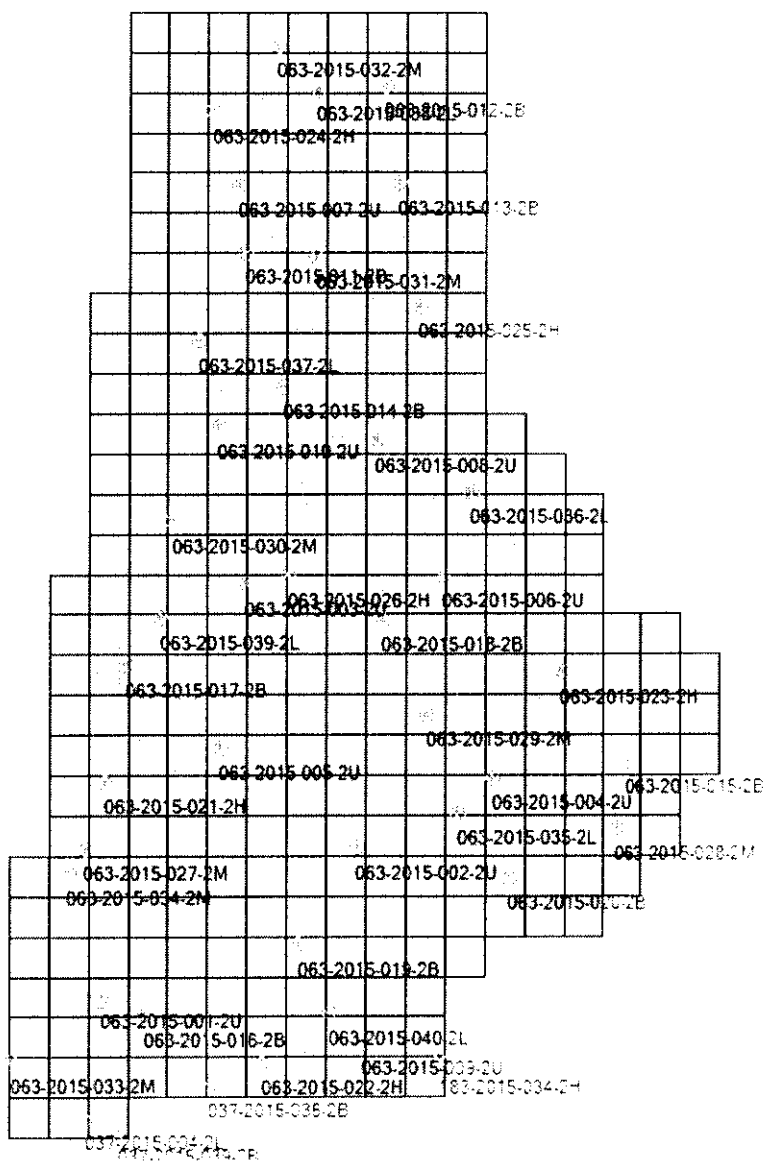
### LAS:

Tile Index Attribute: LiDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery3\_09212015\v2\Classified\_LAS  
Number of Data Files Matching Attribute: 334 out of 334

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### Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	44			
2U	10	0.194	0.169	
2B	12	0.509	0.450	
2H	7		0.103	0.103
2M	8		0.700	0.700
2L	7		0.406	0.406
Total	44			

Units: US Survey Feet

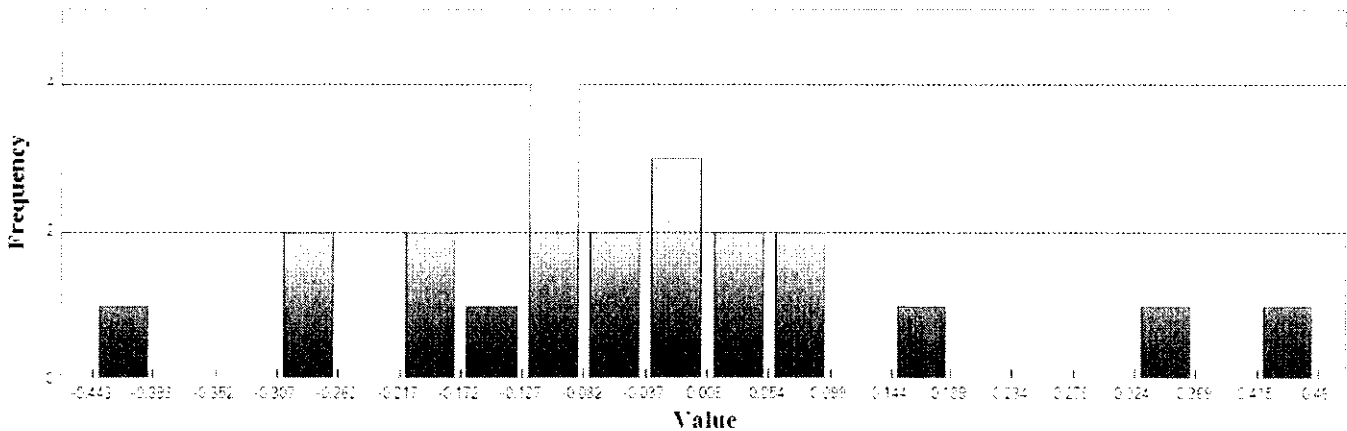


# LAS

## Non-vegetated Vertical Accuracy

LandCover Type: 2U, 2B  
Minimum DZ: -0.443  
Maximum DZ: 0.459  
Mean DZ: -0.046  
Mean Magnitude DZ: 0.39  
Number Observations: 22  
Standard Deviation DZ: 0.202  
RMSE Z: 0.203  
95% Confidence Level Z: 0.398  
Units: US Survey Feet

# Histogram



Min: -0.443  
Max: 0.459  
Number Of Bins: 20  
Bin Interval: 0.045

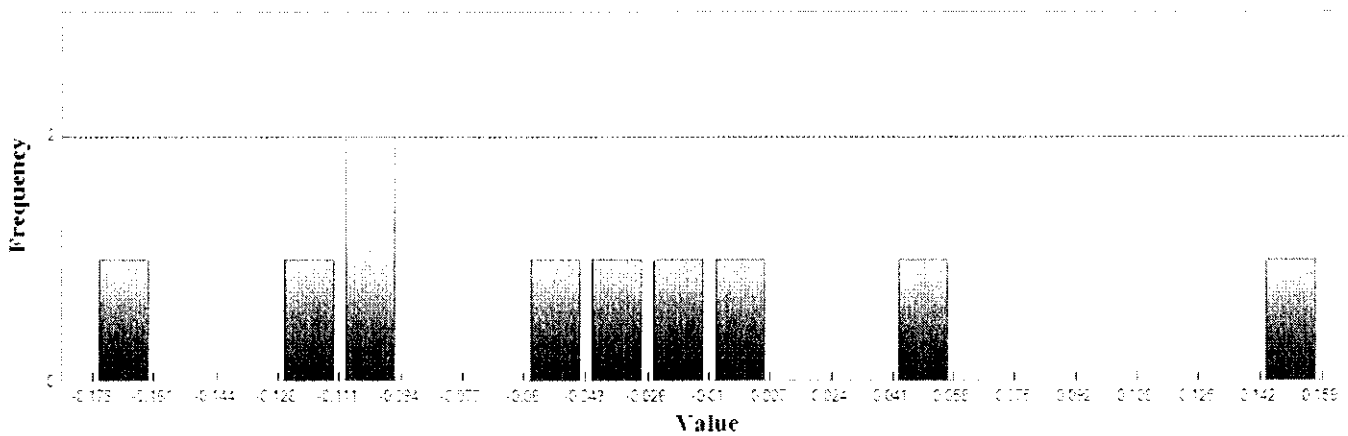


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.178  
Maximum DZ: 0.159  
Mean DZ: -0.038  
Mean Magnitude DZ: 0.286  
Number Observations: 10  
Standard Deviation DZ: 0.096  
RMSE Z: 0.099  
95th Percentile: 0.169  
Units: US Survey Feet

## Histogram



Min: -0.178  
Max: 0.159  
Number Of Bins: 20  
Bin Interval: 0.017

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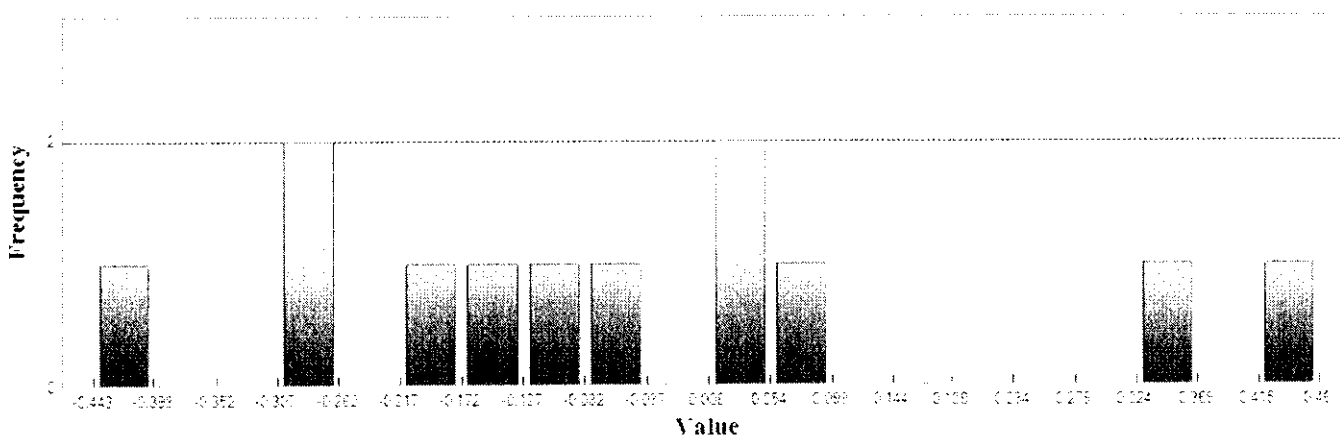


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.443  
Maximum DZ: 0.459  
Mean DZ: -0.053  
Mean Magnitude DZ: 0.458  
Number Observations: 12  
Standard Deviation DZ: 0.265  
RMSE Z: 0.26  
95th Percentile: 0.45  
Units: US Survey Feet

## Histogram



Min: -0.443  
Max: 0.459  
Number Of Bins: 20  
Bin Interval: 0.045

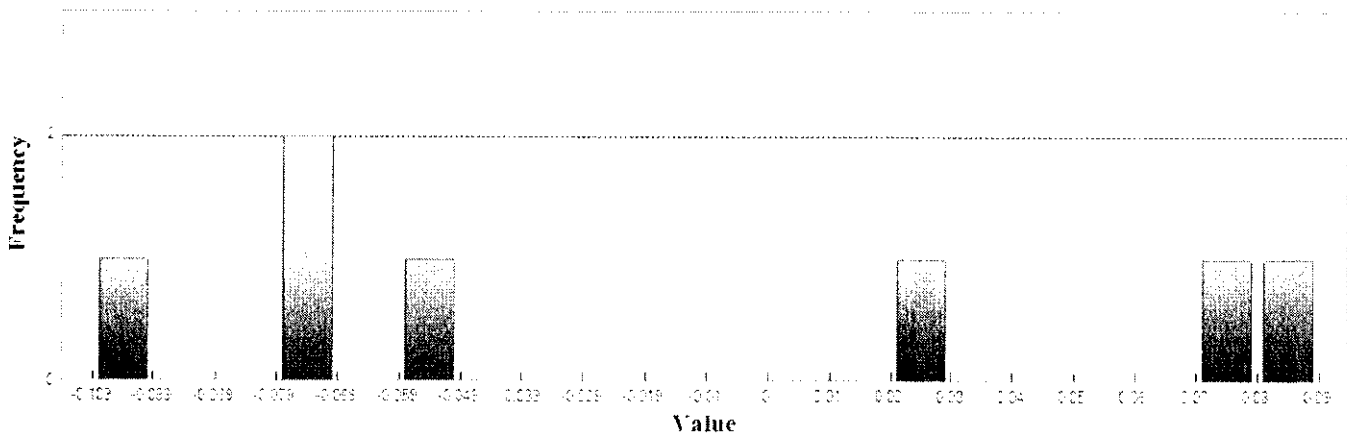


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.109  
Maximum DZ: 0.09  
Mean DZ: -0.018  
Mean Magnitude DZ: 0.265  
Number Observations: 7  
Standard Deviation DZ: 0.079  
RMSE Z: 0.075  
95th Percentile: 0.103  
Units: US Survey Feet

## Histogram



Min: -0.109  
Max: 0.09  
Number Of Bins: 20  
Bin Interval: 0.01



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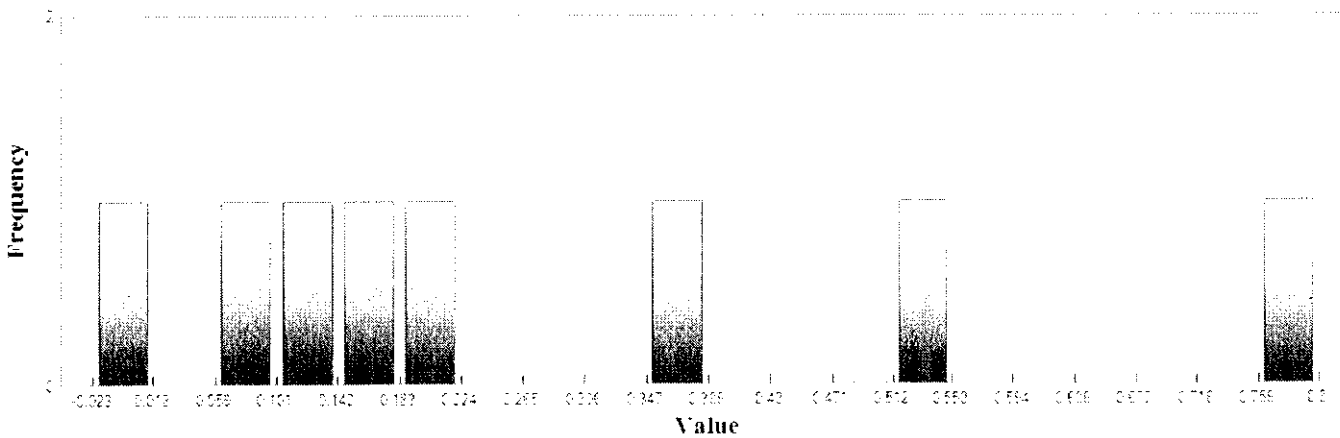


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.023  
Maximum DZ: 0.8  
Mean DZ: 0.276  
Mean Magnitude DZ: 0.531  
Number Observations: 8  
Standard Deviation DZ: 0.27  
RMSE Z: 0.375  
95th Percentile: 0.7  
Units: US Survey Feet

## Histogram



Min: -0.023  
Max: 0.8  
Number Of Bins: 20  
Bin Interval: 0.041

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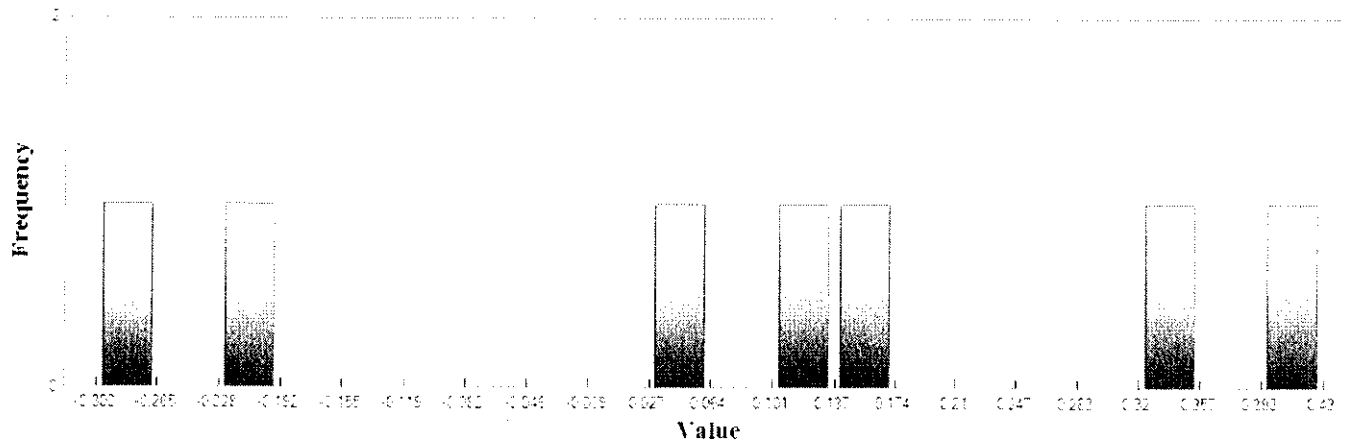


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.301  
Maximum DZ: 0.43  
Mean DZ: 0.08  
Mean Magnitude DZ: 0.481  
Number Observations: 7  
Standard Deviation DZ: 0.272  
RMSE Z: 0.264  
95th Percentile: 0.406  
Units: US Survey Feet

## Histogram



Min: -0.301  
Max: 0.43  
Number Of Bins: 20  
Bin Interval: 0.037



## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2H, 2M, 2L

Minimum DZ: -0.301

Maximum DZ: 0.8

Mean DZ: 0.12

Mean Magnitude DZ: 0.446

Number Observations: 22

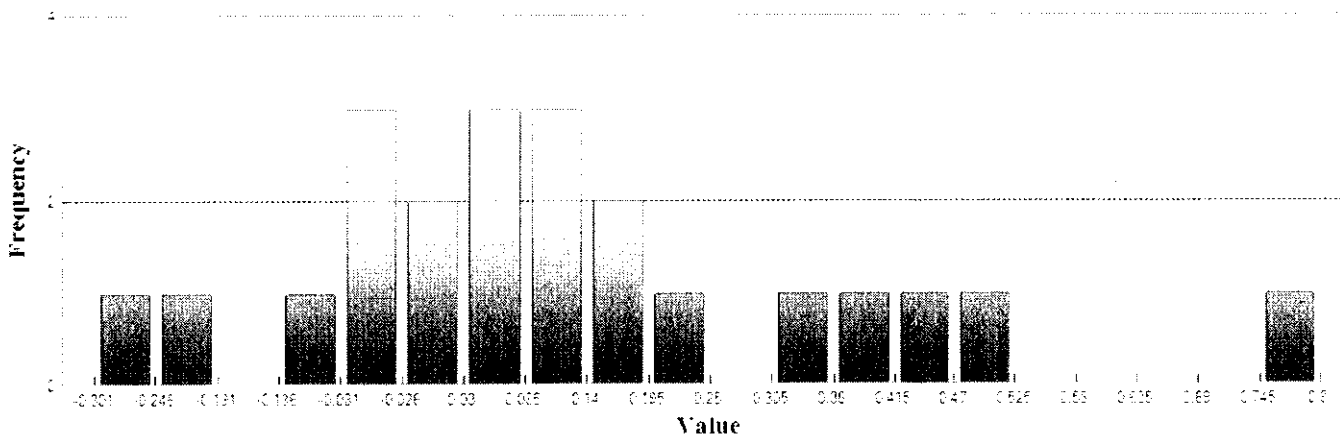
Standard Deviation DZ: 0.252

RMSE Z: 0.274

95th Percentile: 0.51

Units: US Survey Feet

## Histogram



Min: -0.301

Max: 0.8

Number Of Bins: 20

Bin Interval: 0.055

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Aquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gfm\GIS\LiDAR2015\Phase 3 QC\county\_files\granville\_tiles.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

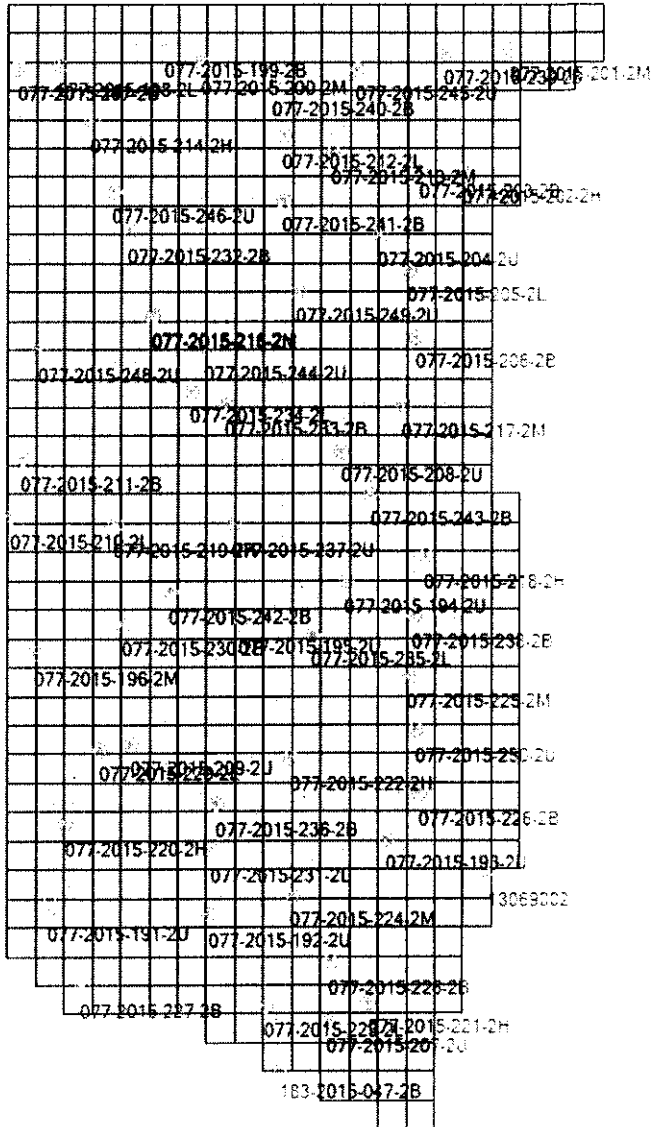
Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### LAS:

Tile Index Attribute: LiDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery3\_09212015\v2\Classified\_LAS  
Number of Data Files Matching Attribute: 637 out of 637



### Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	62			
2U	17	0.186	0.188	
2M	8		0.688	0.688
2B	20	0.232	0.223	
2L	9		0.425	0.425
2H	8		0.382	0.382
Total	62			

Units: US Survey Feet



## LAS

### Non-vegetated Vertical Accuracy

LandCover Type: 2U, 2B

Minimum DZ: -0.299

Maximum DZ: 0.195

Mean DZ: 0.015

Mean Magnitude DZ: 0.298

Number Observations: 37

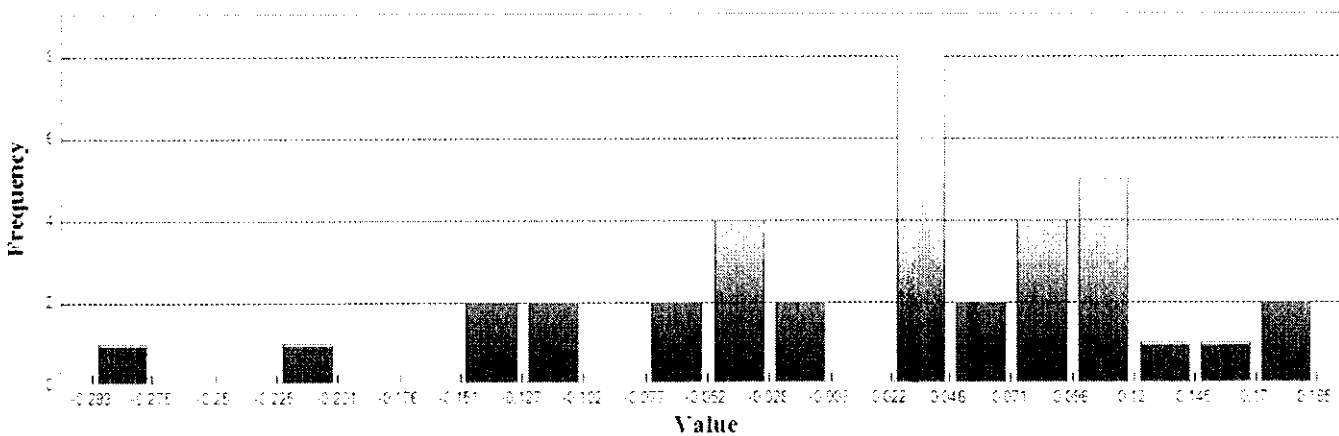
Standard Deviation DZ: 0.109

RMSE Z: 0.108

95% Confidence Level Z: 0.212

Units: US Survey Feet

## Histogram



Min: -0.299

Max: 0.195

Number Of Bins: 20

Bin Interval: 0.025

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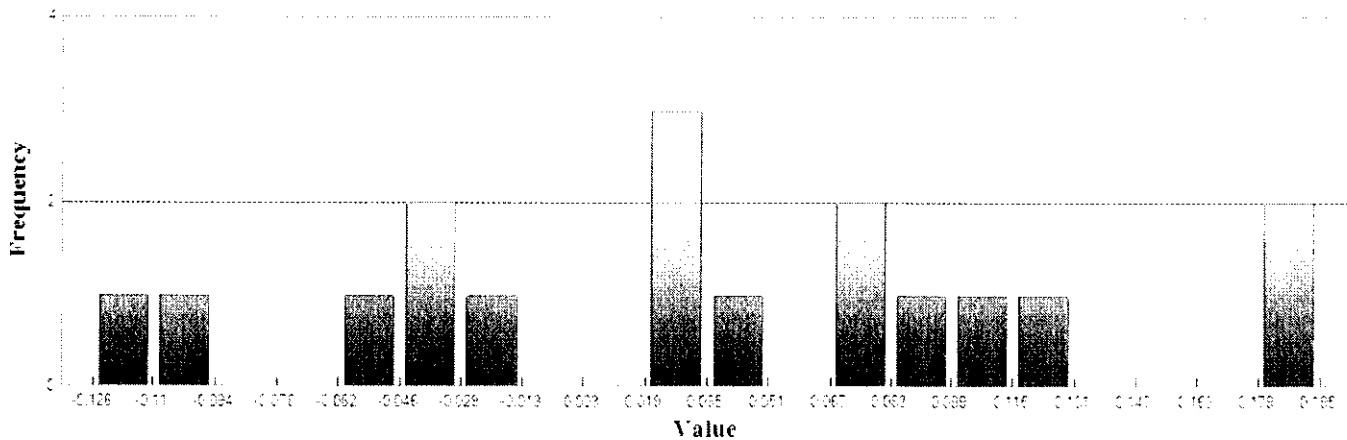


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.126  
Maximum DZ: 0.195  
Mean DZ: 0.034  
Mean Magnitude DZ: 0.283  
Number Observations: 17  
Standard Deviation DZ: 0.091  
RMSE Z: 0.095  
95th Percentile: 0.188  
Units: US Survey Feet

## Histogram



Min: -0.126  
Max: 0.195  
Number Of Bins: 20  
Bin Interval: 0.016



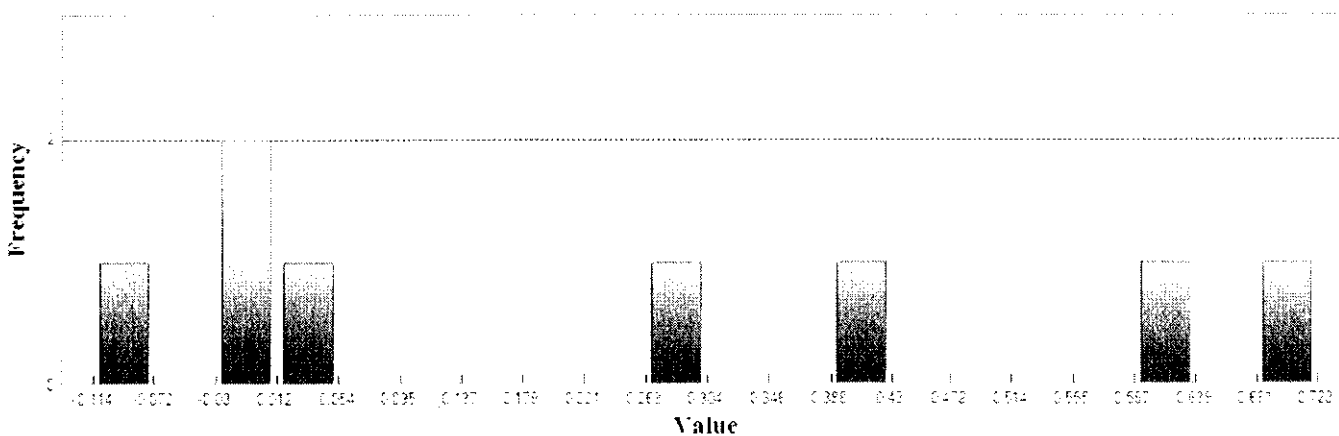


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.114  
Maximum DZ: 0.723  
Mean DZ: 0.238  
Mean Magnitude DZ: 0.524  
Number Observations: 8  
Standard Deviation DZ: 0.318  
RMSE Z: 0.381  
95th Percentile: 0.688  
Units: US Survey Feet

## Histogram



Min: -0.114  
Max: 0.723  
Number Of Bins: 20  
Bin Interval: 0.042

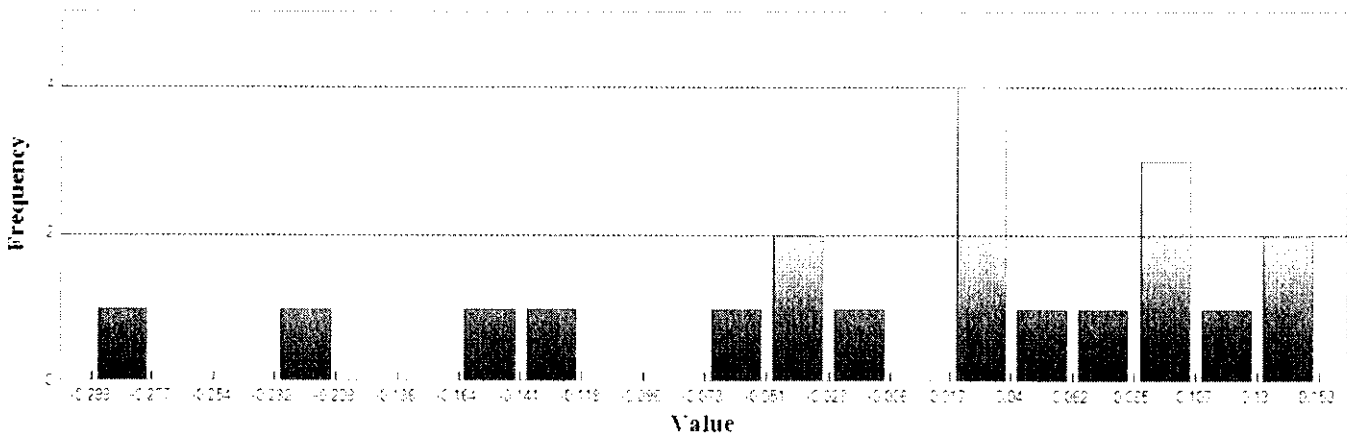


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.299  
Maximum DZ: 0.153  
Mean DZ: -0.001  
Mean Magnitude DZ: 0.31  
Number Observations: 20  
Standard Deviation DZ: 0.121  
RMSE Z: 0.118  
95th Percentile: 0.223  
Units: US Survey Feet

## Histogram



Min: -0.299

Max: 0.153

Number Of Bins: 20

Bin Interval: 0.023

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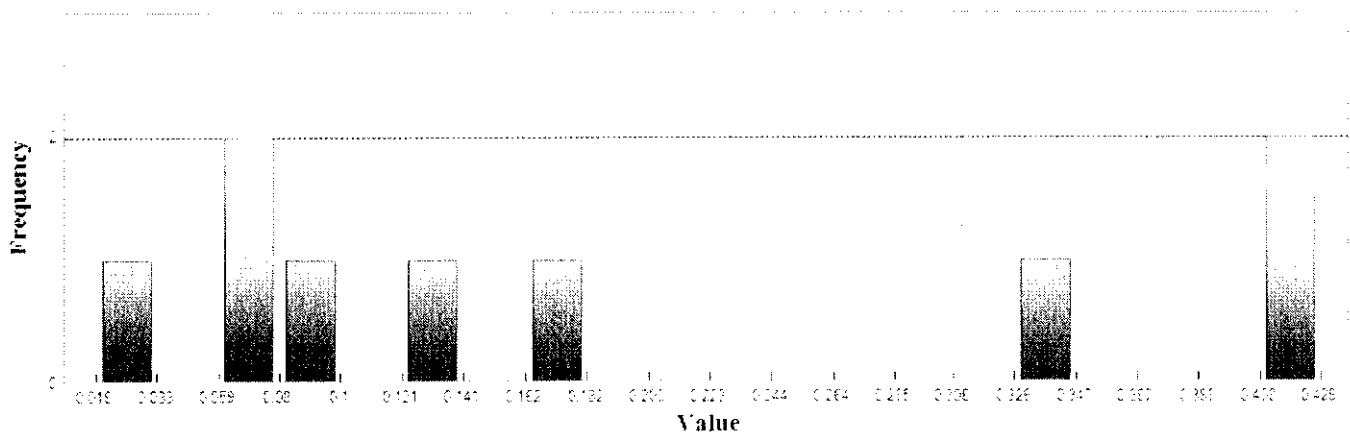


## LAS (Continued)

### Supplemental Vertical Accuracy

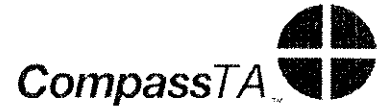
LandCover Type: 2L  
 Minimum DZ: 0.018  
 Maximum DZ: 0.429  
 Mean DZ: 0.192  
 Mean Magnitude DZ: 0.439  
 Number Observations: 9  
 Standard Deviation DZ: 0.158  
 RMSE Z: 0.243  
 95th Percentile: 0.425  
 Units: US Survey Feet

## Histogram



Min: 0.018  
 Max: 0.429  
 Number Of Bins: 20  
 Bin Interval: 0.021

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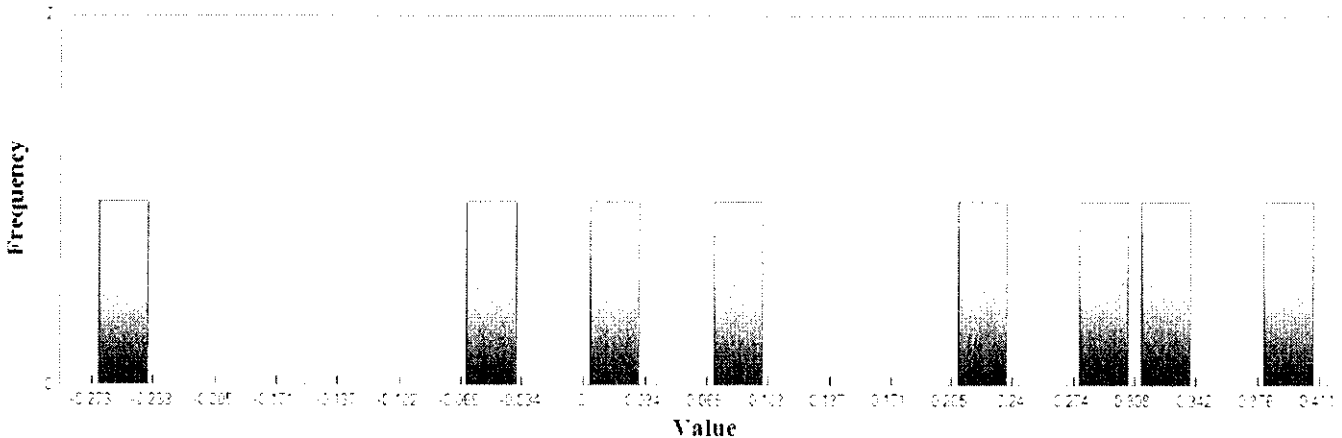


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.273  
Maximum DZ: 0.411  
Mean DZ: 0.132  
Mean Magnitude DZ: 0.461  
Number Observations: 8  
Standard Deviation DZ: 0.228  
RMSE Z: 0.251  
95th Percentile: 0.382  
Units: US Survey Feet

## Histogram



Min: -0.273

Max: 0.411

Number Of Bins: 20

Bin Interval: 0.034

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## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2M, 2L, 2H

Minimum DZ: -0.273

Maximum DZ: 0.723

Mean DZ: 0.188

Mean Magnitude DZ: 0.474

Number Observations: 25

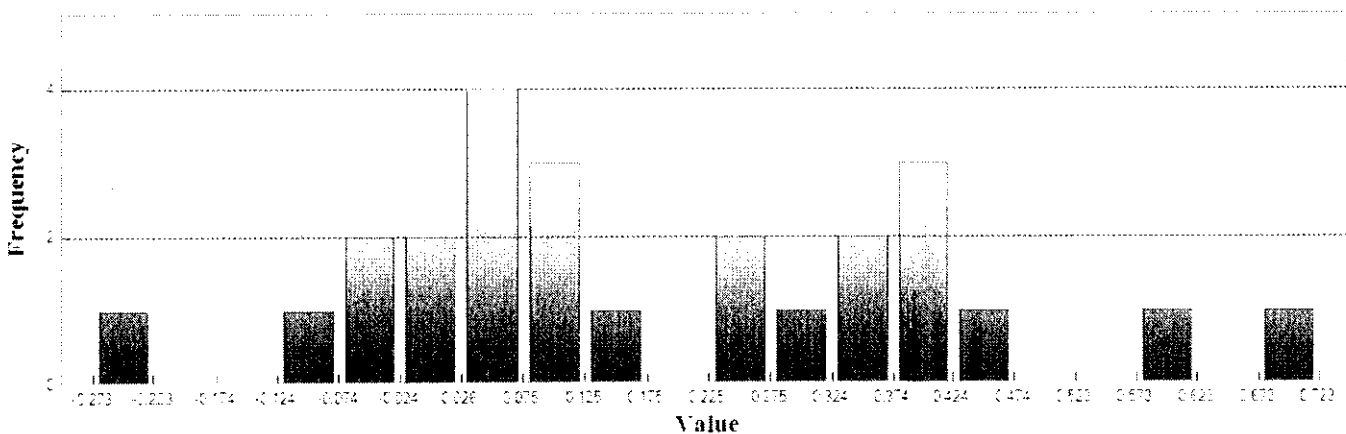
Standard Deviation DZ: 0.234

RMSE Z: 0.297

95th Percentile: 0.584

Units: US Survey Feet

## Histogram



Min: -0.273

Max: 0.723

Number Of Bins: 20

Bin Interval: 0.05

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gfm\GIS\LiDAR2015\Phase 3 QC\county\_files\guilford\_files.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

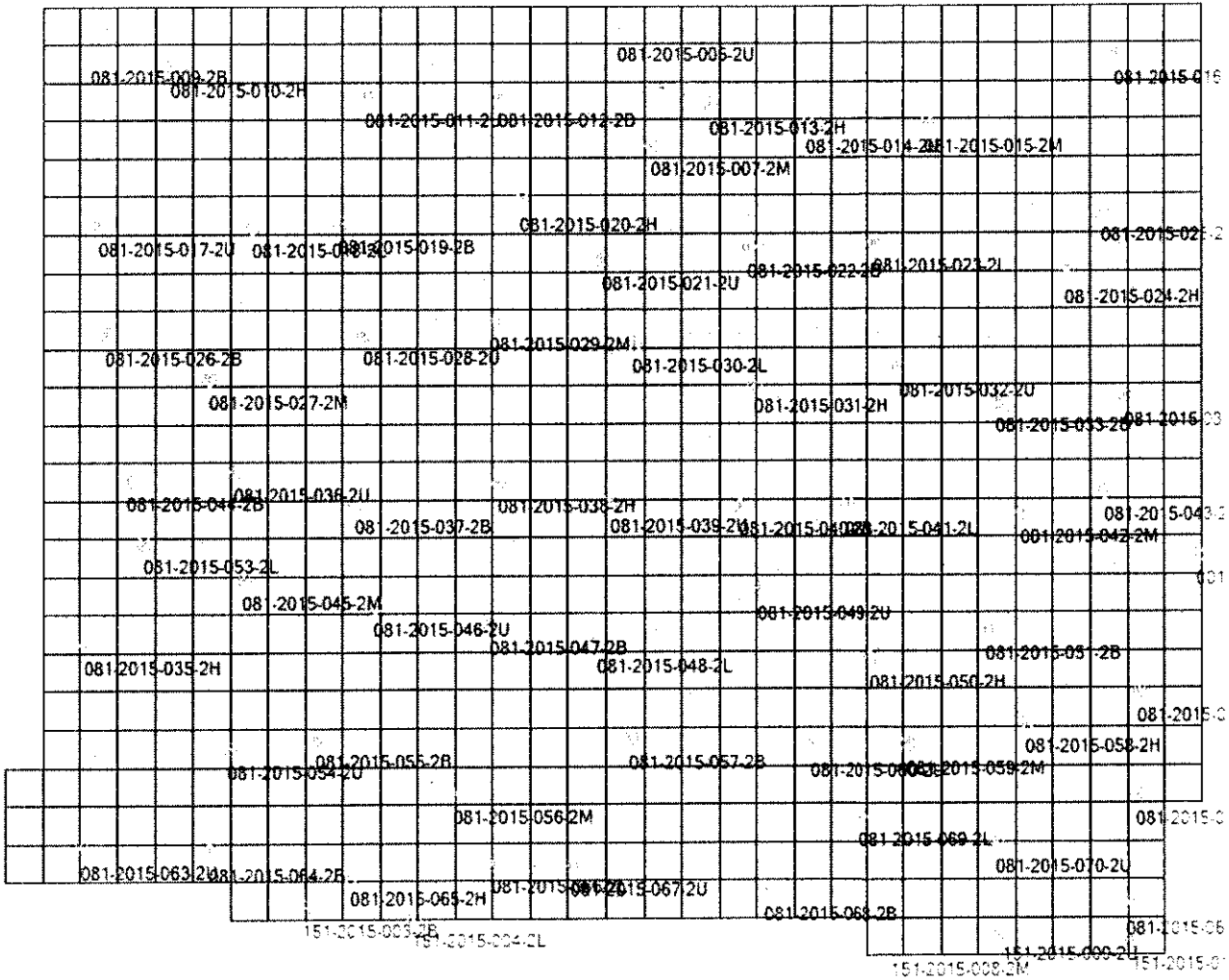
### LAS:

Tile Index Attribute: LiDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery2\_08242015\V2\Classified\_LAS  
Number of Data Files Matching Attribute: 747 out of 747

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Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	70			
2U	21	0.387	0.361	
2M	10		0.655	0.655
2B	18	0.266	0.237	
2H	11		0.282	0.282
2L	10		0.530	0.530
Total	70			

Units: US Survey Feet



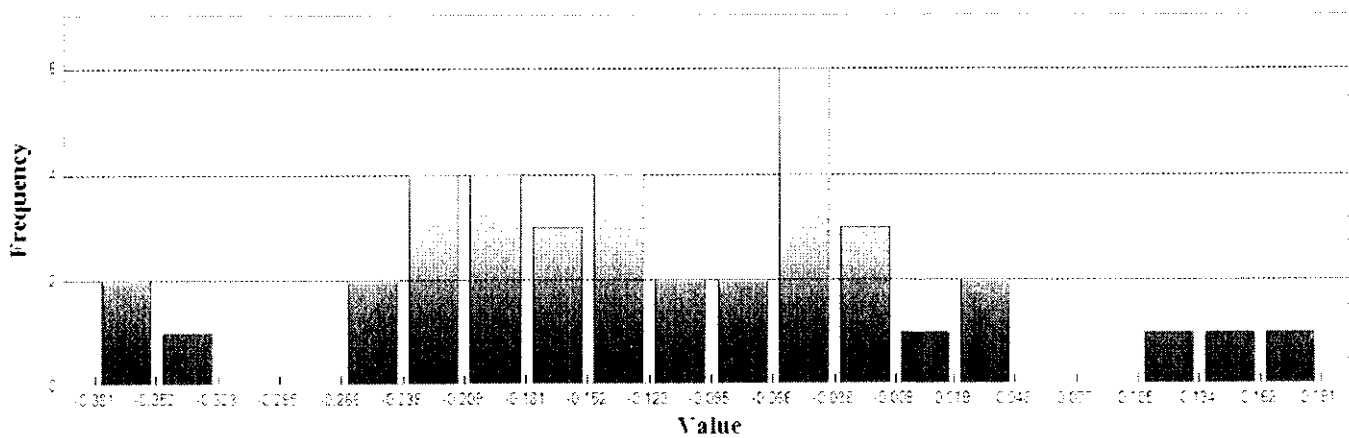


## LAS

### Non-vegetated Vertical Accuracy

LandCover Type: 2U, 2B  
Minimum DZ: -0.38  
Maximum DZ: 0.191  
Mean DZ: -0.115  
Mean Magnitude DZ: 0.377  
Number Observations: 39  
Standard Deviation DZ: 0.129  
RMSE Z: 0.172  
95% Confidence Level Z: 0.337  
Units: US Survey Feet

## Histogram



Min: -0.38  
Max: 0.191  
Number Of Bins: 20  
Bin Interval: 0.029

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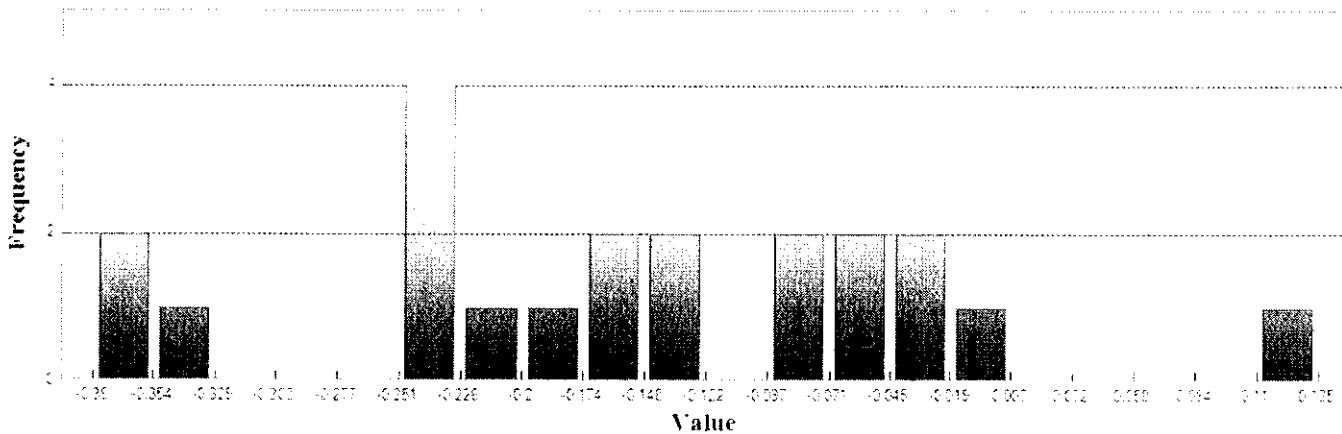


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.38  
Maximum DZ: 0.135  
Mean DZ: -0.154  
Mean Magnitude DZ: 0.409  
Number Observations: 21  
Standard Deviation DZ: 0.127  
RMSE Z: 0.198  
95th Percentile: 0.361  
Units: US Survey Feet

## Histogram



Min: -0.38  
Max: 0.135  
Number Of Bins: 20  
Bin Interval: 0.026

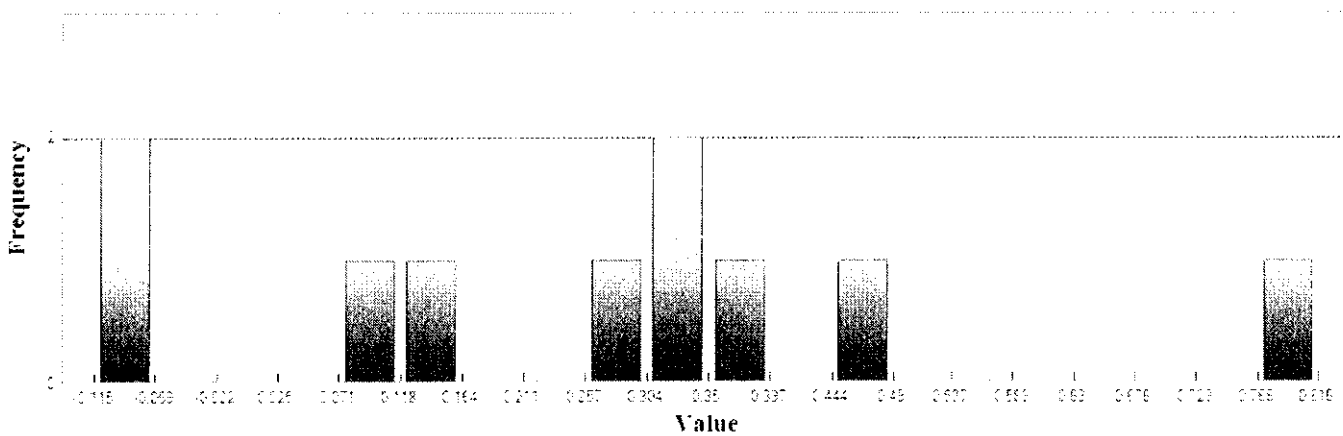


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.115  
Maximum DZ: 0.816  
Mean DZ: 0.26  
Mean Magnitude DZ: 0.551  
Number Observations: 10  
Standard Deviation DZ: 0.278  
RMSE Z: 0.37  
95th Percentile: 0.655  
Units: US Survey Feet

## Histogram



Min: -0.115  
Max: 0.816  
Number Of Bins: 20  
Bin Interval: 0.047

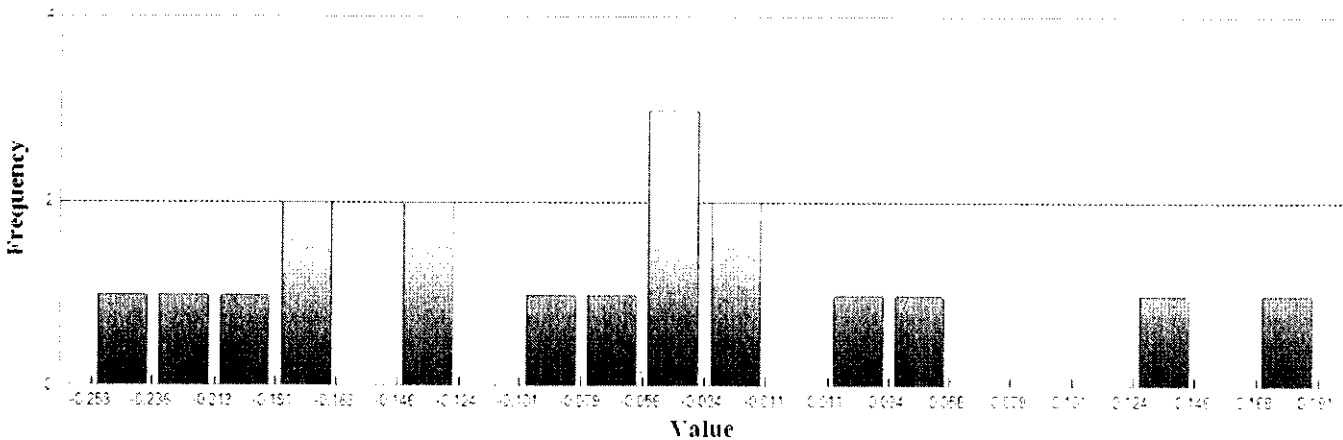


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.258  
Maximum DZ: 0.191  
Mean DZ: -0.07  
Mean Magnitude DZ: 0.336  
Number Observations: 18  
Standard Deviation DZ: 0.12  
RMSE Z: 0.136  
95th Percentile: 0.237  
Units: US Survey Feet

## Histogram



Min: -0.258  
Max: 0.191  
Number Of Bins: 20  
Bin Interval: 0.022

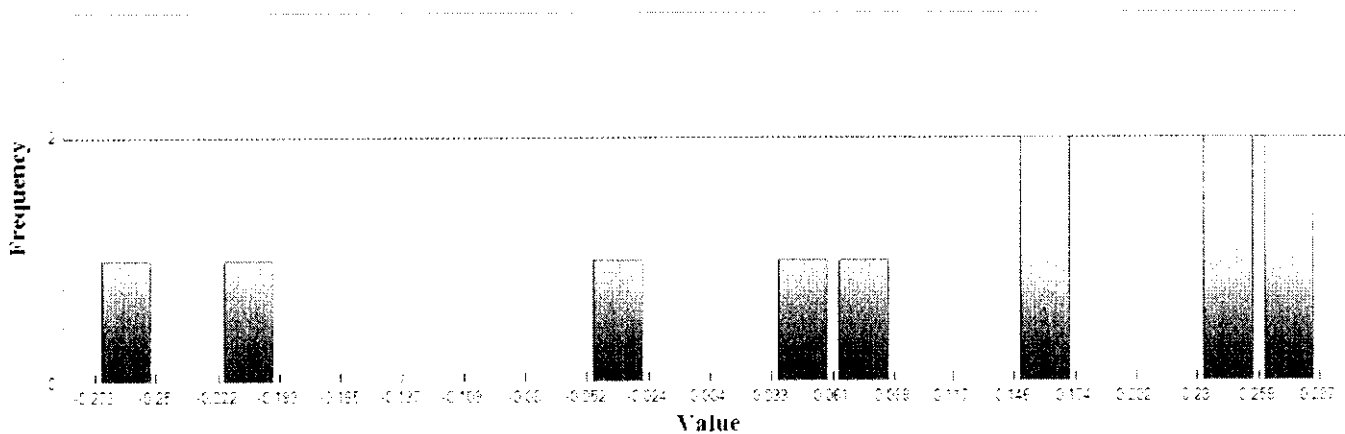


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.278  
Maximum DZ: 0.287  
Mean DZ: 0.088  
Mean Magnitude DZ: 0.427  
Number Observations: 11  
Standard Deviation DZ: 0.191  
RMSE Z: 0.203  
95th Percentile: 0.282  
Units: US Survey Feet

## Histogram



Min: -0.278  
Max: 0.287  
Number Of Bins: 20  
Bin Interval: 0.028

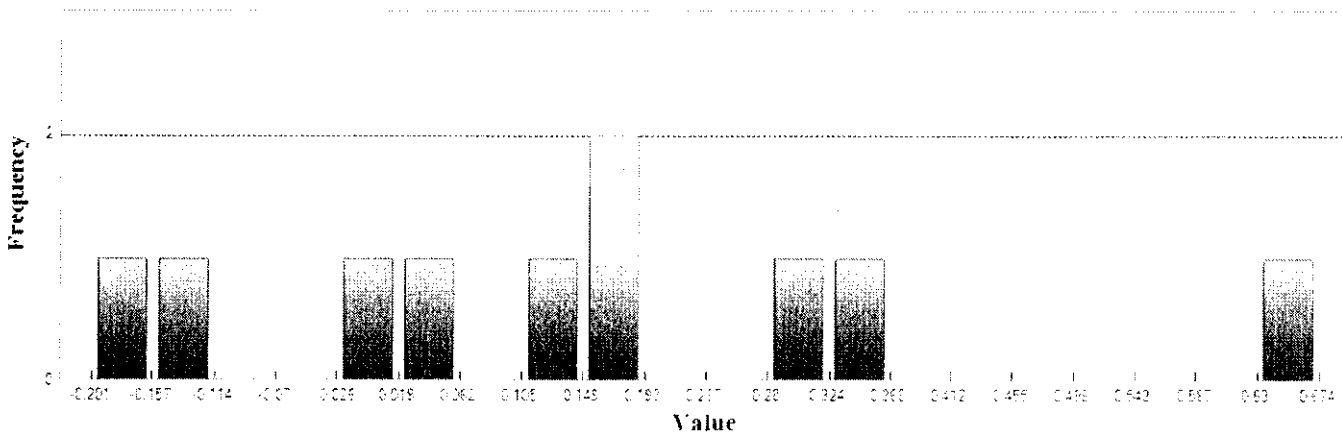


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.201  
Maximum DZ: 0.674  
Mean DZ: 0.15  
Mean Magnitude DZ: 0.464  
Number Observations: 10  
Standard Deviation DZ: 0.25  
RMSE Z: 0.281  
95th Percentile: 0.53  
Units: US Survey Feet

## Histogram



Min: -0.201  
Max: 0.674  
Number Of Bins: 20  
Bin Interval: 0.044

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## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2M, 2H, 2L

Minimum DZ: -0.278

Maximum DZ: 0.816

Mean DZ: 0.164

Mean Magnitude DZ: 0.482

Number Observations: 31

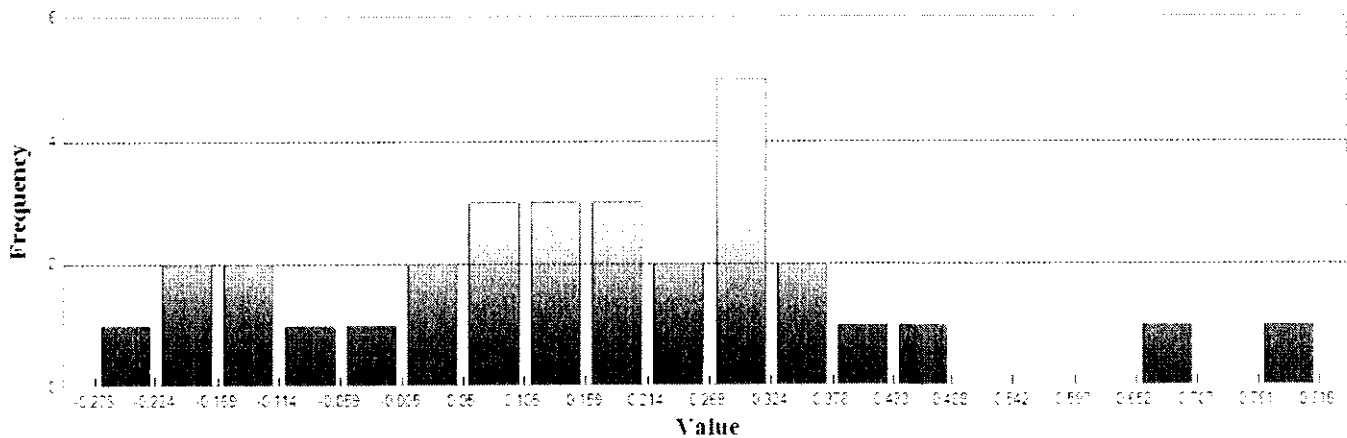
Standard Deviation DZ: 0.244

RMSE Z: 0.29

95th Percentile: 0.566

Units: US Survey Feet

## Histogram



Min: -0.278

Max: 0.816

Number Of Bins: 20

Bin Interval: 0.055

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gfm\GIS\LiDAR2015\Phase 3 QC\county\_files\harnett\_files.shp

Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified

Path to Data: Not Specified

Number of Data Files Matching Attribute: Not Specified

### DEM:

Tile Index Attribute: Not Specified

Path to Data: Not Specified

Number of Data Files Matching Attribute: Not Specified

### LAS:

Tile Index Attribute: LiDARTiles

Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery5\_11232015\Lot5\_Lee\_Harnett\_Wake\

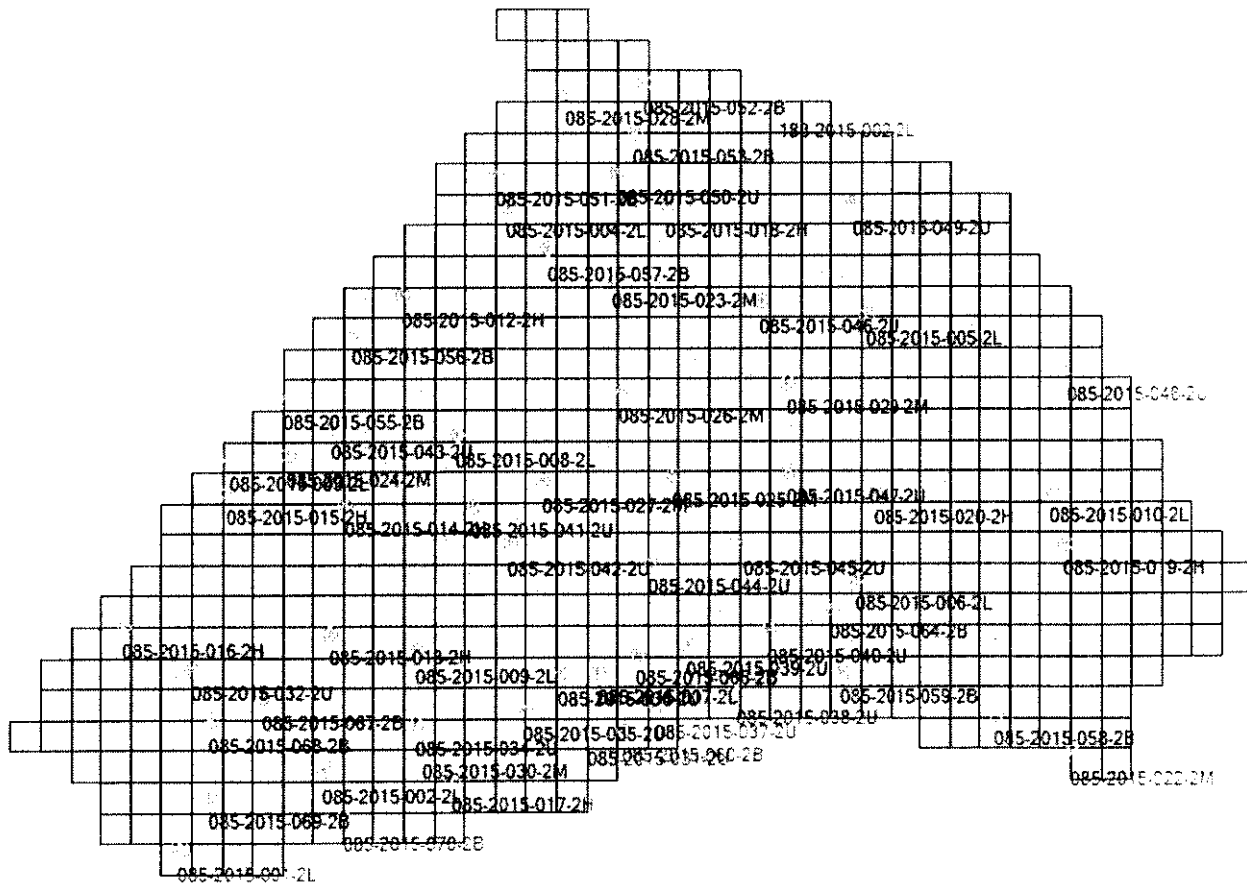
Number of Data Files Matching Attribute: 797 out of 797



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### Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	63			
2L	11		0.343	0.343
2H	9		0.260	0.260
2M	9		0.481	0.481
2U	19	0.521	0.425	
2B	15	0.636	0.574	
Total	63			

Units: US Survey Feet

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## LAS

### Non-vegetated Vertical Accuracy

LandCover Type: 2U, 2B

Minimum DZ: -0.822

Maximum DZ: 0.415

Mean DZ: -0.175

Mean Magnitude DZ: 0.485

Number Observations: 34

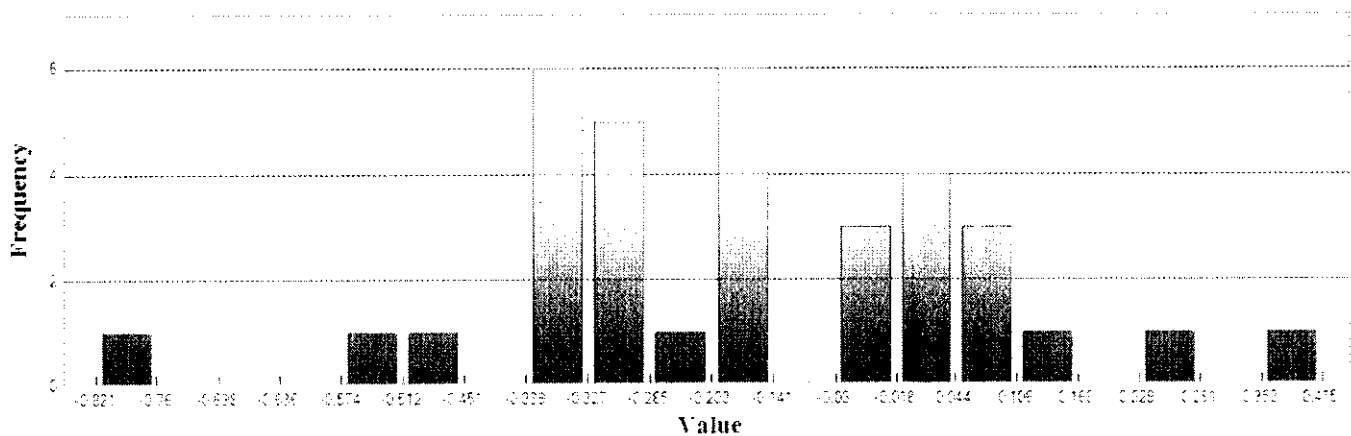
Standard Deviation DZ: 0.239

RMSE Z: 0.293

95% Confidence Level Z: 0.575

Units: US Survey Feet

## Histogram



Min: -0.822

Max: 0.415

Number Of Bins: 20

Bin Interval: 0.062

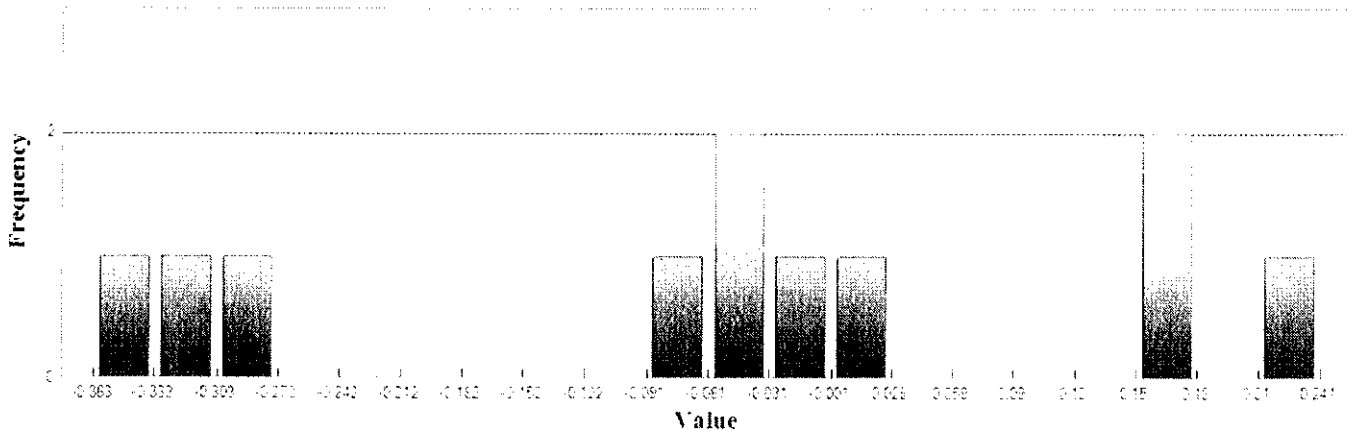


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.363  
Maximum DZ: 0.241  
Mean DZ: -0.049  
Mean Magnitude DZ: 0.398  
Number Observations: 11  
Standard Deviation DZ: 0.204  
RMSE Z: 0.2  
95th Percentile: 0.343  
Units: US Survey Feet

## Histogram



Min: -0.363

Max: 0.241

Number Of Bins: 20

Bin Interval: 0.03

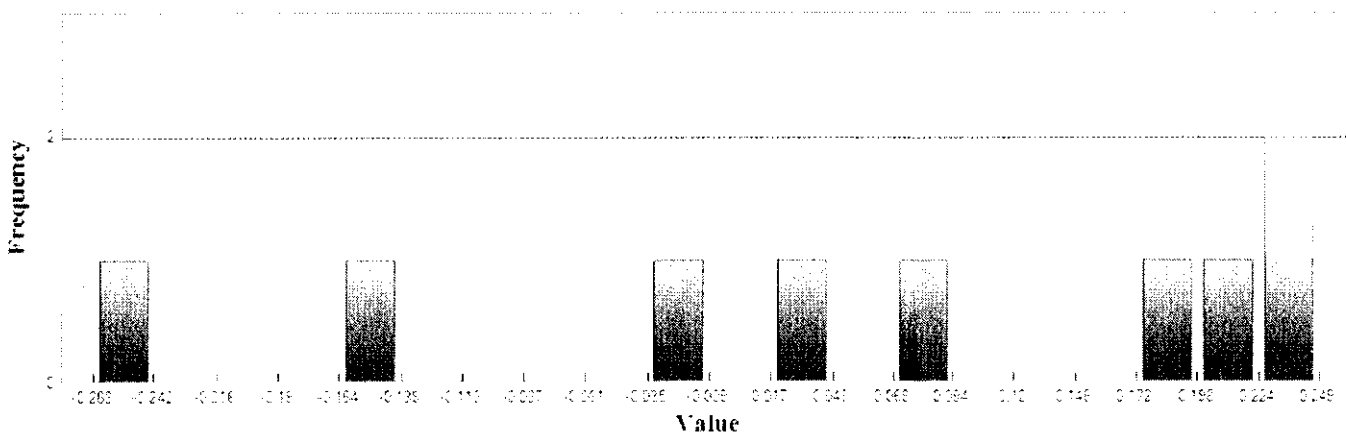


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.268  
Maximum DZ: 0.249  
Mean DZ: 0.06  
Mean Magnitude DZ: 0.402  
Number Observations: 9  
Standard Deviation DZ: 0.183  
RMSE Z: 0.183  
95th Percentile: 0.26  
Units: US Survey Feet

## Histogram



Min: -0.268

Max: 0.249

Number Of Bins: 20

Bin Interval: 0.026

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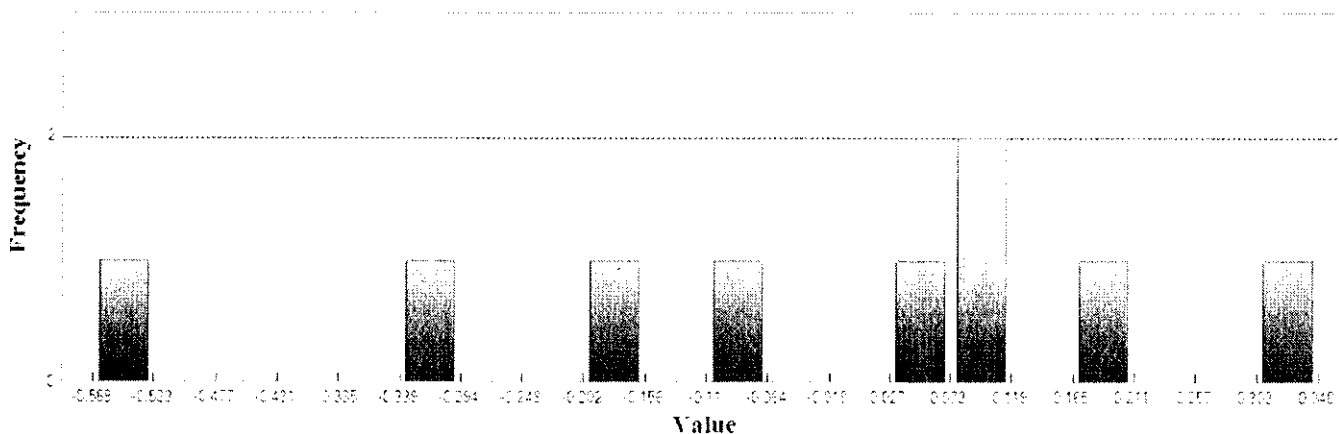


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.569  
Maximum DZ: 0.348  
Mean DZ: -0.043  
Mean Magnitude DZ: 0.46  
Number Observations: 9  
Standard Deviation DZ: 0.277  
RMSE Z: 0.264  
95th Percentile: 0.481  
Units: US Survey Feet

## Histogram



Min: -0.569

Max: 0.348

Number Of Bins: 20

Bin Interval: 0.046

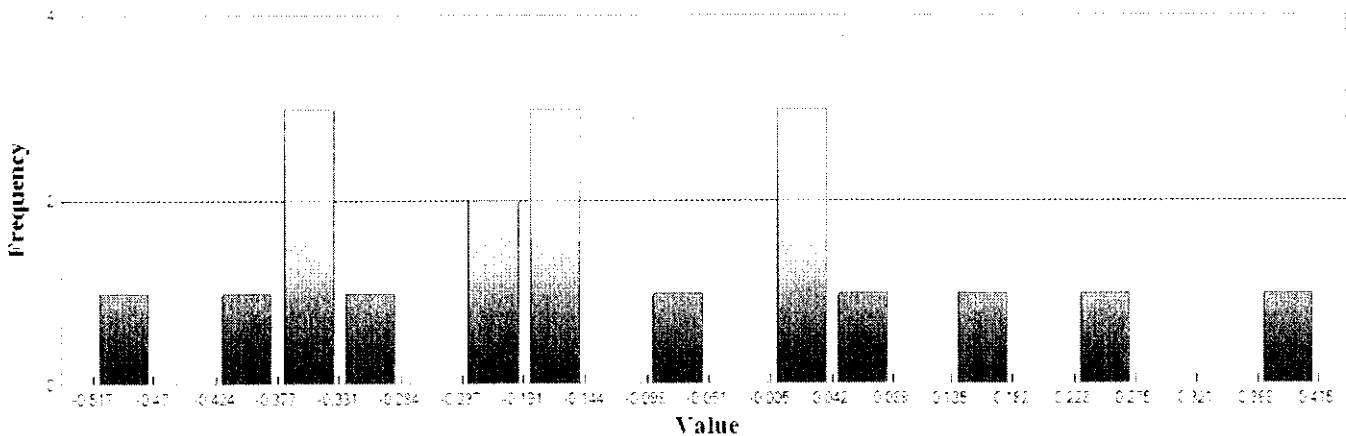


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.517  
Maximum DZ: 0.415  
Mean DZ: -0.128  
Mean Magnitude DZ: 0.47  
Number Observations: 19  
Standard Deviation DZ: 0.24  
RMSE Z: 0.266  
95th Percentile: 0.425  
Units: US Survey Feet

## Histogram



Min: -0.517

Max: 0.415

Number Of Bins: 20

Bin Interval: 0.047

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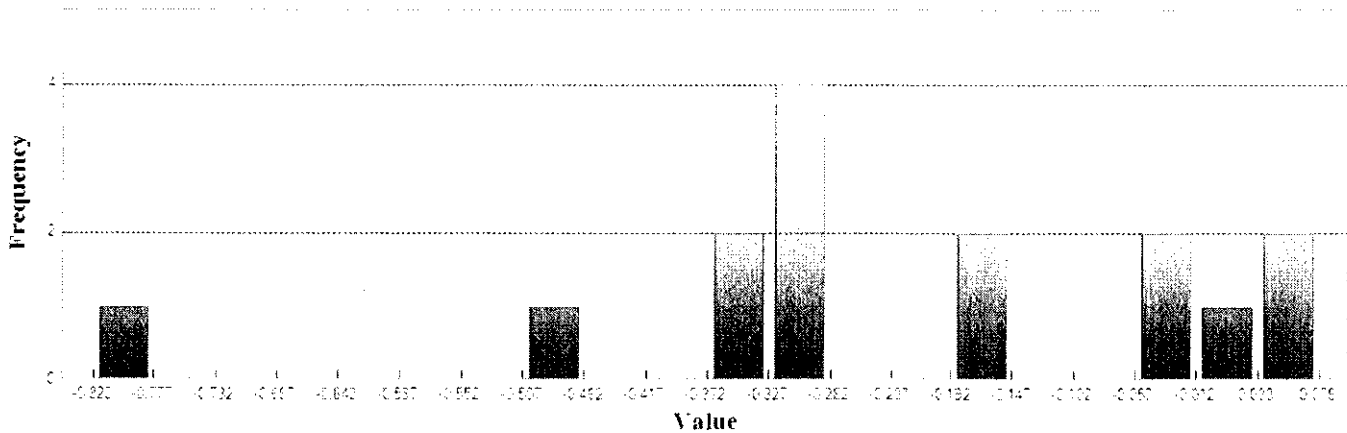


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.822  
Maximum DZ: 0.078  
Mean DZ: -0.235  
Mean Magnitude DZ: 0.503  
Number Observations: 15  
Standard Deviation DZ: 0.232  
RMSE Z: 0.325  
95th Percentile: 0.574  
Units: US Survey Feet

## Histogram



Min: -0.822  
Max: 0.078  
Number Of Bins: 20  
Bin Interval: 0.045



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## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2L, 2H, 2M

Minimum DZ: -0.569

Maximum DZ: 0.348

Mean DZ: -0.013

Mean Magnitude DZ: 0.419

Number Observations: 29

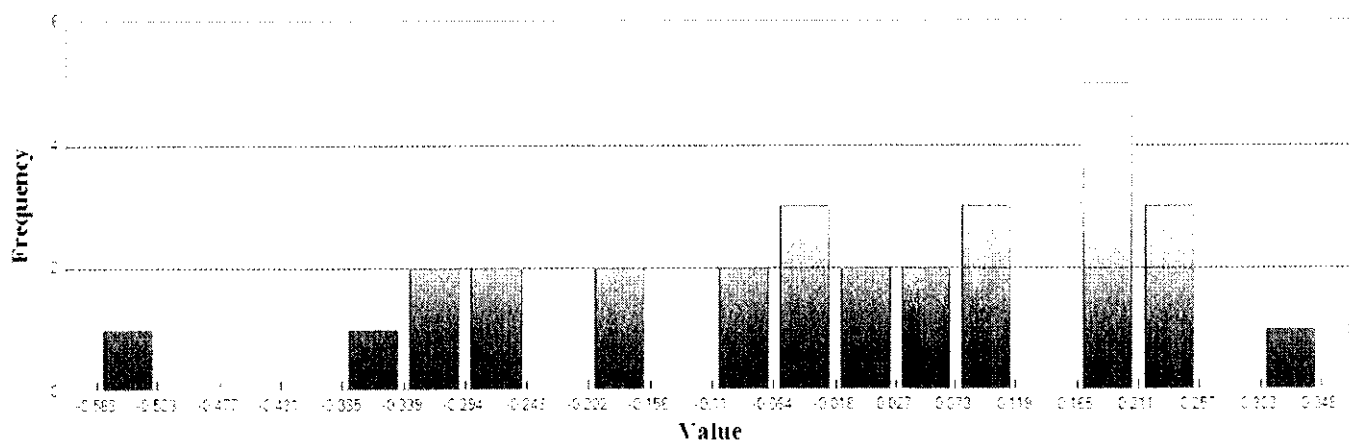
Standard Deviation DZ: 0.221

RMSE Z: 0.218

95th Percentile: 0.357

Units: US Survey Feet

## Histogram



Min: -0.569

Max: 0.348

Number Of Bins: 20

Bin Interval: 0.046

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LIDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gltm\GIS\LIDAR2015\Phase 3 QC\county\_files\lee\_files.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

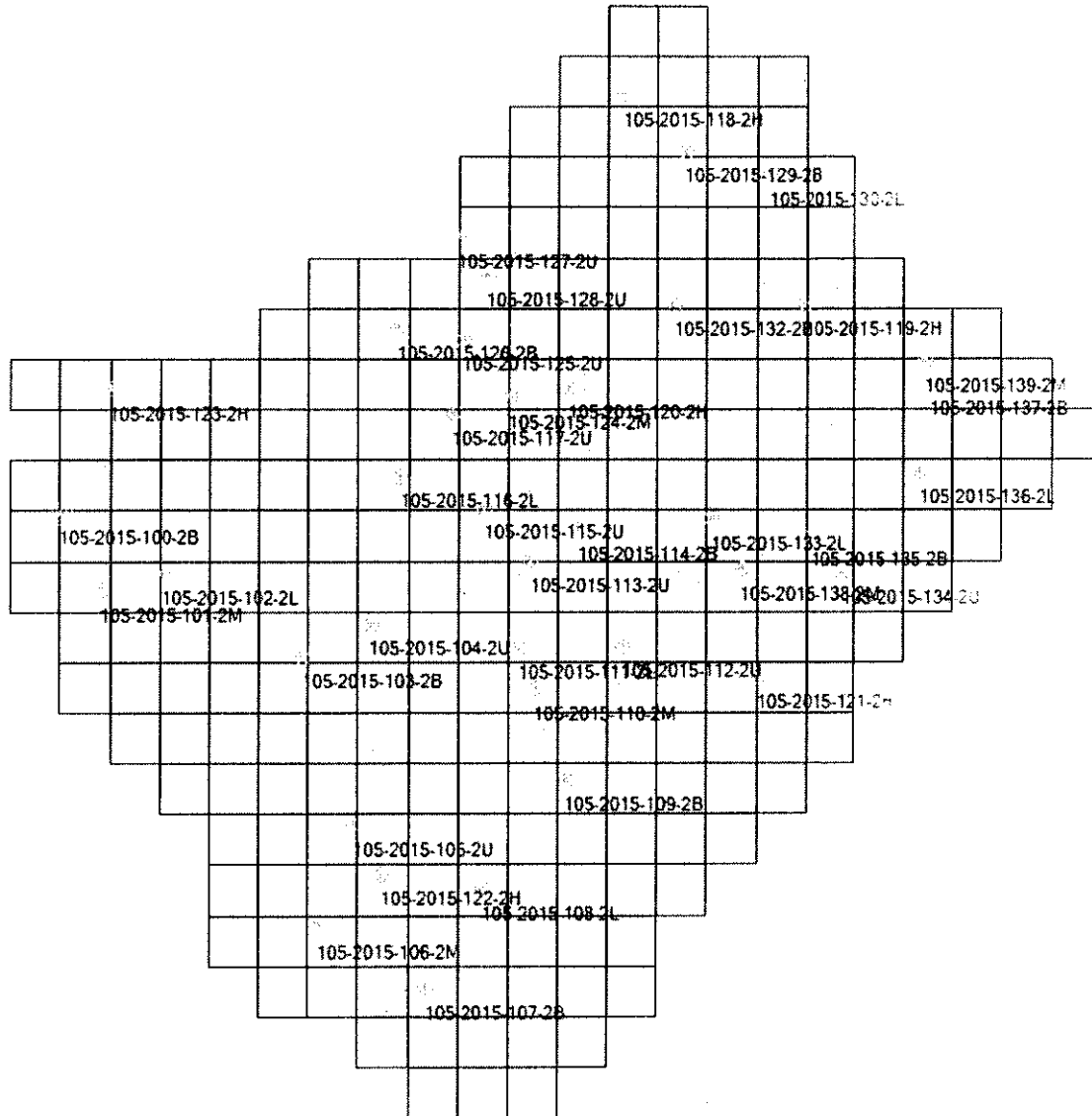
Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### LAS:

Tile Index Attribute: LiDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery5\_11232015\Lot5\_Lee\_Harnett\_Wake\  
Number of Data Files Matching Attribute: 265 out of 265



### Tiled-Data Area



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## LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	39			
2B	10	0.329	0.294	
2M	6		0.230	0.230
2L	7		0.311	0.311
2U	10	0.240	0.200	
2H	6		0.238	0.238
Total	39			

Units: US Survey Feet



## LAS

### Non-vegetated Vertical Accuracy

LandCover Type: 2B, 2U

Minimum DZ: -0.312

Maximum DZ: 0.135

Mean DZ: -0.09

Mean Magnitude DZ: 0.353

Number Observations: 20

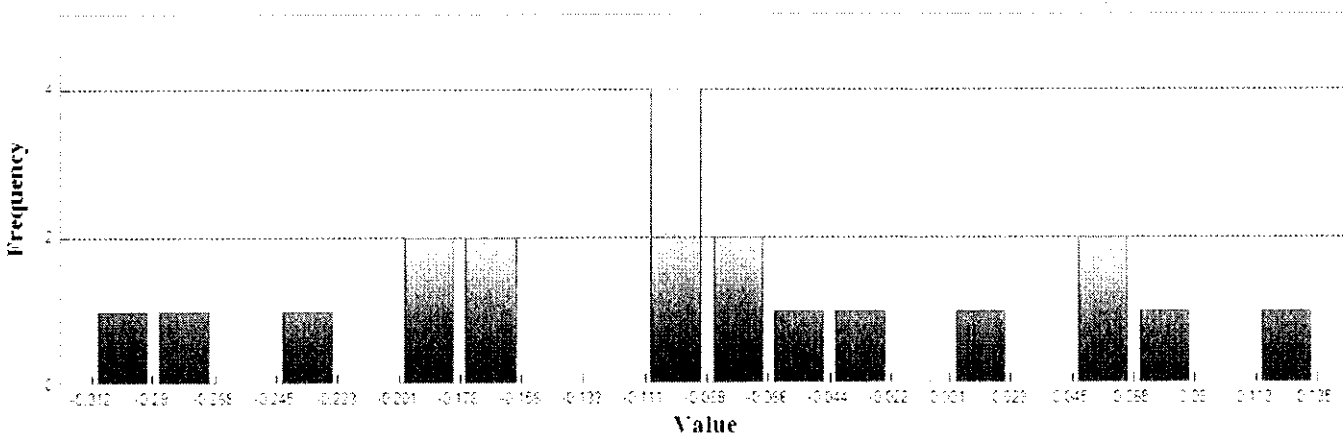
Standard Deviation DZ: 0.119

RMSE Z: 0.147

95% Confidence Level Z: 0.288

Units: US Survey Feet

## Histogram



Min: -0.312

Max: 0.135

Number Of Bins: 20

Bin Interval: 0.022

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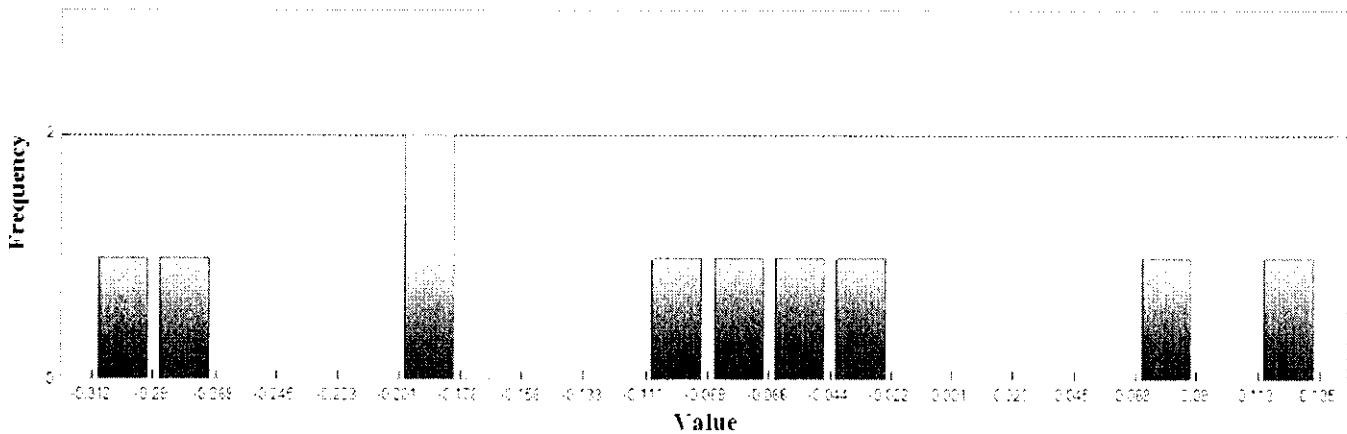


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.312  
Maximum DZ: 0.135  
Mean DZ: -0.101  
Mean Magnitude DZ: 0.377  
Number Observations: 10  
Standard Deviation DZ: 0.141  
RMSE Z: 0.168  
95th Percentile: 0.294  
Units: US Survey Feet

## Histogram



Min: -0.312  
Max: 0.135  
Number Of Bins: 20  
Bin Interval: 0.022

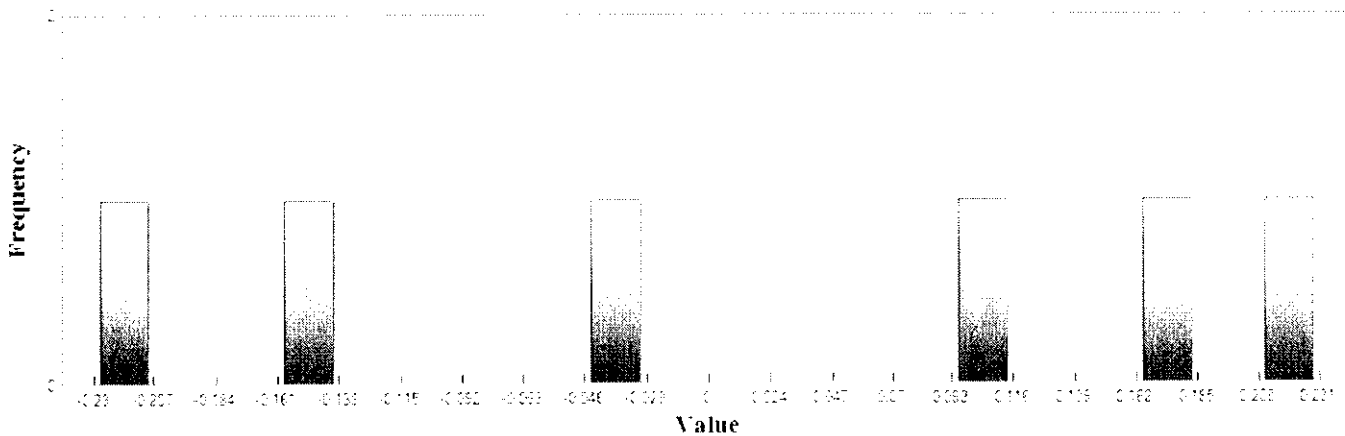


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.23  
Maximum DZ: 0.23  
Mean DZ: 0.015  
Mean Magnitude DZ: 0.393  
Number Observations: 6  
Standard Deviation DZ: 0.184  
RMSE Z: 0.169  
95th Percentile: 0.23  
Units: US Survey Feet

## Histogram



Min: -0.23  
Max: 0.23  
Number Of Bins: 20  
Bin Interval: 0.023

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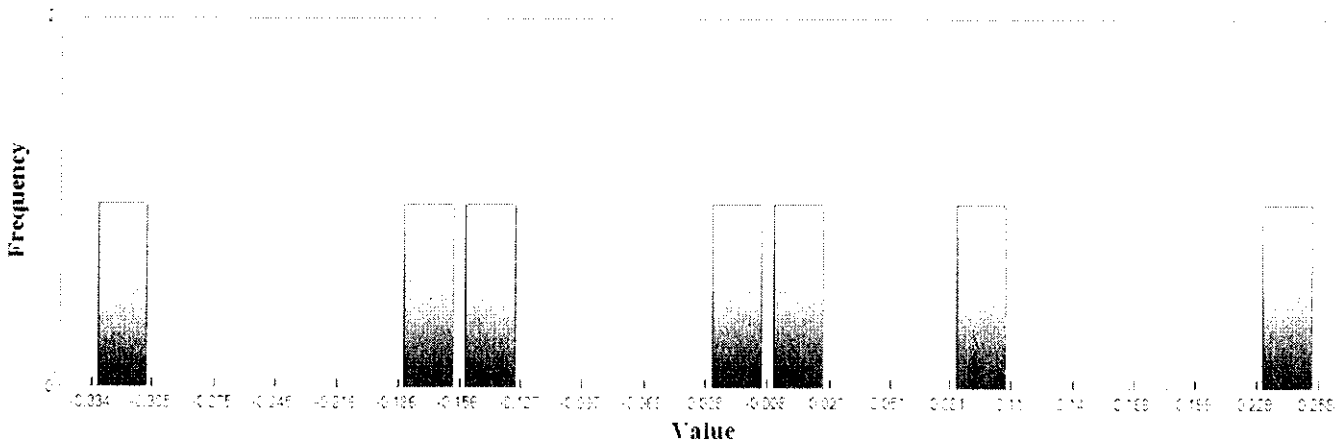


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.334  
Maximum DZ: 0.258  
Mean DZ: -0.049  
Mean Magnitude DZ: 0.385  
Number Observations: 7  
Standard Deviation DZ: 0.193  
RMSE Z: 0.186  
95th Percentile: 0.311  
Units: US Survey Feet

## Histogram



Min: -0.334

Max: 0.258

Number Of Bins: 20

Bin Interval: 0.03



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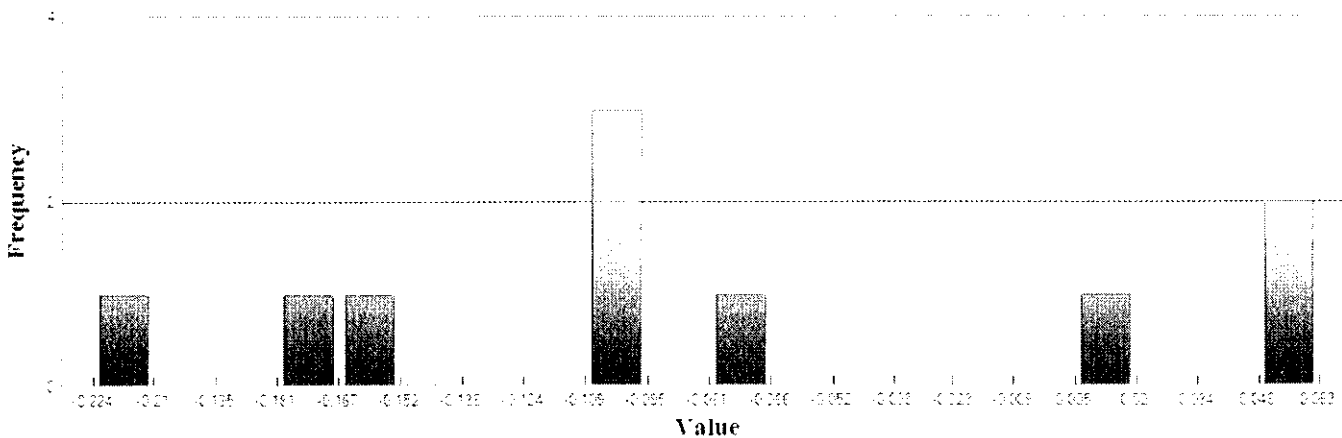


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.224  
Maximum DZ: 0.063  
Mean DZ: -0.08  
Mean Magnitude DZ: 0.328  
Number Observations: 10  
Standard Deviation DZ: 0.098  
RMSE Z: 0.122  
95th Percentile: 0.2  
Units: US Survey Feet

## Histogram



Min: -0.224

Max: 0.063

Number Of Bins: 20

Bin Interval: 0.014

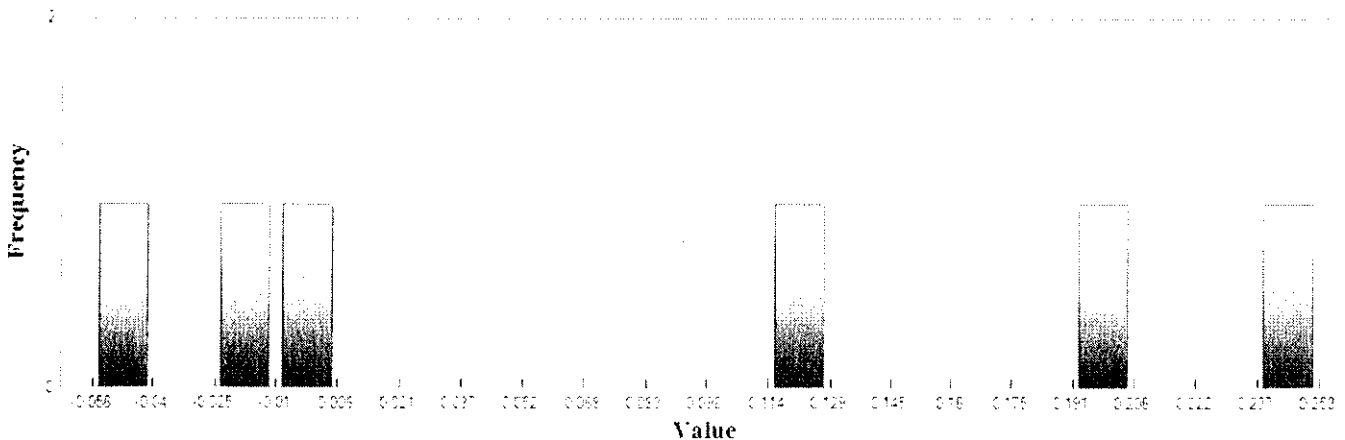


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.056  
Maximum DZ: 0.252  
Mean DZ: 0.083  
Mean Magnitude DZ: 0.327  
Number Observations: 6  
Standard Deviation DZ: 0.125  
RMSE Z: 0.142  
95th Percentile: 0.238  
Units: US Survey Feet

## Histogram



Min: -0.056

Max: 0.252

Number Of Bins: 20

Bin Interval: 0.015



## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2M, 2L, 2H

Minimum DZ: -0.334

Maximum DZ: 0.258

Mean DZ: 0.013

Mean Magnitude DZ: 0.37

Number Observations: 19

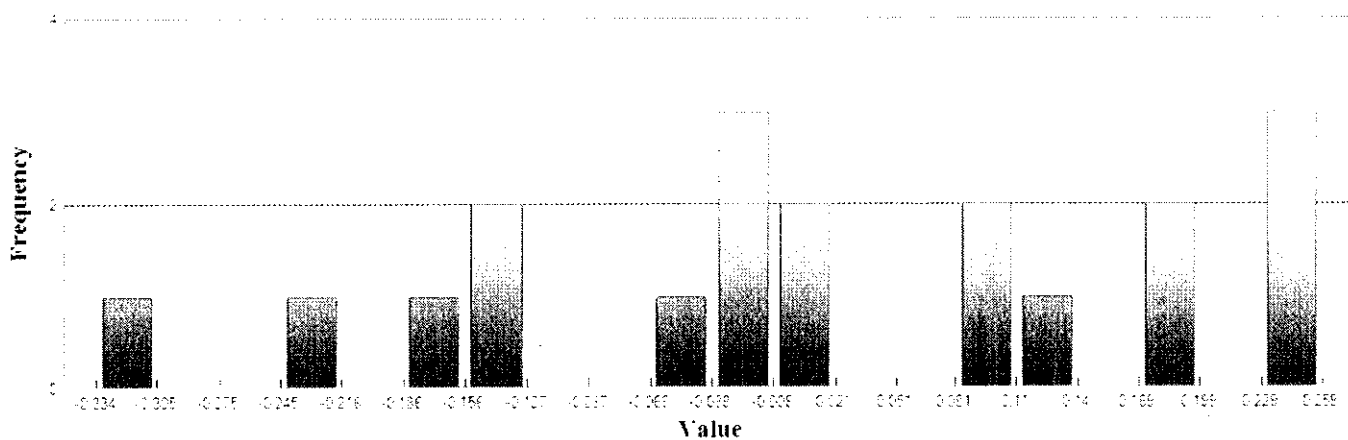
Standard Deviation DZ: 0.171

RMSE Z: 0.167

95th Percentile: 0.266

Units: US Survey Feet

## Histogram



Min: -0.334

Max: 0.258

Number Of Bins: 20

Bin Interval: 0.03

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gltm\GIS\LiDAR2015\Phase 3 QC\county\_files\orange\_files.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

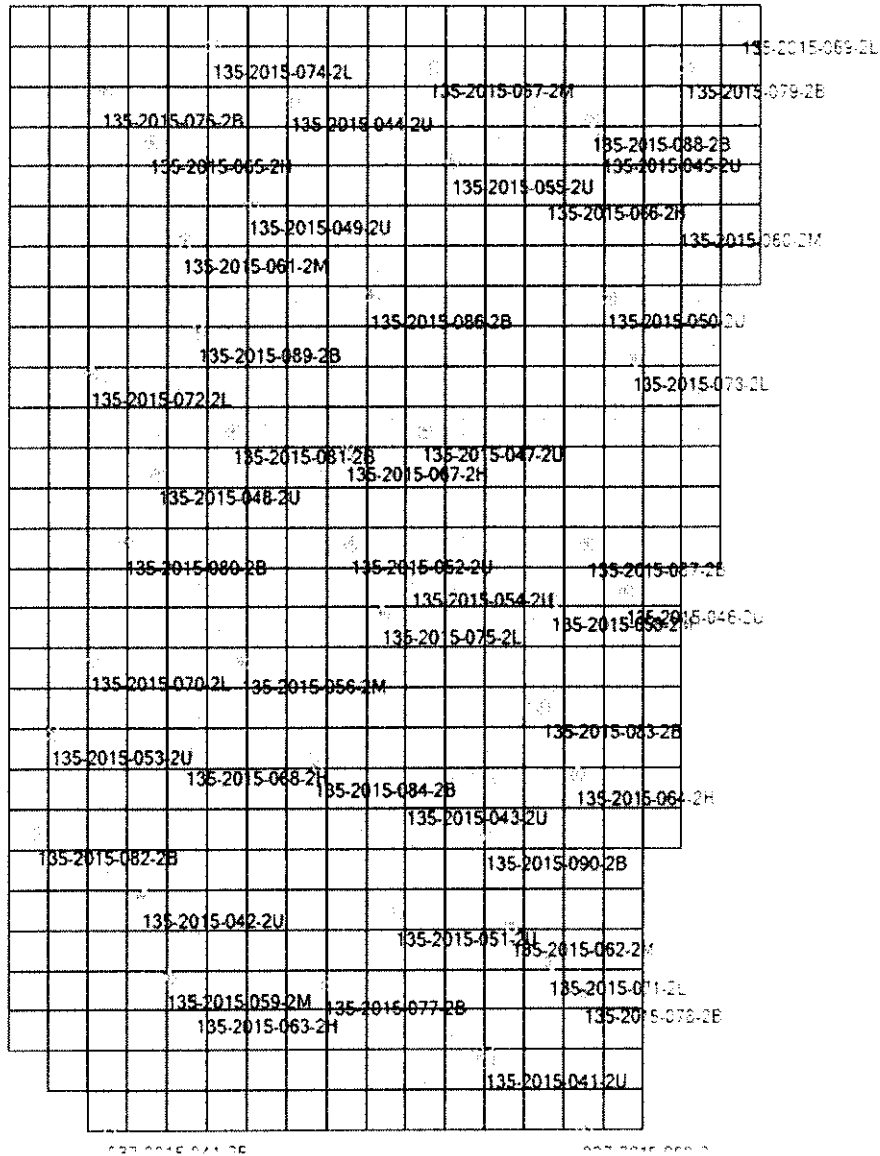
Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### LAS:

Tile Index Attribute: LiDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery2\_08242015\V2\Classified\_LAS  
Number of Data Files Matching Attribute: 487 out of 487



Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	51			
2U	16	0.448	0.468	
2M	7		0.376	0.376
2H	6		0.320	0.320
2L	7		0.483	0.483
2B	15	0.383	0.279	
Total	51			

Units: US Survey Feet

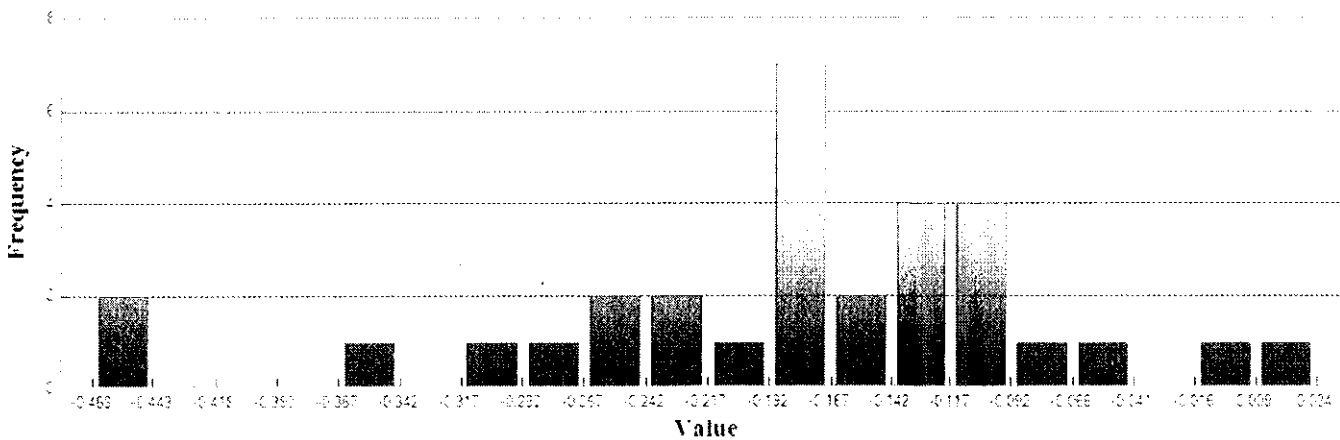


## LAS

### Non-vegetated Vertical Accuracy

LandCover Type: 2U, 2B  
Minimum DZ: -0.468  
Maximum DZ: 0.033  
Mean DZ: -0.183  
Mean Magnitude DZ: 0.43  
Number Observations: 31  
Standard Deviation DZ: 0.111  
RMSE Z: 0.213  
95% Confidence Level Z: 0.418  
Units: US Survey Feet

## Histogram



Min: -0.468  
Max: 0.033  
Number Of Bins: 20  
Bin Interval: 0.025

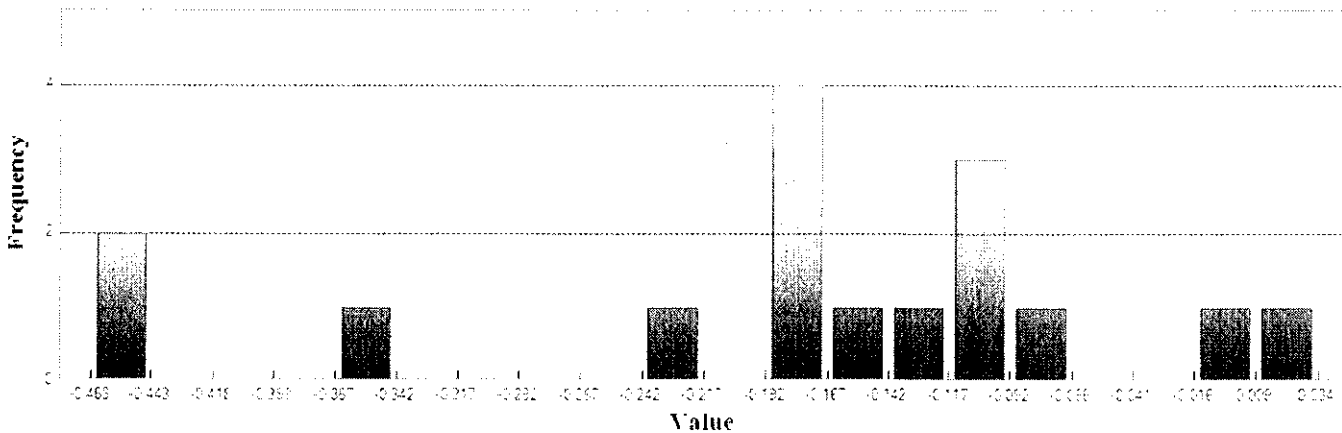


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.468  
Maximum DZ: 0.033  
Mean DZ: -0.182  
Mean Magnitude DZ: 0.432  
Number Observations: 16  
Standard Deviation DZ: 0.142  
RMSE Z: 0.229  
95th Percentile: 0.468  
Units: US Survey Feet

## Histogram



Min: -0.468

Max: 0.033

Number Of Bins: 20

Bin Interval: 0.025



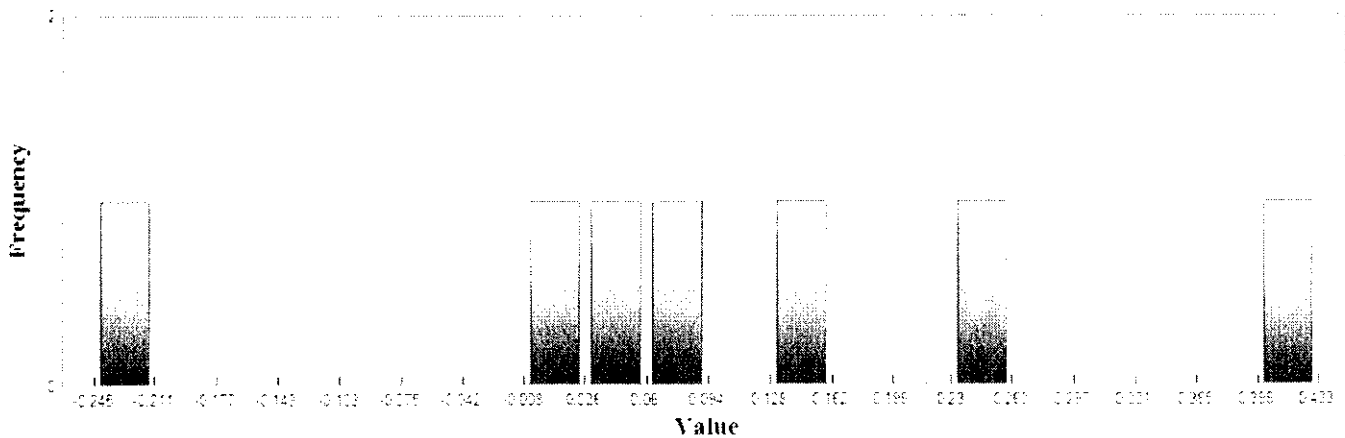


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.245  
Maximum DZ: 0.433  
Mean DZ: 0.102  
Mean Magnitude DZ: 0.415  
Number Observations: 7  
Standard Deviation DZ: 0.209  
RMSE Z: 0.219  
95th Percentile: 0.376  
Units: US Survey Feet

## Histogram



Min: -0.245  
Max: 0.433  
Number Of Bins: 20  
Bin Interval: 0.034

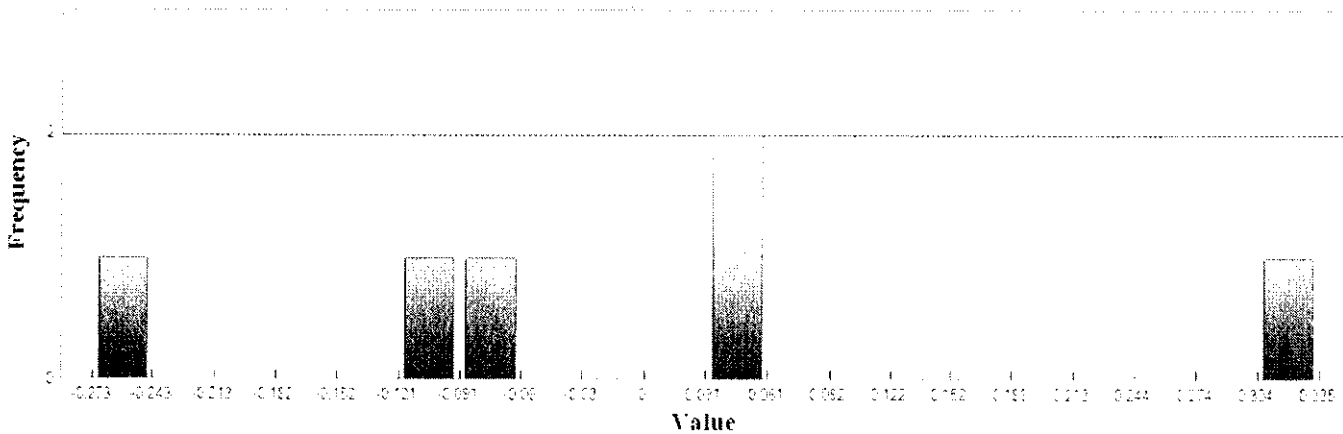


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.273  
Maximum DZ: 0.335  
Mean DZ: -0.006  
Mean Magnitude DZ: 0.389  
Number Observations: 6  
Standard Deviation DZ: 0.206  
RMSE Z: 0.188  
95th Percentile: 0.32  
Units: US Survey Feet

## Histogram



Min: -0.273  
Max: 0.335  
Number Of Bins: 20  
Bin Interval: 0.03

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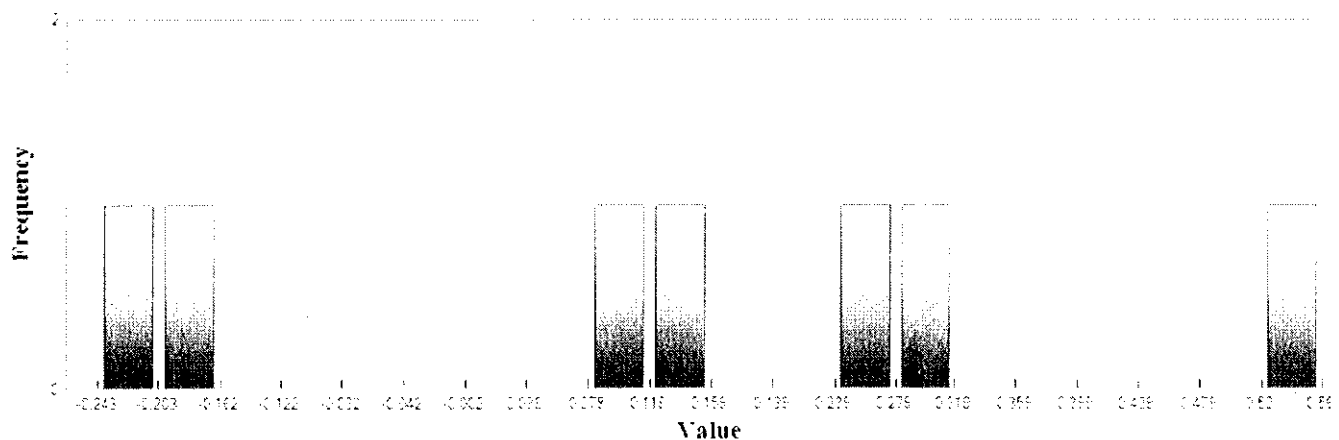


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.243  
Maximum DZ: 0.56  
Mean DZ: 0.131  
Mean Magnitude DZ: 0.506  
Number Observations: 7  
Standard Deviation DZ: 0.281  
RMSE Z: 0.291  
95th Percentile: 0.483  
Units: US Survey Feet

## Histogram



Min: -0.243

Max: 0.56

Number Of Bins: 20

Bin Interval: 0.04

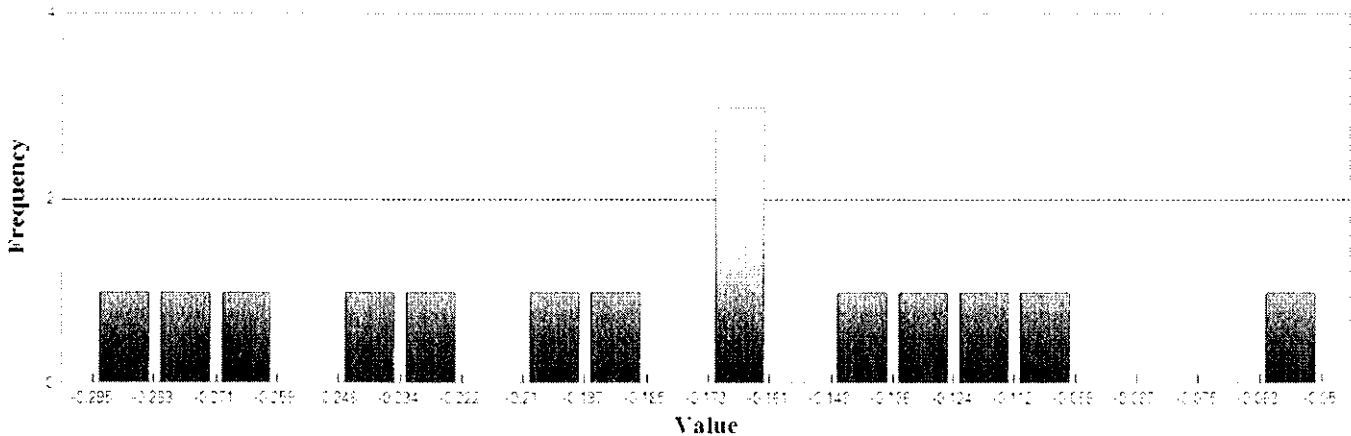


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.295  
Maximum DZ: -0.05  
Mean DZ: -0.184  
Mean Magnitude DZ: 0.428  
Number Observations: 15  
Standard Deviation DZ: 0.069  
RMSE Z: 0.195  
95th Percentile: 0.279  
Units: US Survey Feet

## Histogram



Min: -0.295

Max: -0.05

Number Of Bins: 20

Bin Interval: 0.012



## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2M, 2H, 2L

Minimum DZ: -0.273

Maximum DZ: 0.56

Mean DZ: 0.08

Mean Magnitude DZ: 0.442

Number Observations: 20

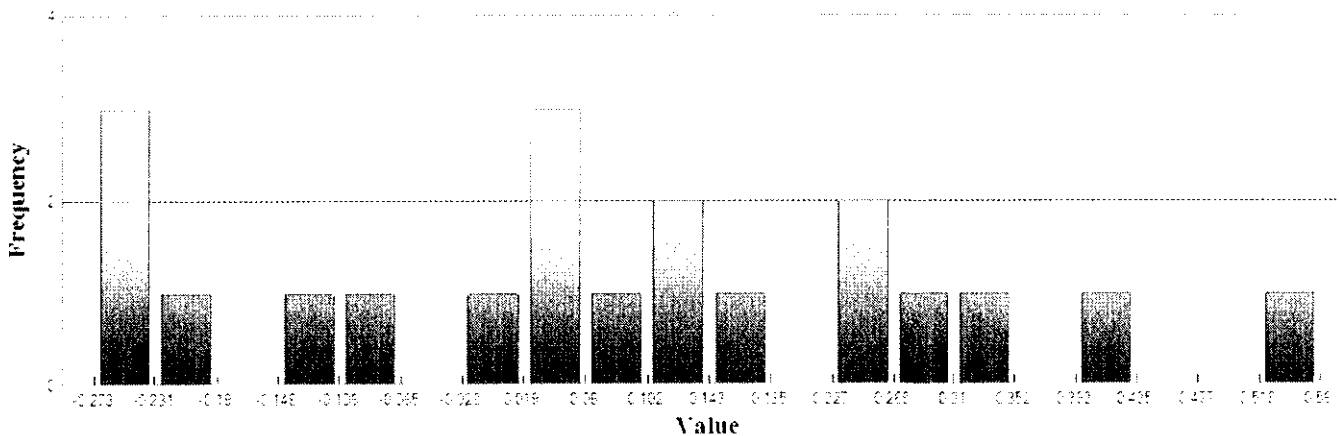
Standard Deviation DZ: 0.231

RMSE Z: 0.239

95th Percentile: 0.439

Units: US Survey Feet

## Histogram



Min: -0.273

Max: 0.56

Number Of Bins: 20

Bin Interval: 0.042

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gim\GIS\LiDAR2015\Phase 3 QC\county\_files\person\_files.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

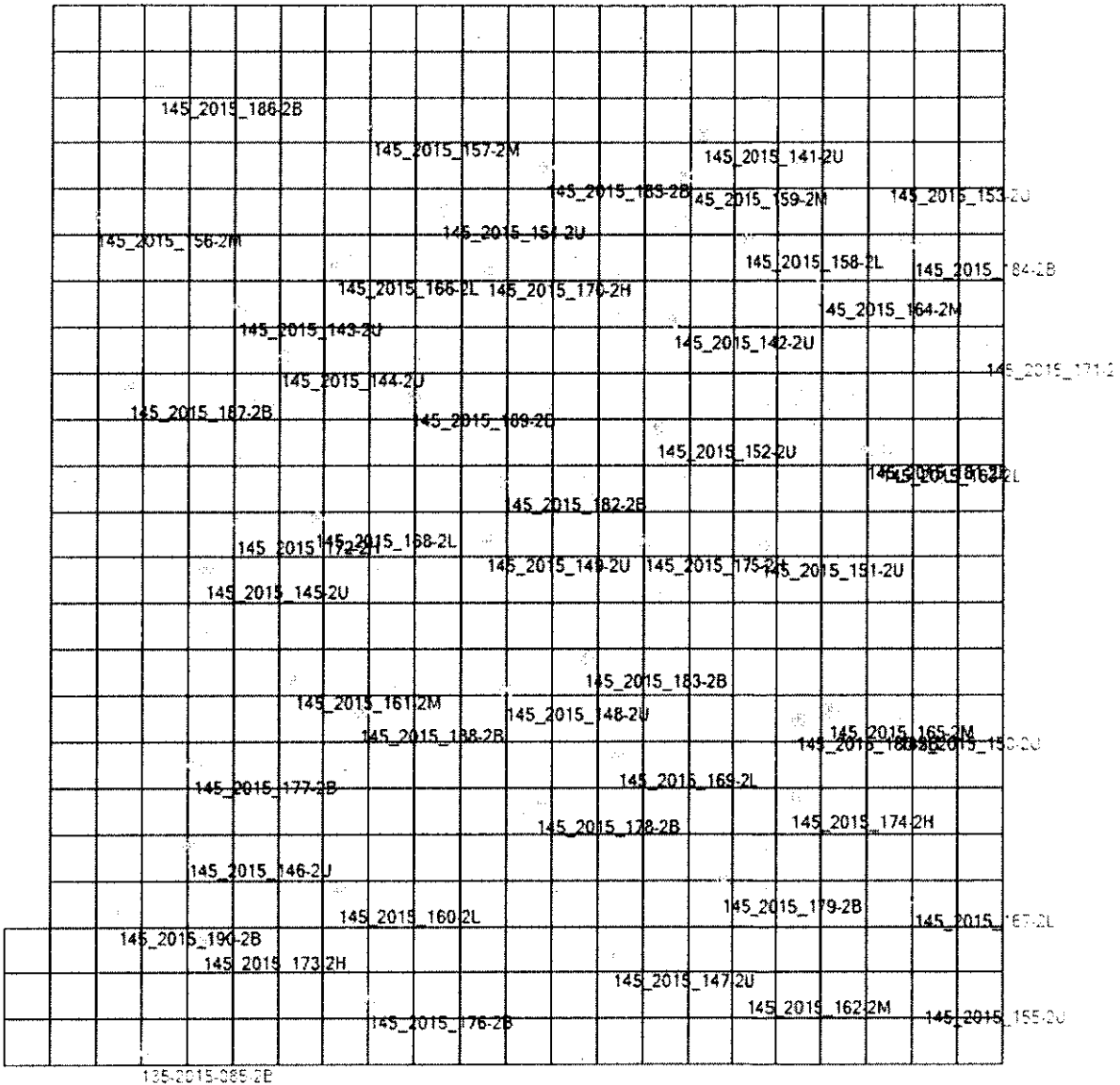
Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### LAS:

Tile Index Attribute: LiDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery1\_1.3\_08122015\V2\Classified\_LAS  
Number of Data Files Matching Attribute: 486 out of 486



Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	51			
2B	16	0.272	0.242	
2U	15	0.388	0.386	
2M	7		0.468	0.468
2L	7		0.196	0.196
2H	6		0.156	0.156
Total	51			

Units: US Survey Feet



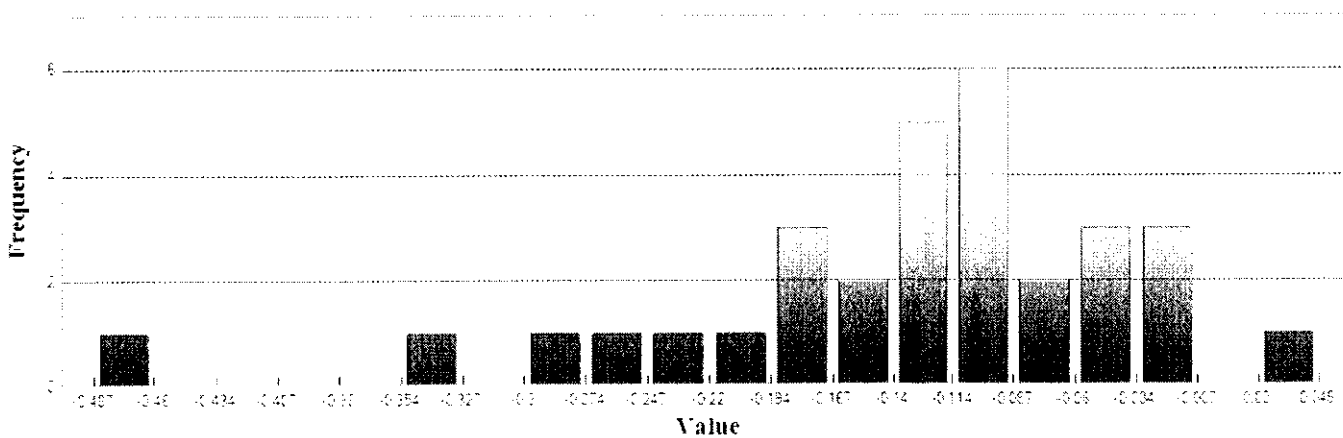


## LAS

### Non-vegetated Vertical Accuracy

LandCover Type: 2B, 2U  
Minimum DZ: -0.487  
Maximum DZ: 0.047  
Mean DZ: -0.134  
Mean Magnitude DZ: 0.37  
Number Observations: 31  
Standard Deviation DZ: 0.106  
RMSE Z: 0.17  
95% Confidence Level Z: 0.333  
Units: US Survey Feet

## Histogram



Min: -0.487  
Max: 0.047  
Number Of Bins: 20  
Bin Interval: 0.027

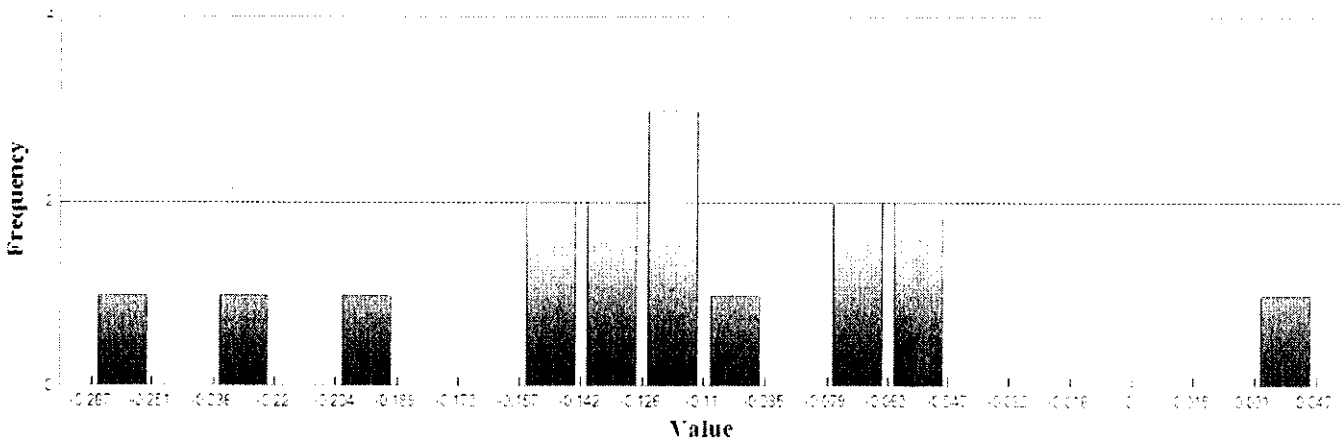


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
 Minimum DZ: -0.267  
 Maximum DZ: 0.047  
 Mean DZ: -0.118  
 Mean Magnitude DZ: 0.352  
 Number Observations: 16  
 Standard Deviation DZ: 0.075  
 RMSE Z: 0.139  
 95th Percentile: 0.242  
 Units: US Survey Feet

## Histogram



Min: -0.267  
 Max: 0.047  
 Number Of Bins: 20  
 Bin Interval: 0.016

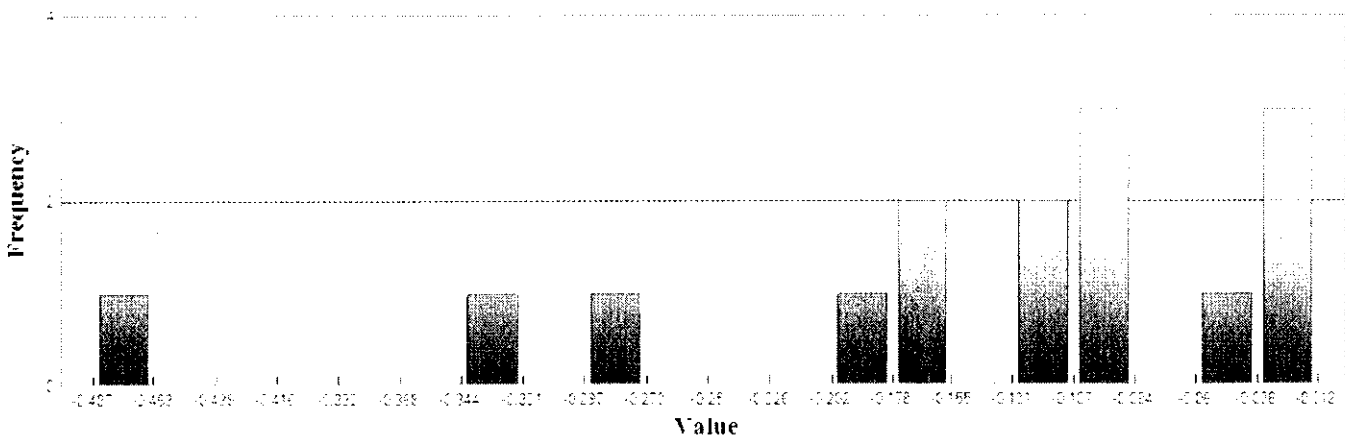


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.487  
Maximum DZ: -0.013  
Mean DZ: -0.151  
Mean Magnitude DZ: 0.389  
Number Observations: 15  
Standard Deviation DZ: 0.132  
RMSE Z: 0.198  
95th Percentile: 0.386  
Units: US Survey Feet

## Histogram



Min: -0.487

Max: -0.013

Number Of Bins: 20

Bin Interval: 0.024

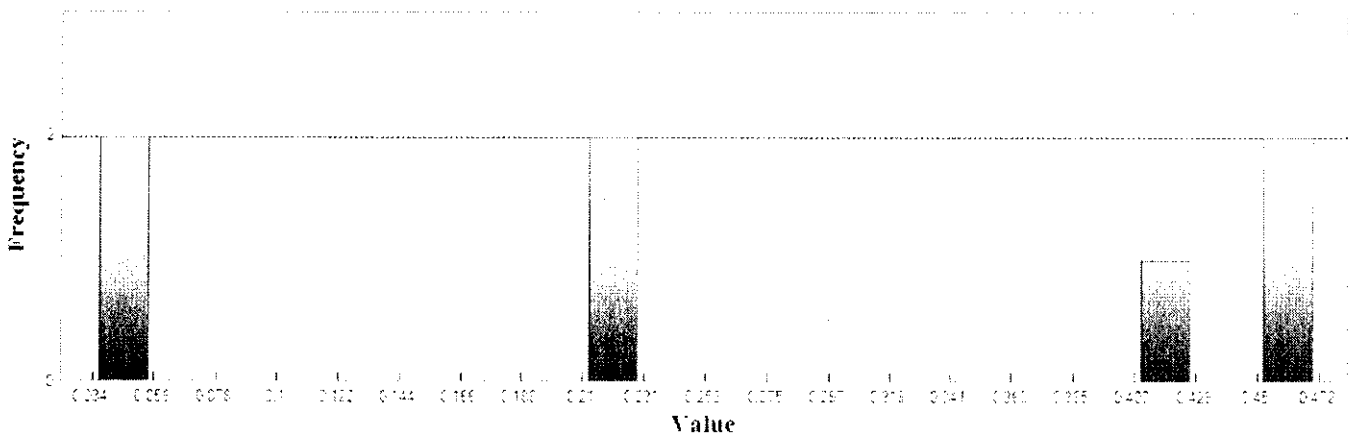


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: 0.034  
Maximum DZ: 0.472  
Mean DZ: 0.266  
Mean Magnitude DZ: 0.515  
Number Observations: 7  
Standard Deviation DZ: 0.188  
RMSE Z: 0.317  
95th Percentile: 0.468  
Units: US Survey Feet

## Histogram



Min: 0.034

Max: 0.472

Number Of Bins: 20

Bin Interval: 0.022

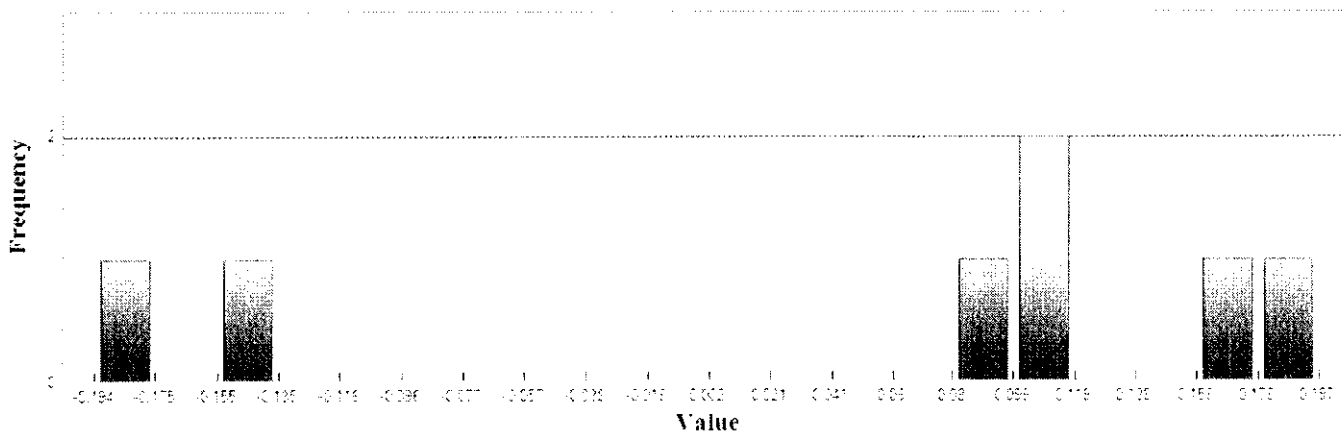


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.194  
Maximum DZ: 0.197  
Mean DZ: 0.048  
Mean Magnitude DZ: 0.383  
Number Observations: 7  
Standard Deviation DZ: 0.155  
RMSE Z: 0.152  
95th Percentile: 0.196  
Units: US Survey Feet

## Histogram



Min: -0.194  
Max: 0.197  
Number Of Bins: 20  
Bin Interval: 0.02

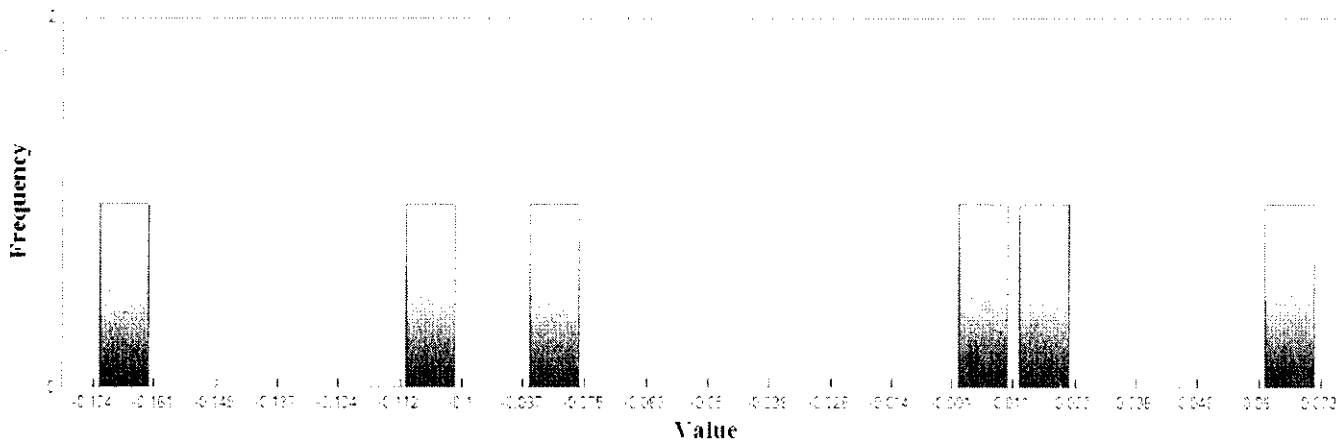


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.173  
Maximum DZ: 0.073  
Mean DZ: -0.043  
Mean Magnitude DZ: 0.275  
Number Observations: 6  
Standard Deviation DZ: 0.091  
RMSE Z: 0.094  
95th Percentile: 0.156  
Units: US Survey Feet

## Histogram



Min: -0.173  
Max: 0.073  
Number Of Bins: 20  
Bin Interval: 0.012

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## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2M, 2L, 2H

Minimum DZ: -0.194

Maximum DZ: 0.472

Mean DZ: 0.097

Mean Magnitude DZ: 0.409

Number Observations: 20

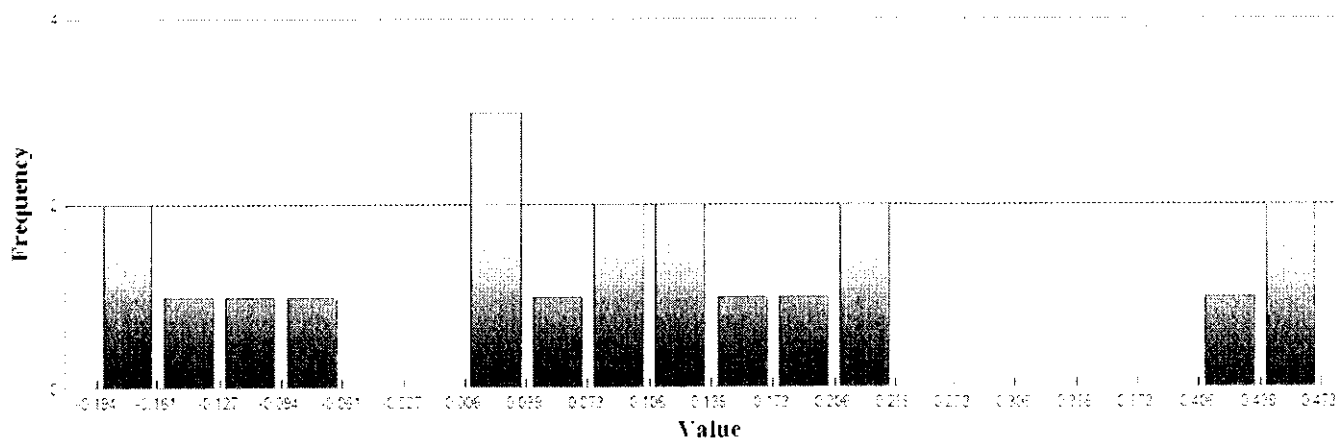
Standard Deviation DZ: 0.196

RMSE Z: 0.214

95th Percentile: 0.459

Units: US Survey Feet

## Histogram



Min: -0.194

Max: 0.472

Number Of Bins: 20

Bin Interval: 0.033

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gtm\GIS\LiDAR2015\Phase 3 QC\county\_files\randolph\_files.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

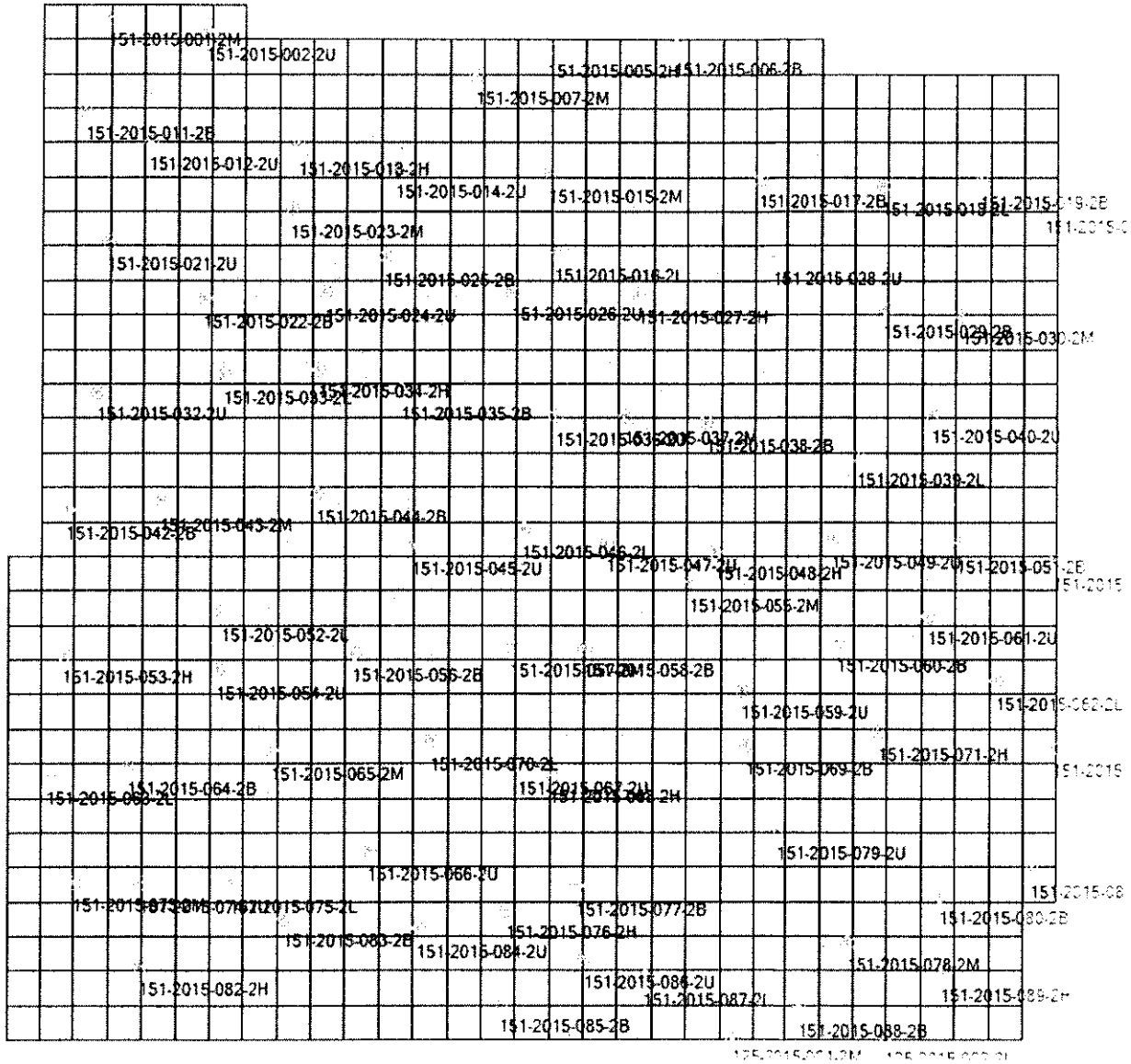
### LAS:

Tile Index Attribute: LiDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery4\_10192015\Delivery4\_01272016\_Redc  
Number of Data Files Matching Attribute: 879 out of 879





Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	84			
2M	13		0.507	0.507
2L	13		0.809	0.809
2U	23	0.238	0.214	
2H	12		0.332	0.332
2B	23	0.180	0.194	
Total	84			

Units: US Survey Feet



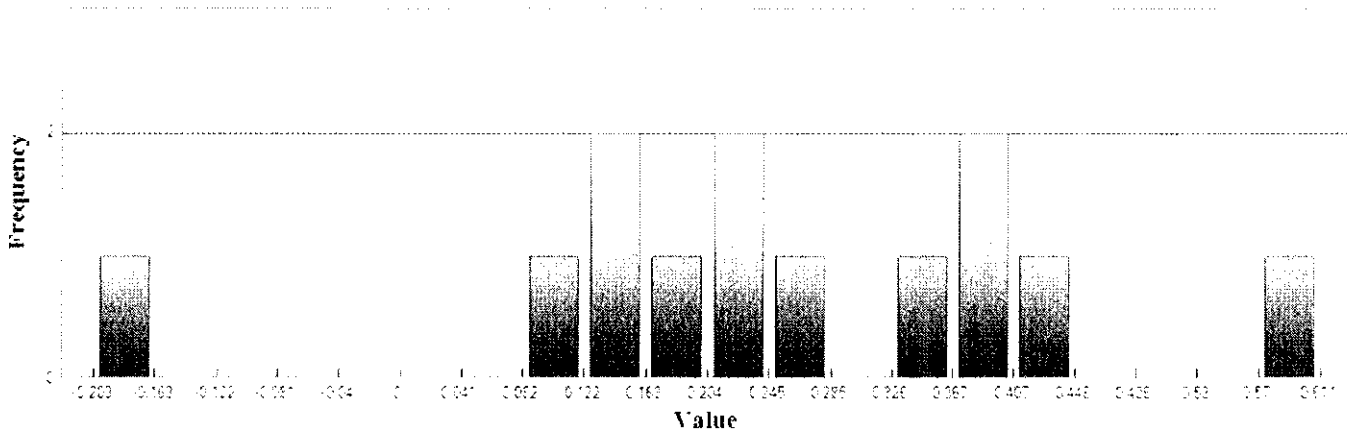


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.203  
Maximum DZ: 0.611  
Mean DZ: 0.249  
Mean Magnitude DZ: 0.529  
Number Observations: 13  
Standard Deviation DZ: 0.196  
RMSE Z: 0.312  
95th Percentile: 0.507  
Units: US Survey Feet

## Histogram



Min: -0.203

Max: 0.611

Number Of Bins: 20

Bin Interval: 0.041

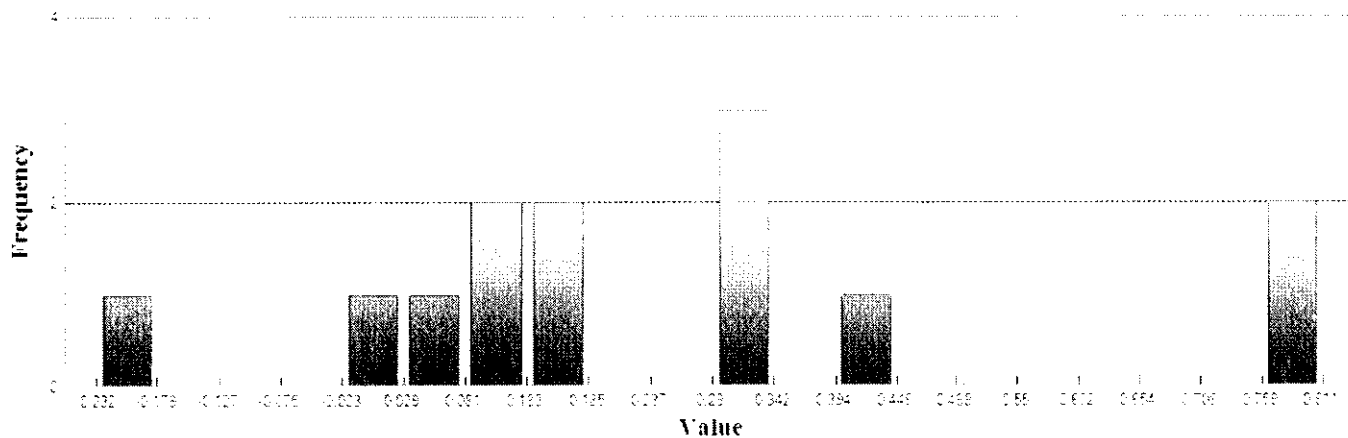


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.232  
Maximum DZ: 0.811  
Mean DZ: 0.256  
Mean Magnitude DZ: 0.543  
Number Observations: 13  
Standard Deviation DZ: 0.299  
RMSE Z: 0.385  
95th Percentile: 0.809  
Units: US Survey Feet

## Histogram



Min: -0.232  
Max: 0.811  
Number Of Bins: 20  
Bin Interval: 0.052

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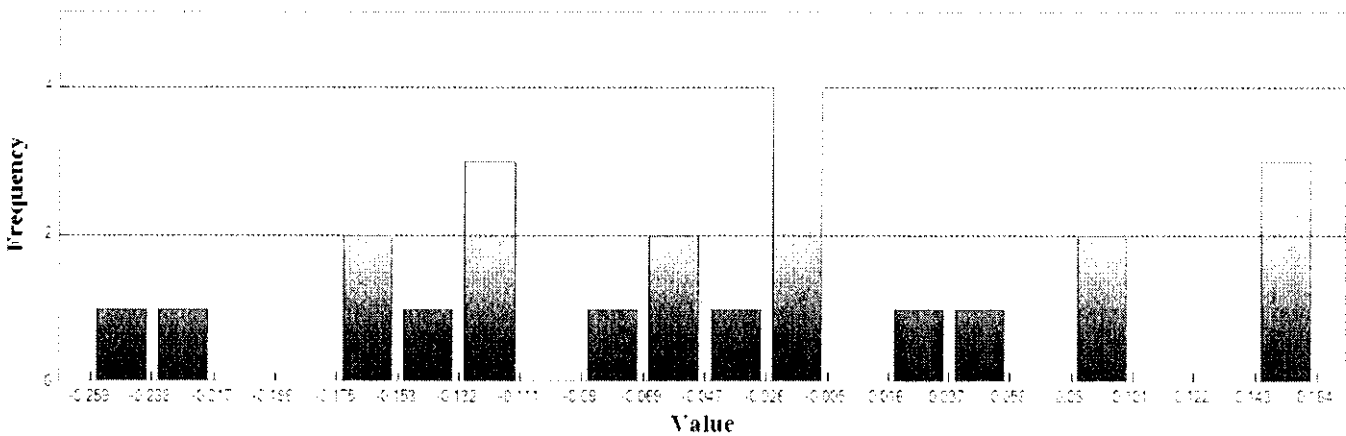


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.26  
Maximum DZ: 0.164  
Mean DZ: -0.037  
Mean Magnitude DZ: 0.318  
Number Observations: 23  
Standard Deviation DZ: 0.118  
RMSE Z: 0.122  
95th Percentile: 0.214  
Units: US Survey Feet

## Histogram



Min: -0.26

Max: 0.164

Number Of Bins: 20

Bin Interval: 0.021

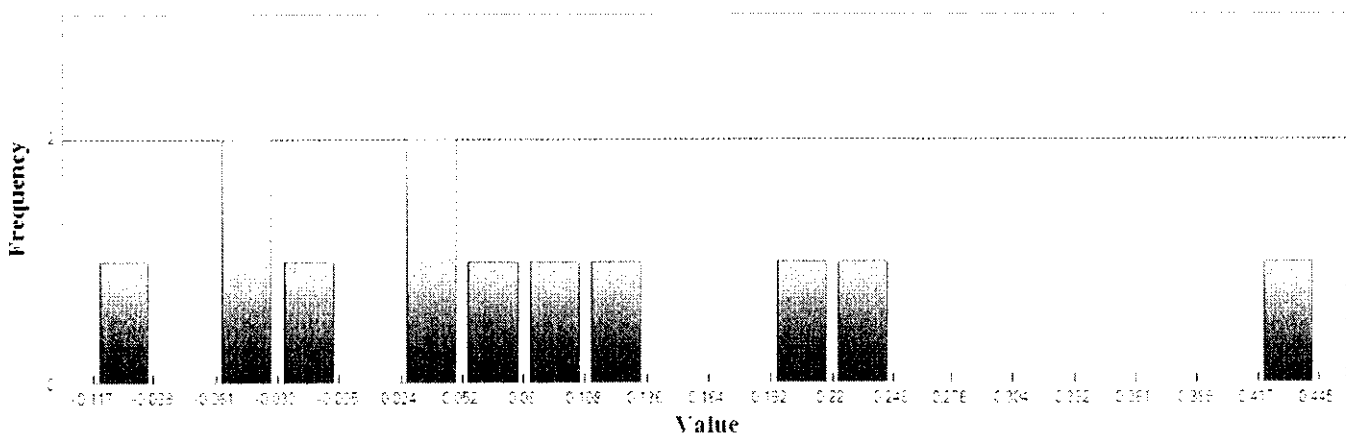


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.117  
Maximum DZ: 0.445  
Mean DZ: 0.082  
Mean Magnitude DZ: 0.347  
Number Observations: 12  
Standard Deviation DZ: 0.153  
RMSE Z: 0.168  
95th Percentile: 0.332  
Units: US Survey Feet

## Histogram



Min: -0.117

Max: 0.445

Number Of Bins: 20

Bin Interval: 0.028

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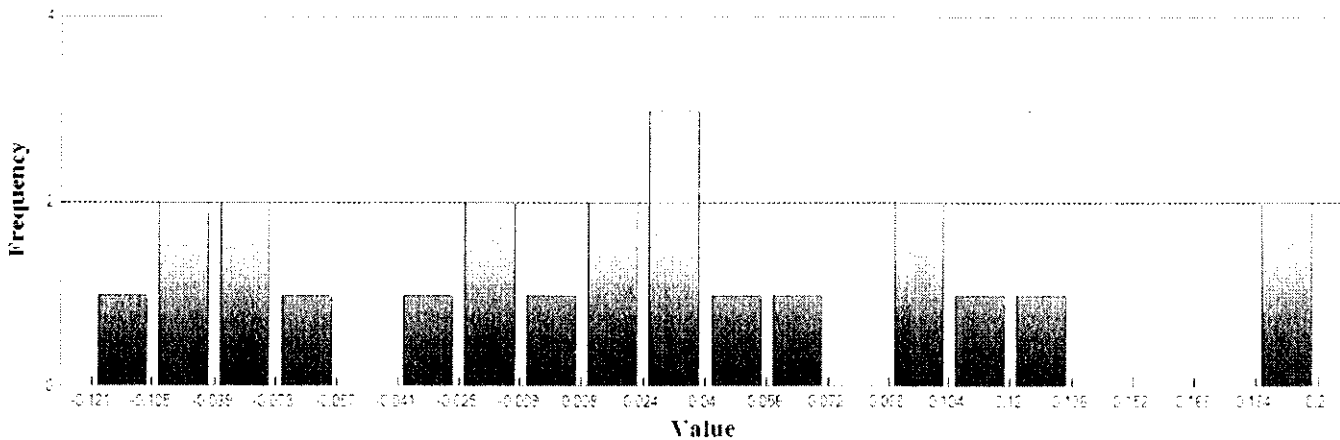


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
Minimum DZ: -0.121  
Maximum DZ: 0.2  
Mean DZ: 0.019  
Mean Magnitude DZ: 0.273  
Number Observations: 23  
Standard Deviation DZ: 0.092  
RMSE Z: 0.092  
95th Percentile: 0.194  
Units: US Survey Feet

## Histogram



Min: -0.121

Max: 0.2

Number Of Bins: 20

Bin Interval: 0.016





## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2M, 2L, 2H

Minimum DZ: -0.232

Maximum DZ: 0.811

Mean DZ: 0.198

Mean Magnitude DZ: 0.485

Number Observations: 38

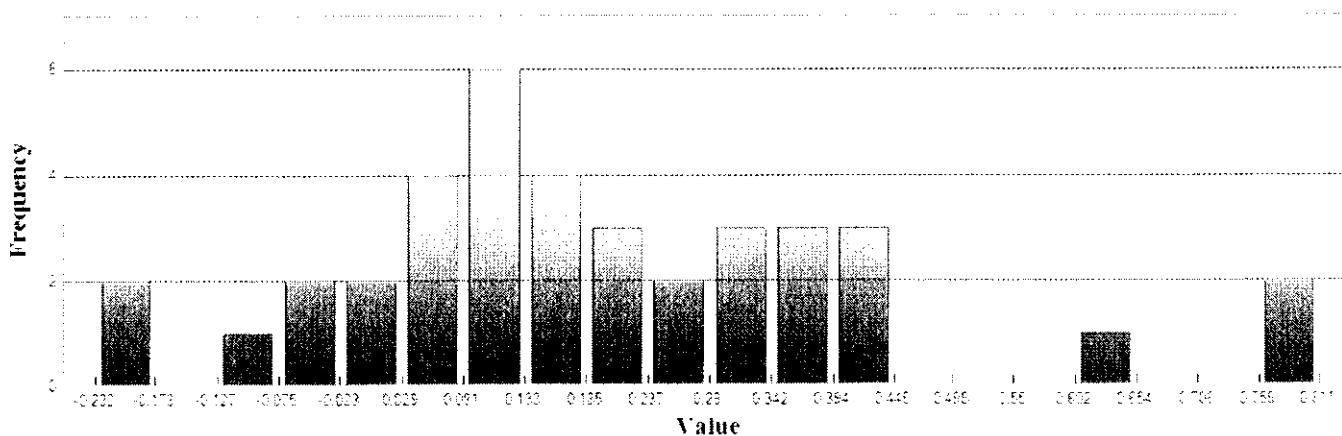
Standard Deviation DZ: 0.234

RMSE Z: 0.305

95th Percentile: 0.641

Units: US Survey Feet

## Histogram



Min: -0.232

Max: 0.811

Number Of Bins: 20

Bin Interval: 0.052

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: N/A  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/20/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gim\GIS\LiDAR2015\Phase 3 QC\county\_files\rockingham\_files.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

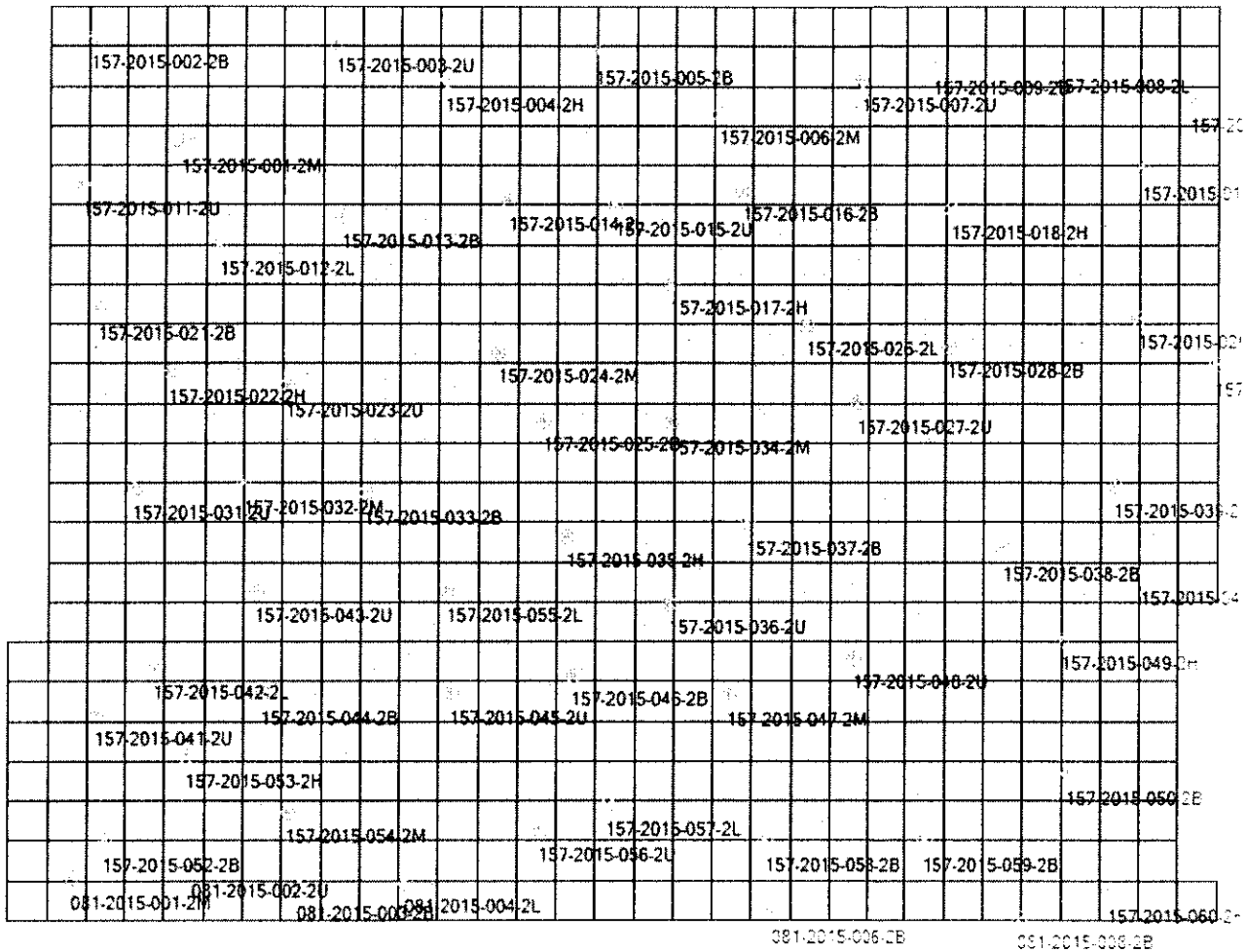
### LAS:

Tile Index Attribute: LiDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery1\_1.3\_08122015\V2\Classified\_LAS  
Number of Data Files Matching Attribute: 690 out of 690

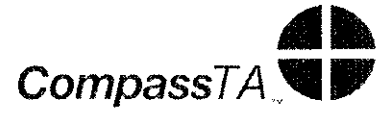
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Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	64			
2M	9		0.308	0.308
2B	20	0.337	0.275	
2U	17	0.407	0.353	
2H	8		0.320	0.320
2L	10		0.365	0.365
Total	64			

Units: US Survey Feet

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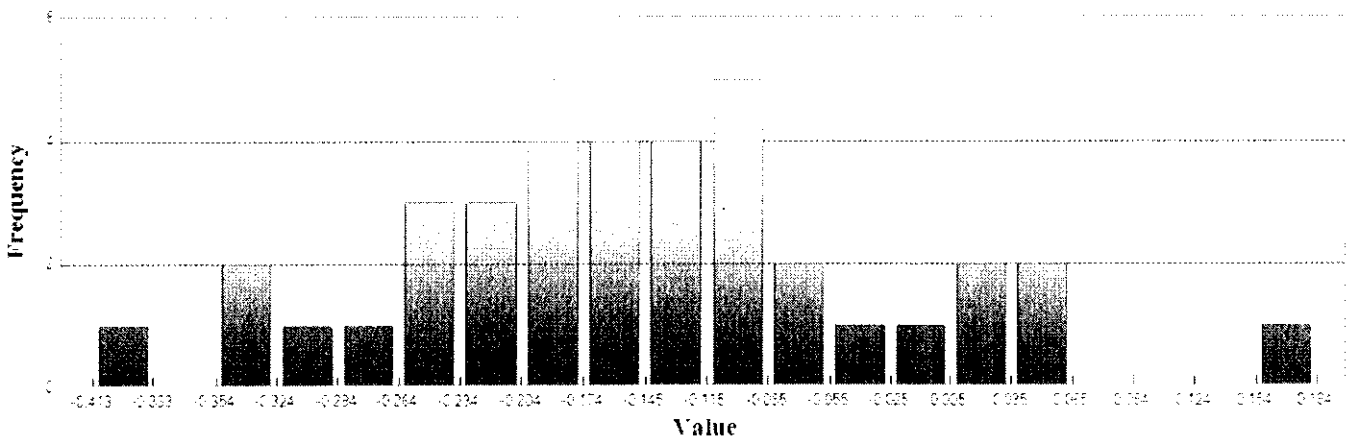


# LAS

## Non-vegetated Vertical Accuracy

LandCover Type: 2B, 2U  
Minimum DZ: -0.413  
Maximum DZ: 0.184  
Mean DZ: -0.145  
Mean Magnitude DZ: 0.403  
Number Observations: 37  
Standard Deviation DZ: 0.123  
RMSE Z: 0.189  
95% Confidence Level Z: 0.371  
Units: US Survey Feet

# Histogram



Min: -0.413  
Max: 0.184  
Number Of Bins: 20  
Bin Interval: 0.03

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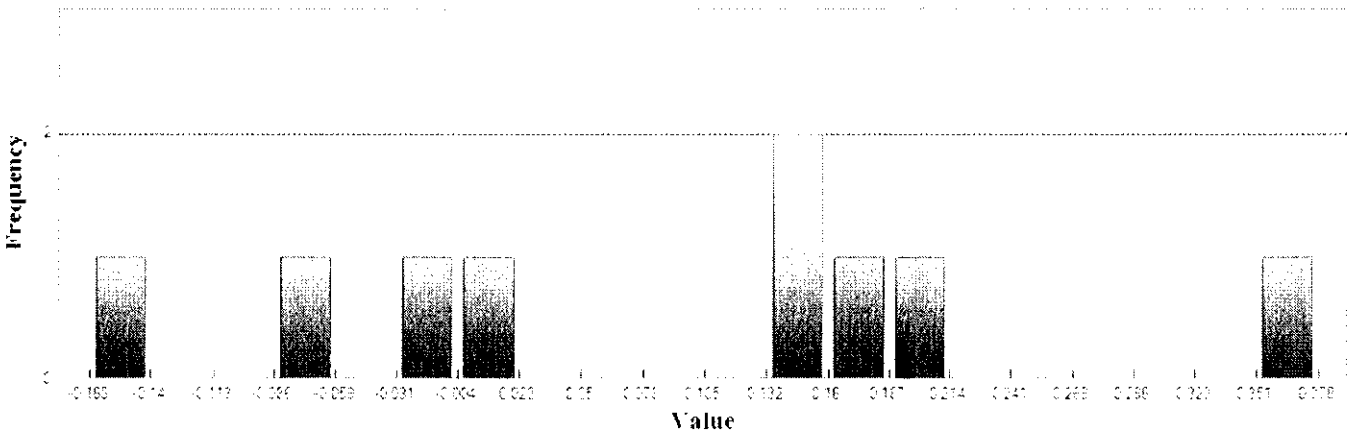


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.168  
Maximum DZ: 0.377  
Mean DZ: 0.09  
Mean Magnitude DZ: 0.382  
Number Observations: 9  
Standard Deviation DZ: 0.167  
RMSE Z: 0.181  
95th Percentile: 0.308  
Units: US Survey Feet

## Histogram



Min: -0.168  
Max: 0.377  
Number Of Bins: 20  
Bin Interval: 0.027

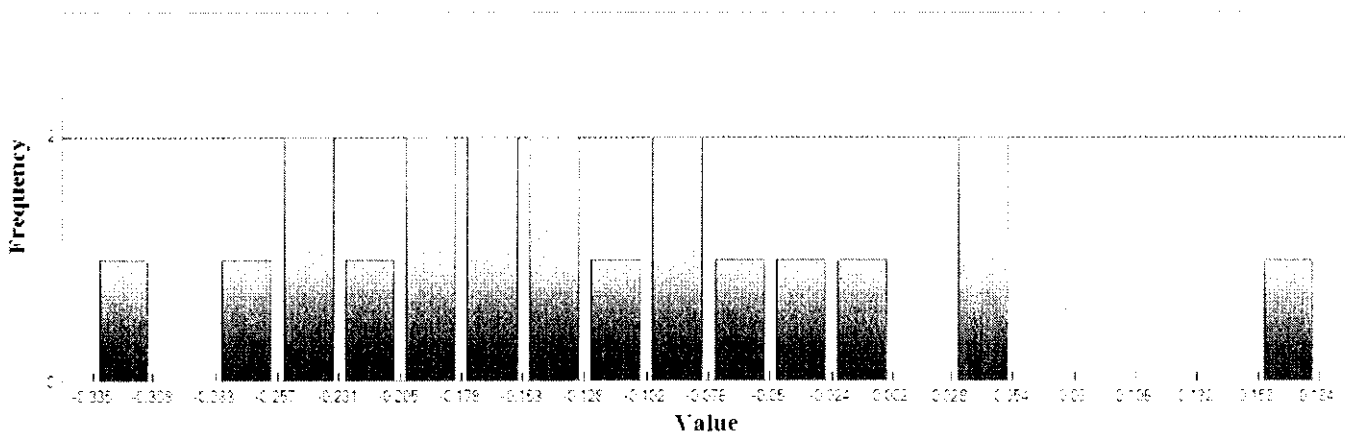


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2B  
 Minimum DZ: -0.335  
 Maximum DZ: 0.184  
 Mean DZ: -0.122  
 Mean Magnitude DZ: 0.385  
 Number Observations: 20  
 Standard Deviation DZ: 0.125  
 RMSE Z: 0.172  
 95th Percentile: 0.275  
 Units: US Survey Feet

## Histogram



Min: -0.335  
 Max: 0.184  
 Number Of Bins: 20  
 Bin Interval: 0.026

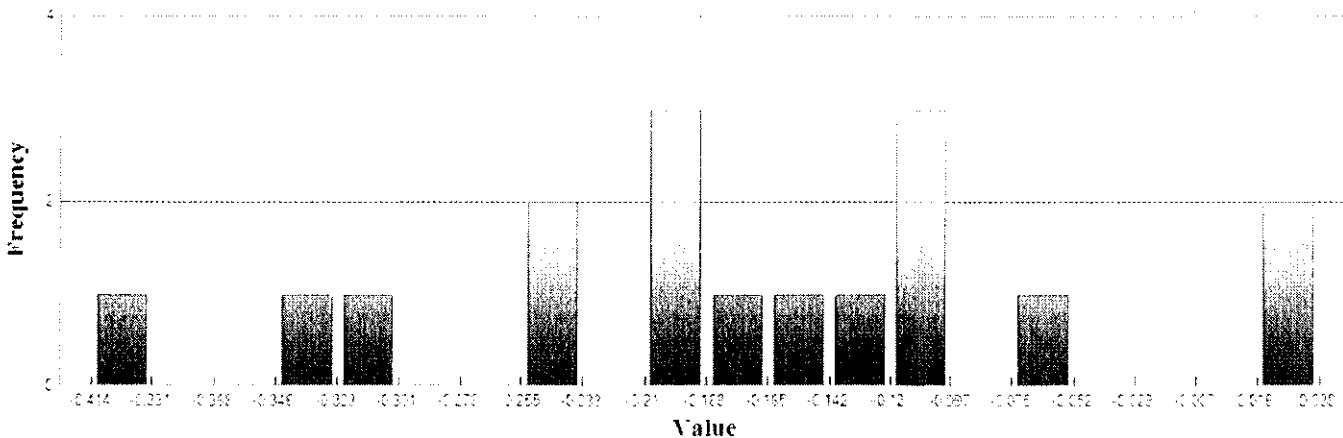


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.413  
Maximum DZ: 0.039  
Mean DZ: -0.172  
Mean Magnitude DZ: 0.423  
Number Observations: 17  
Standard Deviation DZ: 0.12  
RMSE Z: 0.207  
95th Percentile: 0.353  
Units: US Survey Feet

## Histogram



Min: -0.413

Max: 0.039

Number Of Bins: 20

Bin Interval: 0.023



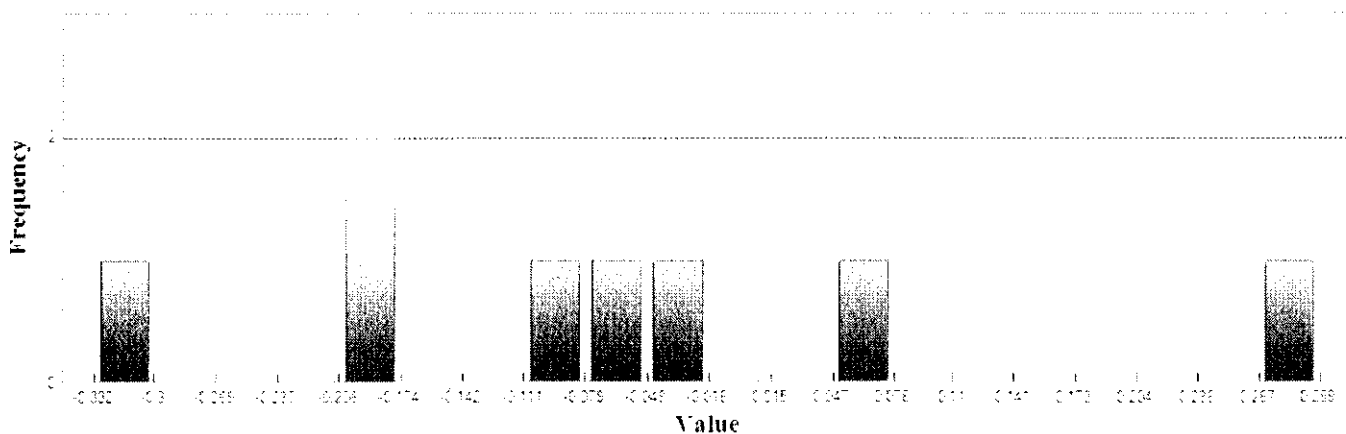


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.332  
Maximum DZ: 0.299  
Mean DZ: -0.07  
Mean Magnitude DZ: 0.403  
Number Observations: 8  
Standard Deviation DZ: 0.191  
RMSE Z: 0.192  
95th Percentile: 0.32  
Units: US Survey Feet

## Histogram



Min: -0.332

Max: 0.299

Number Of Bins: 20

Bin Interval: 0.032

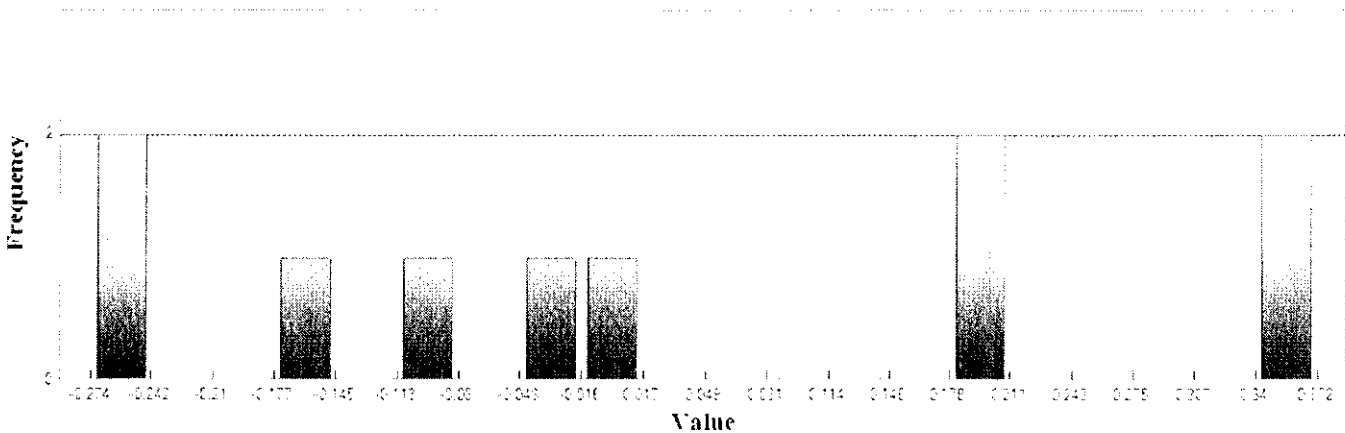


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.274  
Maximum DZ: 0.372  
Mean DZ: 0.03  
Mean Magnitude DZ: 0.445  
Number Observations: 10  
Standard Deviation DZ: 0.24  
RMSE Z: 0.23  
95th Percentile: 0.365  
Units: US Survey Feet

## Histogram



Min: -0.274  
Max: 0.372  
Number Of Bins: 20  
Bin Interval: 0.032



## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2M, 2H, 2L

Minimum DZ: -0.332

Maximum DZ: 0.377

Mean DZ: 0.02

Mean Magnitude DZ: 0.413

Number Observations: 27

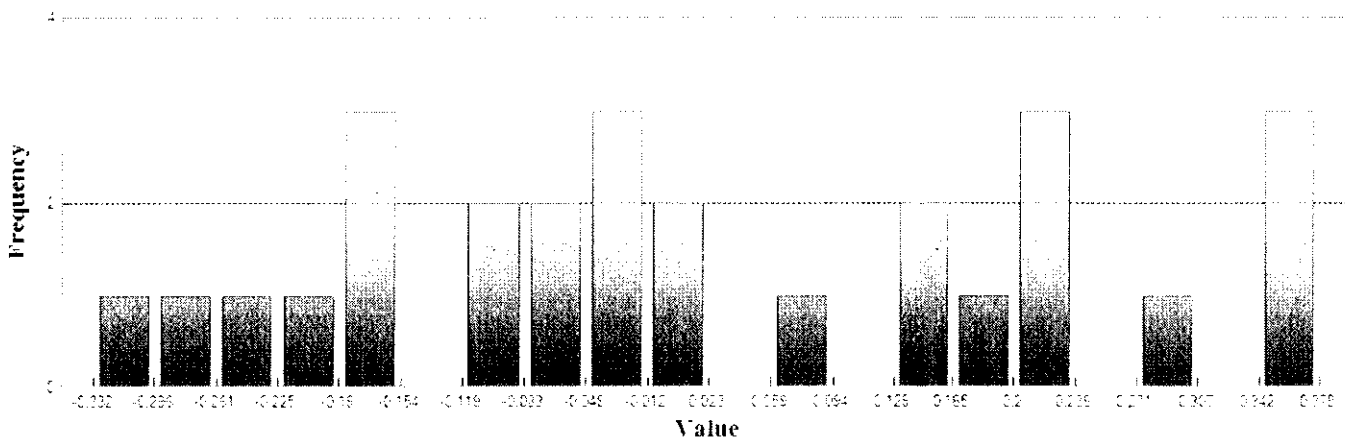
Standard Deviation DZ: 0.206

RMSE Z: 0.204

95th Percentile: 0.367

Units: US Survey Feet

## Histogram



Min: -0.332

Max: 0.377

Number Of Bins: 20

Bin Interval: 0.035

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## Project Information

Prepared By: Watson Ross  
Project Name: 2015 Phase 3 LiDAR QC  
Sensor Info: NA  
Required Nominal Pulse Spacing: 0.7  
Vendor Name: Photo Science, Inc.  
Units: US Survey Feet  
Percent of Extent Tolerance: Extents Not Checked  
Date of Acquisition: Start: 1/21/2015 Finish: 3/7/2015

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## Metadata Information

### Tile Index:

Path: \\NCEMJFHQFS01\gfm\GIS\LiDAR2015\Phase 3 QC\county\_tiles\wake\_files.shp  
Number of Polys: 0

### Intensity:

Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### DEM:

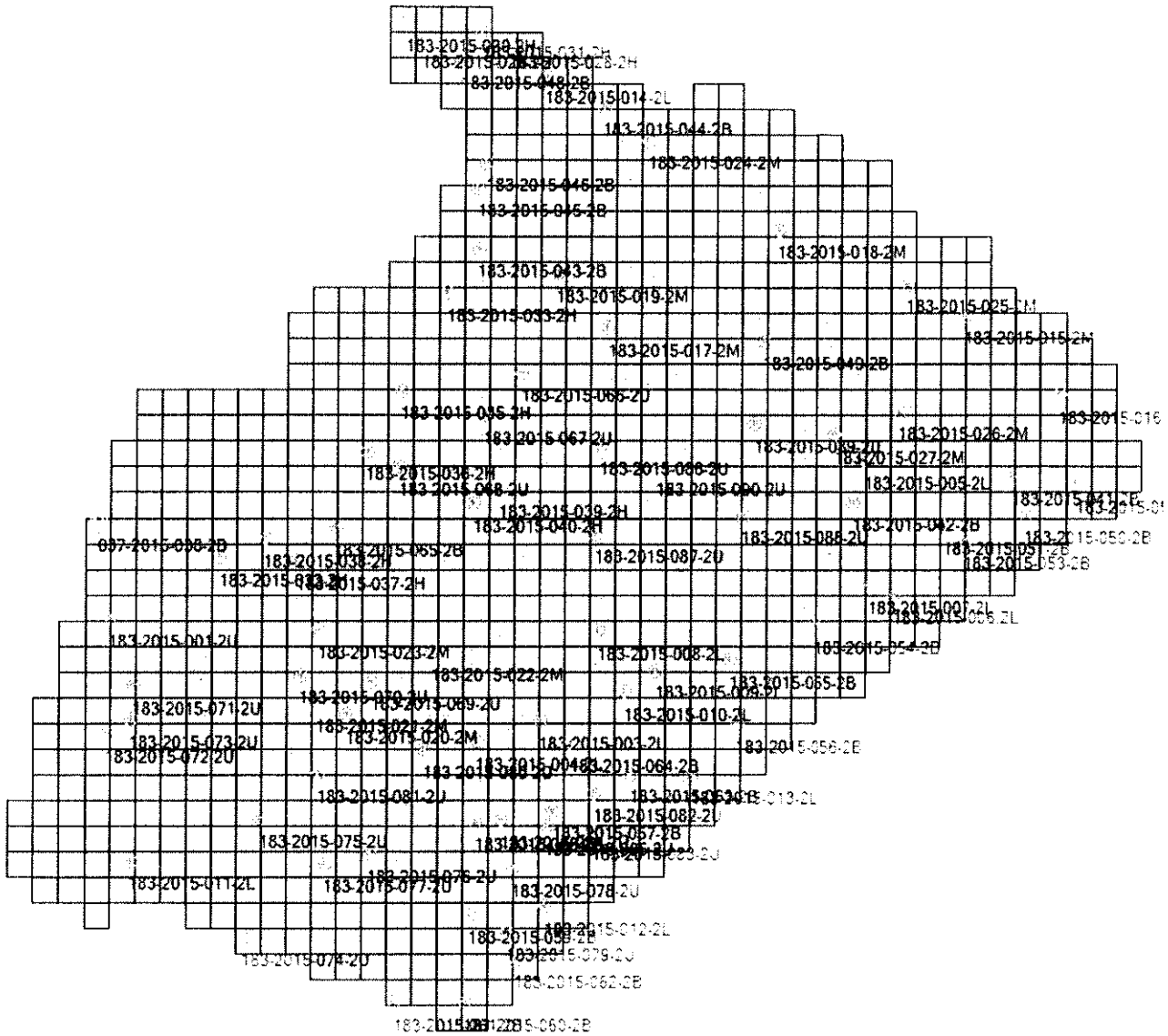
Tile Index Attribute: Not Specified  
Path to Data: Not Specified  
Number of Data Files Matching Attribute: Not Specified

### LAS:

Tile Index Attribute: LiDARTiles  
Path to Data: \\ncemjfhqclpshp\hdata\Phase\_3\Quantum\Delivery5\_11232015\Lot5\_Lee\_Harnett\_Wake\  
Number of Data Files Matching Attribute: 797 out of 797



Tiled-Data Area



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LIDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	SVA	VVA
<b>LAS</b>				
ALL	88			
2B	25	0.433	0.385	
2U	26	0.422	0.384	
2L	12		0.388	0.388
2M	13		0.604	0.604
2H	12		0.586	0.586
Total	88			

Units: US Survey Feet

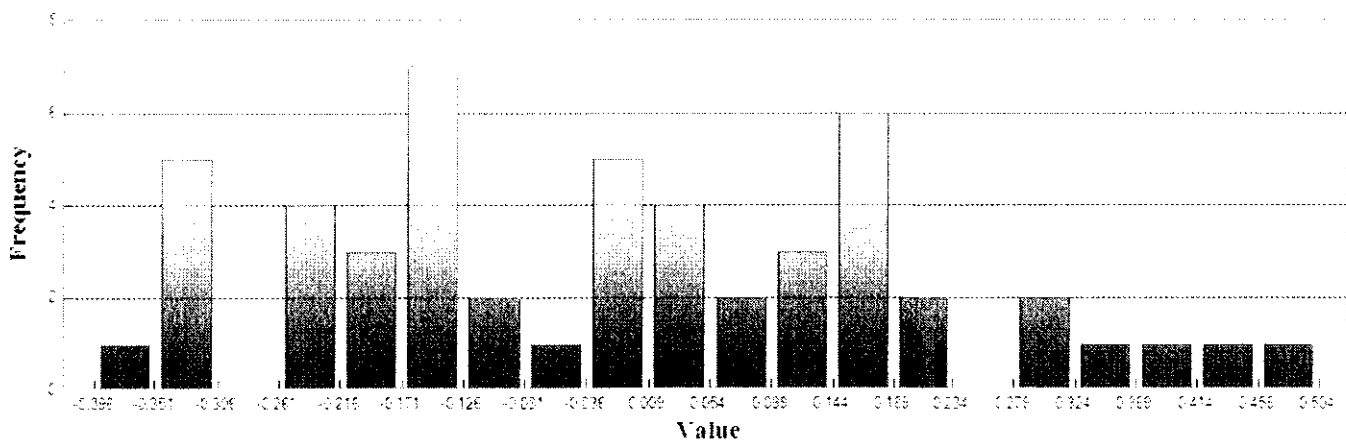


## LAS

### Non-vegetated Vertical Accuracy

LandCover Type: 2B, 2U  
Minimum DZ: -0.397  
Maximum DZ: 0.504  
Mean DZ: -0.012  
Mean Magnitude DZ: 0.427  
Number Observations: 51  
Standard Deviation DZ: 0.22  
RMSE Z: 0.218  
95% Confidence Level Z: 0.428  
Units: US Survey Feet

## Histogram



Min: -0.397

Max: 0.504

Number Of Bins: 20

Bin Interval: 0.045





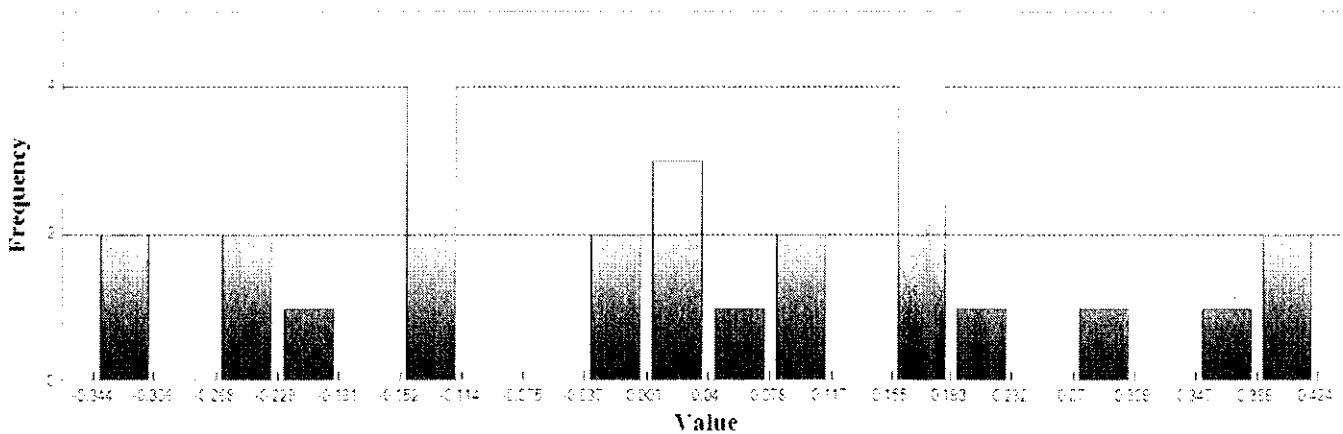


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2U  
Minimum DZ: -0.344  
Maximum DZ: 0.424  
Mean DZ: 0.026  
Mean Magnitude DZ: 0.424  
Number Observations: 26  
Standard Deviation DZ: 0.218  
RMSE Z: 0.215  
95th Percentile: 0.384  
Units: US Survey Feet

## Histogram



Min: -0.344

Max: 0.424

Number Of Bins: 20

Bin Interval: 0.038

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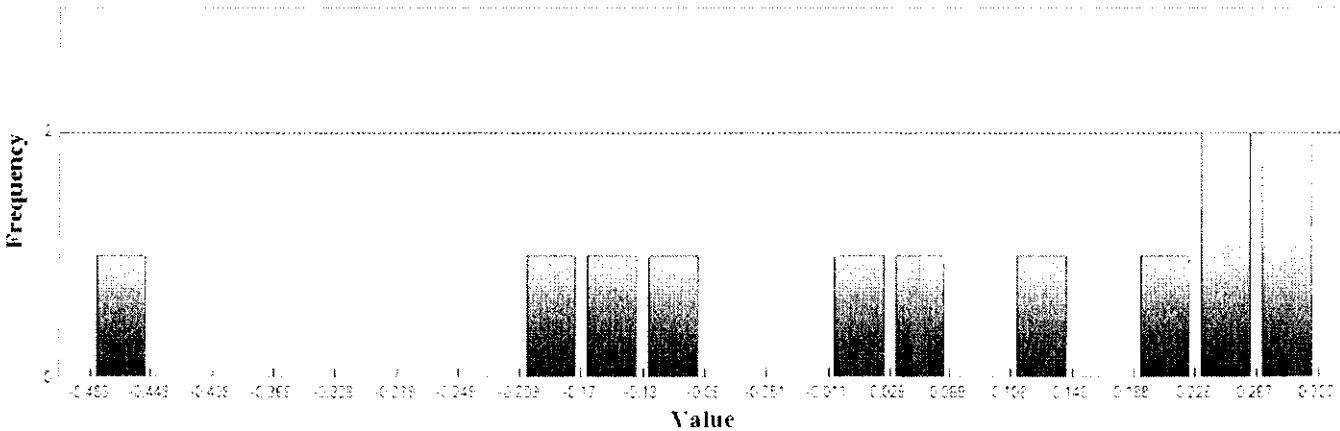


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2L  
Minimum DZ: -0.488  
Maximum DZ: 0.307  
Mean DZ: 0.046  
Mean Magnitude DZ: 0.45  
Number Observations: 12  
Standard Deviation DZ: 0.243  
RMSE Z: 0.237  
95th Percentile: 0.388  
Units: US Survey Feet

## Histogram



Min: -0.488

Max: 0.307

Number Of Bins: 20

Bin Interval: 0.04

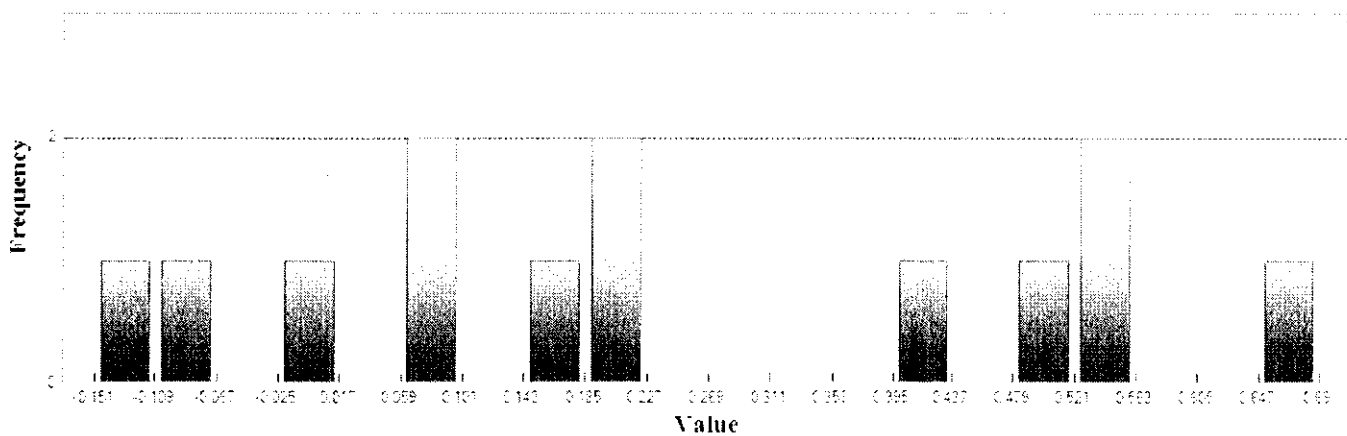


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2M  
Minimum DZ: -0.151  
Maximum DZ: 0.69  
Mean DZ: 0.245  
Mean Magnitude DZ: 0.536  
Number Observations: 13  
Standard Deviation DZ: 0.268  
RMSE Z: 0.355  
95th Percentile: 0.604  
Units: US Survey Feet

## Histogram



Min: -0.151  
Max: 0.69  
Number Of Bins: 20  
Bin Interval: 0.042

Claude T Bowers Building  
4105 Reedy Creek Road  
Raleigh, North Carolina 27607  
(919)733-3836

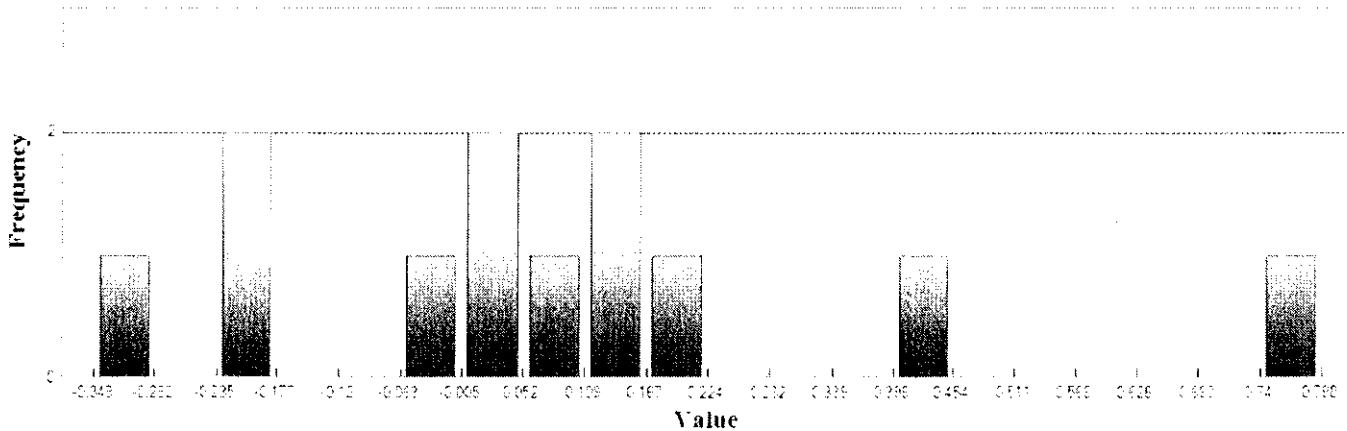


## LAS (Continued)

### Supplemental Vertical Accuracy

LandCover Type: 2H  
Minimum DZ: -0.35  
Maximum DZ: 0.797  
Mean DZ: 0.089  
Mean Magnitude DZ: 0.465  
Number Observations: 12  
Standard Deviation DZ: 0.303  
RMSE Z: 0.303  
95th Percentile: 0.586  
Units: US Survey Feet

## Histogram



Min: -0.35

Max: 0.797

Number Of Bins: 20

Bin Interval: 0.057



## LAS (Continued)

### Vegetated Vertical Accuracy

LandCover Type: 2L, 2M, 2H

Minimum DZ: -0.488

Maximum DZ: 0.797

Mean DZ: 0.13

Mean Magnitude DZ: 0.486

Number Observations: 37

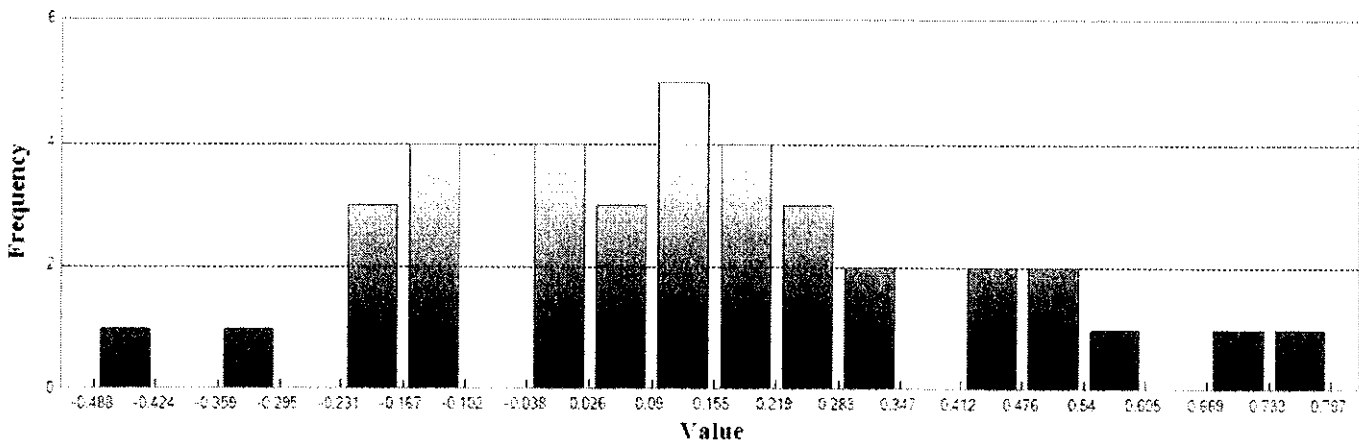
Standard Deviation DZ: 0.279

RMSE Z: 0.304

95th Percentile: 0.576

Units: US Survey Feet

## Histogram



Min: -0.488

Max: 0.797

Number Of Bins: 20

Bin Interval: 0.064



Station Name	PID	NAVD88			NAD83(2011) Epoch 2010.0			SPC Combined Factor
		Ellipsoid Height (m)	Orthometric Height (m)	Latitude DMS	Longitude DMS	SPC North (m)	SPC East (m)	
POLKTON CORS ARP	DG7402	84.929	115.530	34 59 33.17297 N	080 10 37.85763 W	138473.153	502143.744	0.99986944
LILLINGTON 2004 CORS ARP	DG5759	25.706	58.730	35 25 12.54674 N	078 48 40.33946 W	185286.626	626745.253	0.99987286
CARTHAGE CORS ARP	DG5938	149.613	181.000	35 20 30.04880 N	079 23 05.08515 W	176632.942	574629.599	0.99985034
LEXINGTON CORS ARP	DG5757	194.102	225.340	35 48 53.14318 N	080 13 46.20206 W	229736.512	498497.891	0.99989030
ALBEMARLE CORS ARP	DG5755	112.630	142.970	35 20 17.30339 N	080 12 48.52476 W	176846.600	499299.251	0.99985604
ASHEBORO 2 CORS ARP	DL6900	210.381	240.790	35 37 49.38501 N	079 45 53.75304 W	208859.939	540319.797	0.99986134
WILSON CORS ARP	DK7563	11.179	46.030	35 42 26.29637 N	077 55 57.08393 W	217645.964	706192.128	0.99990236
BURLINGTON CORS ARP	DF9213	173.401	203.610	36 05 29.58604 N	079 26 12.17620 W	259845.465	570271.809	0.99995269
WALNUT COVE CORS ARP	DL1894	276.319	309.540	36 22 19.68806 N	080 11 05.62514 W	291528.706	503266.558	1.00002046
WARRENTON CORS ARP	DM3529	76.208	109.530	36 23 41.68571 N	078 10 13.74958 W	293732.691	684023.061	1.00005974
LUMBERTON CORS ARP	DI1682	15.824	49.560	34 37 36.33605 N	079 04 39.69481 W	97263.238	602477.201	0.99992918
ELIZABETHTOWN CORS ARP	DI1680	-9.537	25.460	34 39 13.60147 N	078 31 11.73447 W	100363.878	653606.669	0.99992817
SANFORD CORS ARP	AM7024	95.450	127.140	35 28 24.67784 N	079 09 28.98436 W	191202.330	595258.352	0.99986507
DURHAM COOP CORS ARP	DG9328	117.466	148.790	35 59 46.12942 N	078 53 58.03641 W	249177.805	618666.816	0.99993843
CONCORD CORS ARP	DF7471	154.382	184.810	35 22 35.24392 N	080 33 51.11399 W	181542.684	467489.138	0.99985072
SMITHFIELD CORS ARP	DK6525	24.469	58.660	35 33 49.60980 N	078 20 10.80495 W	201405.073	669760.307	0.99988353
HIGH POINT CORS ARP	AI1198	267.948	299.220	35 57 56.48686 N	080 00 48.93737 W	246260.723	518178.455	0.99990805
GREENSBORO 5 CORS ARP	DI6107	217.179	247.880	36 04 03.61208 N	079 44 41.84535 W	257360.899	542492.959	0.99993979
MONROE CORS ARP	DF5880	144.332	174.600	34 58 54.77687 N	080 31 25.79009 W	137720.671	470484.517	0.99986097
TROY CORS ARP	DK4045	144.044	174.590	35 22 01.84517 N	079 52 12.77094 W	179740.437	530528.389	0.99985200
JORDAN LAKE CORS ARP	DL3891	45.996	77.430	35 46 52.49646 N	079 02 03.92766 W	225330.877	606489.109	0.99990797
RALEIGH DOT CORS ARP	DG4687	51.789	85.040	35 45 49.50795 N	078 34 44.39448 W	223469.874	647669.715	0.99990429
NASHVILLE CORS ARP	DK7576	34.500	68.960	35 58 09.06797 N	078 01 11.34161 W	246618.195	698006.712	0.99994546
REIDSVILLE CORS ARP	DM3525	234.815	266.700	36 21 42.71489 N	079 39 56.54007 W	289954.707	549851.005	1.00002348
ROXBORO CORS ARP	DM3527	194.654	225.650	36 23 28.05620 N	078 59 54.41890 W	293001.606	609740.318	1.00003983
FAYETTEVILLE 2006 CORS ARP	DH9594	16.914	50.450	35 02 02.48998 N	078 52 14.73160 W	142444.626	621393.108	0.99987712
GOLDSBORO CORS ARP	DK5550	14.068	48.900	35 25 16.86892 N	078 03 30.57562 W	185808.939	695094.939	0.99987475
SALISBURY CORS ARP	DN5840	174.906	206.250	35 42 41.69212 N	080 25 55.99488 W	218535.902	480015.188	0.99987726
ROCKINGHAM CORS ARP	DM3995	91.872	122.950	34 57 51.98780 N	079 47 47.74087 W	135010.039	536859.244	0.99987067
RAEFORD BASE ARP	51.567	84.270		34 58 45.00929 N	079 13 04.01644 W	136373.746	589717.557	0.99987575
WINSTON SALEM 2 BASE ARP		252.005		36 06 20.42399 N	080 14 16.05963 W	262020.720	498150.922	0.99994400
CLINTON BASE ARP	DP9434	23.891	58.490	34 59 25.64828 N	078 21 31.47858 W	137793.223	668139.836	0.99987918

Note: Published positional informaton of published Continuous Operating Reference Stations (CORS) are denoted in meters (m)





## Acronyms, Abbreviations, and Definitions

ARP – Antenna Reference Point

CORS – Continuous Operating Reference Station

DMS – Degrees Minutes Seconds

m – Meter

PID – Permanent Identifier

SPC – State Plane Coordinates

### Statistical Definitions:

**Nonvegetated Vertical Accuracy (NVA)** – The vertical accuracy at the 95-percent confidence level in nonvegetated open terrain, where errors should approximate a normal distribution.

**Supplemental Vertical Accuracy (SVA)** – Term for reporting the vertical accuracy at the 95th percentile in each separate land cover category where vertical errors may not follow a normal error distribution.

**Vegetated Vertical Accuracy (VVA)** – An estimate of the vertical accuracy, based on the 95<sup>th</sup> percentile, in vegetated terrain where errors do not necessarily approximate a normal distribution.

**Minimum DZ** – This statistic represents the change in value between the Z-coordinate location based on LiDAR and Z-coordinate location in the survey. The minimum of each simply represents the smallest value out of all of the analyzed locations. This component of the statistics can be used to show which locations most closely correspond to the surveyed points.

**Maximum DZ** – This statistic represents the change in value between the Z-coordinate location based on LiDAR and Z-coordinate location in the survey. The maximum value of each represents the largest value out of all of the analyzed locations. Maximum values can be used to show which locations most closely correspond to the surveyed points.

**Mean DZ** - The statistic of the mean DZ is intended to show the average values of the DZ. These statistics show the change in value between the Z-coordinate location based on LiDAR and Z-coordinate location in the survey. The mean values can be used to show the average off-sets of all of the analyzed locations

**Mean Magnitude DZ** - The statistic of the mean DZ is intended to show the average values of the DZ. These statistics show the change in value between the Z-coordinate location based on LiDAR and Z-coordinate location in the survey. The mean values can be used to show the average off-sets of all of the analyzed locations.

**Number Observations** – Number of observations

**Standard Deviation DZ** - A measure of spread or dispersion of a sample of errors around the sample mean error. It is a measure of precision, rather than accuracy; the standard deviation does not account for uncorrected systematic errors.

**RMSE Z** - The square root of the average of the set of squared differences between dataset coordinate values and coordinate values from an independent source of higher accuracy for identical points. The RMSE is used to estimate the absolute accuracy of both horizontal and vertical coordinates when standard or accepted values are known, as with GPS-surveyed check points of higher accuracy than the data being tested. In the United States, the independent source of higher accuracy is expected to be at least three times more accurate than the dataset being tested. RMSE Z measures RMSE in the Z direction only.

**95<sup>th</sup> Percentile** - A measure used in statistics indicating the value below which a given percentage of observations (absolute values of errors) in a group of observations fall. For example, the 95<sup>th</sup> percentile is the value (or score) below which 95 percent of the observations may be found.