LiDAR Project Report

G17PD01257, NV Reno Carson City Urban

Prepared For:

United States Geological Survey

Prepared By:

Digital Aerial Solutions, LLC

CONTRACT: # G16PC00044
CONTRACTOR: DIGITAL AERIAL SOLUTIONS
TASK ORDER: # G17PD01257

Project Report
LiDAR Collection, Processing, and QA/QC

G17PD01257, NV Reno Carson City Urban

Prepared For:
US Geological Survey
1400 Independence Road
Rolla, MO 65401
Phone: (573) 308-3759

Prepared By:
Digital Aerial Solutions, LLC
4027 Crescent Park Drive
Riverview, FL
33578
Phone: (813) 628-0788

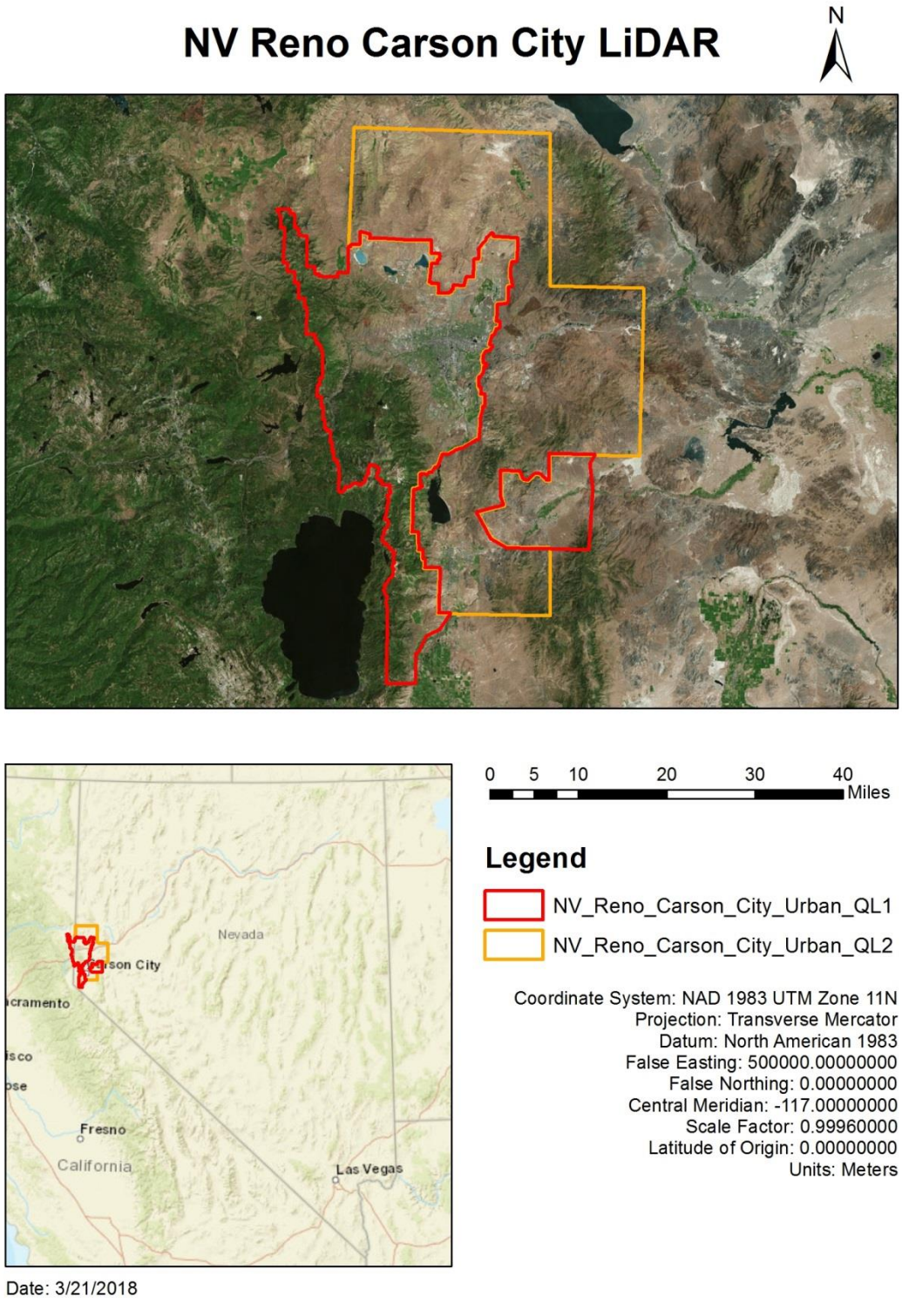


Image 1: NV Reno Carson City Urban LiDAR AOI

Table of Contents

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 G17PD01257, NV Reno Carson City Urban LiDAR. The area encompasses approximately 1534 square miles Aerial LiDAR data was collected utilizing a Leica ALS80. The ALS80 is a discrete return topographic LiDAR mapping system manufactured by Leica Geosystems. LiDAR data collected for the G17PD01257, NV Reno Carson City Urban LiDAR survey has an Aggregate Nominal Pulse (ANPS) spacing of (QL1 0.35 meters) and (QL2 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. The point cloud deliverables are stored in the LAS version 1.4, point data record format 6. The tiling scheme for tiled deliverables is a 1000 meter x 1000 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 1.3.

2 Spatial Reference System

The spatial reference of the data is as follows:

Horizontal Spatial Reference

- Coordinates: UTM Zone 11 N, Meters (to 2 decimal places)
- Datum: North American Datum 1983 (2011), 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 1988 (GEOID12B)

3 LiDAR Acquisition

3.1 Survey Area

The NV Reno Carson City Urban LiDAR survey covers approximately 676 square miles for the QL1 area of interest and 858 square miles for the QL2 area of interest. Totaling 1534 square miles covering all of Washoe, Storey, Carson City and Lyon counties in NV. The flight plan consisted of 610 survey lines and 4 control lines.

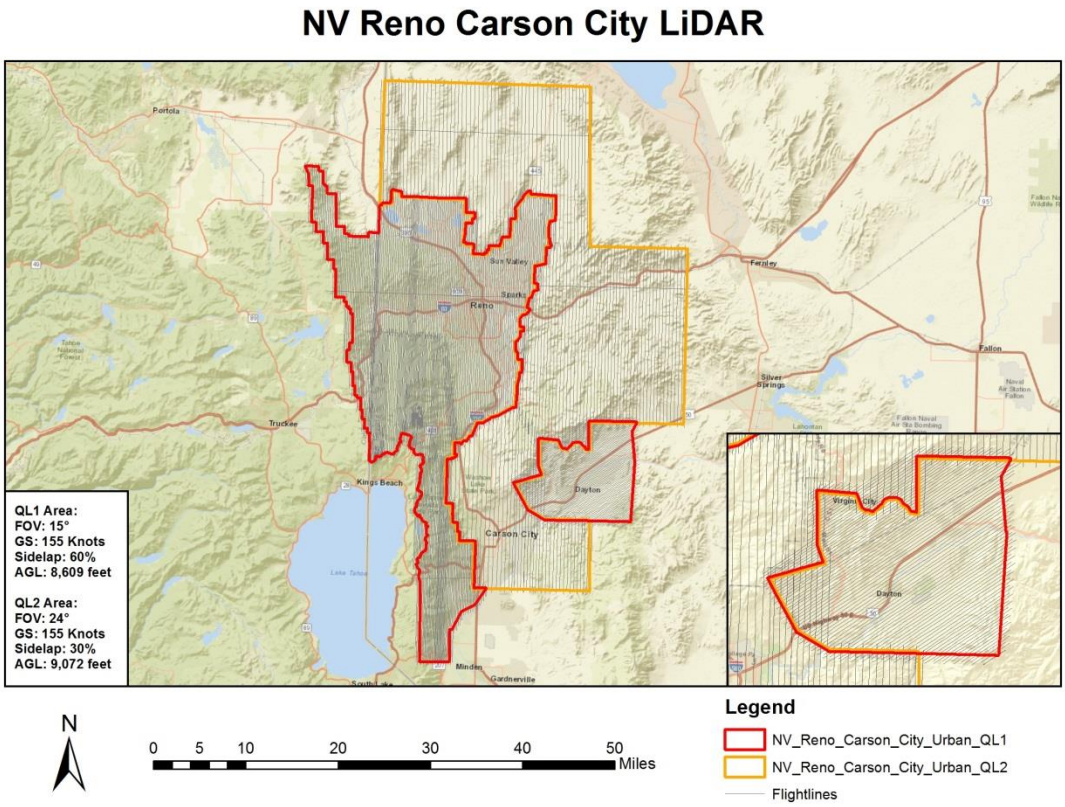


Image 2: NV Reno Carson City Urban LiDAR Flightlines

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. Aggregate Nominal Pulse Density (ANPD) for QL1 AOIs are no less than 8ppsm and for the QL2 AOIs are no less than 2ppsm. The project parameters are summarized below.

Parameter	QL1	QL2
Flying Height Above Ground Level:	8,609 feet	9,072 feet
Nominal Sidelap:	60%	30%
Nominal Speed Over Ground:	155 Knots	155 Knots
Field of View:	15°	24°
Laser Rate:	220.2 kHz	206.2 kHz
Scan Rate:	65.2 Hz	49.2 Hz
Maximum Cross Track Spacing:	1.22 meters	1.62 meters
Maximum Along Track Spacing:	0.61 meters	0.81 meters
Average point Spacing:	0.50 meters	0.67 meters

Table 1: Flight Parameters

3.3 Acquisition Mission

The acquisition mission for the G17PD01257, NV Reno Carson City Urban LiDAR survey was coordinated for optimal collection conditions and was acquired within 6 weeks. Collection began on September 19, 2017 and was completed on October 27, 2017.

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-N12RF	ALS80 SN# 8137	X: -0.153, Y: -0.055, Z: -1.361	X: -0.219, Y: 0.297, Z: 1.192

Table 2: Aircraft and Lever Arms

GPS data was collected with ground base stations during the acquisition missions, providing corrections to support differential post-processing of the airborne GPS. Base stations were setup at

Minden-Tahoe Airport NV. Ground GPS observations were collected at a frequency of 2Hz. The use of three CORS stations was also employed to support data acquisition for the project area. The following table's list the positions used in to post-process the airborne GPS.

Name	Latitude	Longitude	Ellipsoid (m)
Minden-Tahoe Airport – KMEV	38° 59' 52.40797"	-119° 45' 22.01331"	1409.811
Minden-Tahoe Airport – KMEV1	38° 59' 52.32560"	-119° 45' 22.16652"	1409.803
CORS – COF1	39° 36' 18.05072"	-119° 14' 26.22857"	1252.459
CORS – DOT1	39° 09' 22.30087"	-119° 45' 48.33047"	1416.299
CORS – P143	38° 45' 36.58657"	-119° 45' 53.35851"	1734.123

Table 3: Base Stations locations

4 LiDAR Processing

4.1 Acquisition Post-Processing

For each mission, airborne GPS was differentially corrected using the ground base station GPS for the corresponding day in Leica's IPAS software. The resulting solution is check to assure an accuracy of +/- 3 cm combined separation for north, east and height position difference between the forward and reverse processing solutions.

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 flight line, 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 G17PD01257, NV Reno Carson City Urban 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 Leica ALS80 sensor system. Terrasolid's Terramatch software was used to calculate the IMU bore-site and mirror scale parameters for the G17PD01257, NV Reno Carson City Urban 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.

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. The 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. The 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 G17PD01257, NV Reno Carson City Urban LiDAR project, the control lines were used to determine relative z offset corrections in areas of discernible ground. The ground control points listed below were used to adjust the LiDAR by an average of -0.180 cm.

Point Id	Easting	Northing	Orth. Height
04.GCP.BG.01	620192.726	5064157.33	891.6397
08.GCP.BG.01	625950.124	5081209.372	920.0333
08.GCP.BG.01A	602777.4524	5031062.218	1066.0656
GCP.BG.01	260969.099	4338273.65	1423.118
GCP.BG.10	277392.198	4356378.341	1648.38
GCP.BG.11	277392.199	4356378.343	1648.371
GCP_NVA.BG.02	256020.902	4329290.092	1528.339
GCP_NVA.BG.03	250244.158	4318040.241	2163.541
GCP_NVA.BG.04	272152.037	4347496.544	1554.815
GCP_NVA.BG.06	271231.517	4353733.3	1907.229
GCP_NVA.BG.07	271263.717	4359012.689	2074.733
GCP_NVA.BG.11	252561.759	4358148.771	2308.951
GCP.HP.01	258003.661	4344308.104	1550.248
GCP.HP.02	272445.392	4375771.769	1338.888
GCP.HP.11	282521.926	4353104.002	1323.601
GCP.HP.12	257558.262	4403563.812	1563.345
GCP_NVA.HP.03	259189.646	4332992.955	1480.408
GCP_NVA.HP.06	263293.752	4332298.771	1438.997
GCP_NVA.HP.08	270245.594	4344174.034	1481.727
GCP_NVA.HP.09	256091.814	4362654.773	1771.648
GCP_NVA.HP.16	260442.59	4341638.183	1442.508
GCP_NVA.HP.24	280973.185	4381806.092	1308.072
GCP_NVA.LV.10	261848.55	4352267.561	1569.989
GCP.PS.01	248807.55	4392717.7	1520.357
GCP.PS.02	256445.016	4416808.361	1513.873
GCP_NVA.PS.04	256325.956	4333359.564	1631.584
GCP_NVA.PS.06	252854.437	4332996.338	1824.366
GCP_NVA.PS.08	265773.119	4332626.121	1415.375
GCP_NVA.PS.13	265301.972	4372050.22	1347.786
GCP_NVA.PS.18	252471.425	4400483.183	1575.459
GCP_NVA.PS.28	264254.101	4412809.06	1476.773
GCP_NVA.PS.30	269039.062	4400110.38	1434.329
GCP_NVA.PS.31	267592.54	4391765.602	1372.906

Table 5: Ground Control Points

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 cloud LAS files. Geometrically calibrated swath point clouds were cut into USNG index, 1000 meter x 1000 meter LAS 1.2 format tiles for point cloud classification and derived in LAS 1.4 format for 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:

```
Class 1 – Processed, but unclassified
Class 2 – Bare-earth ground
Class 7 – Low Noise (low, manually identified, if necessary)
Class 9 — Water
Class 17 — Bridge Decks
Class 18 – High Noise (high, manually identified, if necessary)
Class 20 — 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 Terrasolid'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 G17PD01257, NV Reno Carson City Urban 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 20 – 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 ERDAS Imagine 32-bit floating point raster format ".img" 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 G17PD01257, NV Reno Carson City Urban 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.

Image 3: NV Reno Carson City Urban LiDAR QL1 Intensity Image

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.

This data set was produced to meet ASPRS "Positional Accuracy Standards for Digital Geospatial Data" (2014) for a 22.6 (cm) RMSEx / RMSEy Horizontal Accuracy Class which equates to Positional Horizontal Accuracy =+/- 78.3 cm at a 95% confidence level.

Estimated LiDAR Horizontal:	(cm)
Error Per Point ($RMSE_R$)	32.0
Error Per Point ($RMSE_X$/$RMSE_Y$)	22.6
Per Point at 95% confidence level	78.3

Table 6: Estimated LiDAR Horizontal Accuracy

Absolute vertical accuracy assessments for the point cloud data are made against ground check point data. For the G17PD01257, NV Reno Carson City Urban 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 was 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 Non-vegetated Vertical Accuracy (NVA) of the swath point clouds. The NVA of the TIN tested RMSEz 0.051 meters and 0.100 meters at the 95% confidence level in open terrain. NVA of the DEM tested at an RMSEz of 0.053 meters and 0.104 meters at the 95% confidence level in open terrain. The full calculations for all check points can be found in Appendix B.

NVA of TIN		
$RMSE_Z$ =	0.051	meters
NSSDA =	0.100	meters

Table 7: Tested NVA of tin from Classified Point Cloud.

NVA of DEM		
$RMSE_Z$ =	0.053	meters
NSSDA =	0.104	meters

Table 7: Tested NVA of Digital Elevation Model.

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 1.3 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

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	9/20/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3301.6					NV_Reno					Keith Morrel	
Hobbs ST	3297.1		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.5		A			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		312	170920_004726	:47	:54	13793	346°	159	745	23	1	0.5	
		313	170920_010019	1:00	1:07	13791	166°	151	743	23	1	0.5	
		314	170920_011622	1:16	1:24	13790	346°	146	741	21	1.1	0.6	
		311	170920_012838	1:28	1:34	13850	166°	164	738	19	1.3	0.6	
		310	170920_014105	1:41	1:47	13842	346°	164	737	20	1.3	0.6	
		309	170920_015252	1:52	1:59	13842	166°	161	735	20	1.2	0.6	
		308	170920_020503	2:05	2:11	13861	346°	159	733	21	1.2	0.7	
		307	170920_021710	2:17	2:23	14027	166°	162	731	21	1.2	0.7	
		306	170920_023059	2:30	2:35	14063	346°	159	730	21	1.2	0.7	
		305	170920_024137	2:41	2:45	14210	166°	160	729	21	1.2	0.7	
		304	170920_025045	2:50	2:53	14192	346°	169	728	21	1.2	0.7	
		303	170920_025942	2:59	3:02	14200	166°	165	726	21	1.3	0.7	
		302	170920_030957	3:09	3:12	14176	346°	163	725	21	1.3	0.7	
		301	170920_031800	3:18	3:19	14176	166°	170	725	21	1.3	0.6	
		315	170920_032857	3:28	3:35	13852	346°	161	724	22	1.1	0.6	
		316	170920_034043	3:40	3:47	13835	166°	168	722	21	1.2	0.6	
		317	170920_035208	3:52	3:59	13853	346°	152	720	22	1.2	0.6	

Leica ALS80 Flight Log

Project:	NV_ Reno								Sensor Operator/s	
									Jackson Beebe	
Date/Julian:	9/24/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):			Pilot/s	
Hobbs End	3306					NV_Reno			Keith Morrel	
Hobbs ST	3301.6		LIFT			TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	4.4		A			155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		300	170924_021626	2:16	2:19	13256	166°	157	696	20	1.3	0.7	
		301	170924_022411	2:24	2:27	13310	346°	155	696	21	1.2	0.7	
		302	170924_023302	2:33	2:35	13265	166°	154	695	21	1.2	0.7	
		303	170924_024056	2:40	2:43	13225	346°	155	695	21	1.2	0.7	
		304	170924_025040	2:50	2:53	13326	166°	154	694	22	1.2	0.7	
		305	170924_025950	2:59	3:02	13400	346°	155	6393	22	1.2	0.6	
		306	170924_030749	3:07	3:10	13519	166°	154	692	22	1.2	0.6	
		307	170924_031549	3:15	3:18	13569	346°	155	691	21	1.1	0.6	
		308	170924_032319	3:23	3:26	13522	166°	155	690	20	1.2	0.6	
		309	170924_033055	3:30	:33	13525	346°	154	689	20	1.2	0.6	
		310	170924_033816	3:38	3:41	13404	166°	153	688	21	1.1	0.6	
		311	170924_034613	3:46	3:42	13361	346°	156	688	22	1	0.6	
		299	170924_035723	3:57	4:00	13407	166°	155	687	21	1	0.6	
		298	170924_040638	4:06	4:09	1338	346°	157	686	23	1	0.6	
		486	170924_041836	4:18	4:21	13074	41°	152	685	22	1.1	0.6	
		487	170924_042629	4:26	4:29	12082	221°	158	684	22	1	0.6	
		488	170924_043526	4:35	4:38	12697	41°	153	683	21	1	0.6	
		489	170924_044300	4:43	4:45	12658	221°	155	682	20	1.1	0.6	
		490	170924_045113	4:51	4:53	12708	41°	156	681	20	1.1	0.6	
		491	170924_045823	4:58	5:00	12764	221°	155	681	21	1.1	0.6	
		492	170924_050608	5:06	5:08	12769	41°	155	680	19	1.1	0.6	
		493	170924_051334	5:13	5:15	12928	221°	155	679	19	1.2	0.6	
		494	170924_052045	5:20	5:22	13130	41°	152	678	18	1.2	0.7	
		495	170924_052821	5:28	5:30	13207	221°	155	678	18	1.4	0.7	
		496	170924_053547	5:35	5:37	13330	41°	155	677	17	1.3	0.7	
		497	170924_054300	5:43	5:44	13407	221°	157	676	17	1.3	0.7	

Leica ALS80 Flight Log

		498	170924_055026	5:50	5:51	13623	41°	152	675	18	1.2	0.7	
		499	170924_055743	5:57	5:59	13886	221°	154	675	12	1.2	0.3	

Leica ALS80 Flight Log

Project:	NV_ Reno								Sensor Operator/s	
									Jackson Beebe	
Date/Julian:	9/28/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):			Pilot/s	
Hobbs End	3309.2					NV_Reno			Keith Morrel	
Hobbs ST	3307.7		LIFT			TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	1.5		A			155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		289	170928_212255	21:22	21:29	13186	0°	154	673	17	1.1	0.74	
		290	170928_213551	21:35	21:42	13188	180°	153	671	21	0.9	0.6	
		291	170928_214756	21:47	21:54	13200	0°	154	669	20	1	0.6	
		292	170928_215952	21:59		13160	180°	152	667	20	1	0.6	BACK REFLECTION ERROR

Leica ALS80 Flight Log

Project:	NV_ Reno											Sensor Operator/s	
												Jackson Beebe	
Date/Julian:	10/11/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):						Pilot/s	
Hobbs End	3336.3					NV_Reno						Keith Morrel	
Hobbs ST	3334.2		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:		Aircraft	Airport Idnt:
Flight Time	2.1		A			155		TEMP		1.500		C421-N13RF	KMEV (Miden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A													
	1	569	171011_153622	15:36	15:37	13104	347°	142	658	19	1.1	.	
	2	568	171011_154237	15:42	15:43	13106	167°	151	657	191	1.1		
	3	567	171011_154824	15:48	13:49	13072	347°	155	657	19	1.2	0.6	
	4	566	171011_155508	15:54	15:55	13042	167°	152	657	19	1.1	0.6	
	5	565	171011_160100	16:01	16:01	13102	166°	155	657	18	1.1	0.6	
	6	564	171011_160840	16:08	16:08	13069	347°	152	657	18	1.2	0.7	
	7	563	171011_162249	16:22	16:23	13082	167°	151	657	18	1.1	0.6	
	8	562	171011_162842	16:28	16:31	13126	347°	150	656	18	1.2	0.6	
	9	561	171011_163731	16:37	16:40	13078	167°	156	655	18	1.2	0.6	
	10	562	171011_164745	16:47	16:48	13020	347°	154	654	19	1.2	0.6	
	11	84	171011_165641	16:56	17:03	13183	347°	154	654	18	1.4	0.7	
	12	85	171011_170939	17:09	17:16	13097	167°	150	652	19	1.2	0.7	
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												

Leica ALS80 Flight Log

Project:	NV_ Reno								Sensor Operator/s	
									Jackson Beebe	
Date/Julian:	10/12/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):			Pilot/s	
Hobbs End	3340.1					NV_Reno			Keith Morrel	
Hobbs ST	3336.3		LIFT			TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	3.8		A			155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A													
	1	86	171012_052825	5:28	5:34	13104	347°	155	650	16	1.2	0.7	
	2	87	171012_054002	5:40	5:41	13012	167°	150	648	16	1.3	0.7	Brieft Low R 12 mi South
	3	88	171012_055054	5:50	5:56	13089	347°	152	646	16	1.3	0.7	
	4	89	171012_060213	6:02	6:08	13091	167°	157	644	17	1.3	0.7	
	5	90	171012_061308	6:13	6:17	13079	347°	150	643	18	1.2	0.6	
	6	560	171012_062402	6:24	6:26	13189	167°	156	641	19	1.1	0.7	
	7	559	171012_063106	6:31	6:33	13209	347°	155	640	18	1.1	0.7	
	8	558	171012_063800	6:38	6:40	13196	167°	150	639	18	1.2	0.8	
	9	557	171012_064458	6:44	6:47	132007	347°	151	639	17	1.4	0.8	
	10	556	171012_065158	6:51	6:54	13200	167°	151		17	1.4	0.8	
	11	555	171012_065900	6:59	7:01	13149	347°	155	637	17	1.4	0.8	
	12	554	171012_070602	7:06	7:08	13132	167°	152	636	17	1.5	0.7	
	13	553	171012_071311	7:13	7:16	13147	347°	152	635	18	1.3	0.7	
	14	552	171012_072025	7:20	7:23	13113	167°	157	634	18	1.3	0.7	
	15	551	171012_072749	7:27	7:30	13165	347°	151	633	18	1.3	0.7	
	16	550	171012_073503	7:35	7:38	13138	167°	159	632	18	1.3	0.7	
	17	549	171012_074312	7:43	7:46	13146	347°	152	631	17	1.4	0.7	
	18	548	171012_075116	7:51	7:55	13142	167°	157	630	18	1.4	0.6	
	19	547	171012_075929	7:59	8:03	13120	347°	152	629	18	1.2	0.6	
	20	546	171012_080757	8:07	8:12	13131	167°	156	628	19	1.1	0.6	
	21	545	171012_081624	8:16	8:20	13140	347°	156	626	20	1.1	0.6	
	22	544	171012_082447	8:24	8:30	13143	167°	155	625	19	1.1	0.6	
	23	543	171012_083445	8:34	8:40	13143	347°	152	623	20	1.2	0.6	
	24	542	171012_084525	8:45	8:51	13078	167°	157	622	20	1.2	0.6	
	25	541	171012_085554	8:55	9:01	13137	347°	157	620	21	1.1	6	

Leica ALS80 Flight Log

	26	540	171012_090618	9:06	9:12	13096	167°	157	618	23	1	0.5	

Leica ALS80 Flight Log

Project:	NV_ Reno								Sensor Operator/s	
									Jackson Beebe	
Date/Julian:	10/12/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):			Pilot/s	
Hobbs End	3344.9					NV_Reno			Keith Morrel	
Hobbs ST	3340.1		LIFT			TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	4.8		B			155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
B													
		539	171012_175429	17:54	18:00	13127	347°	151	616	21	1.1	0.6	
		538	171012_180816	18:08	18:15	13118	167°	154	614	22	1.1	0.6	
		537	171012_182020	18:20	18:28	13136	347°	155	611	20	1.1	0.6	
		536	171012_183246	183:23	15:40	10600	167°	159	609	19	1.2	0.6	
		535	171012_184525	18:45	18:53	10733	347°	150	607	20	1.1	0.6	
		534	171012_185712	18:57	19:04	10687	167°	156	605	21	1	0.6	
		533	171012_190932	19:09	19:17	10730	347°	155	603	19	1.2	0.7	
		532	171012_192108	19:21	19:28	10823	167°	156	602	19	1.2	0.7	
		531	171012_193325	19:33	19:41	11017	347°	153	600	16	1.4	0.7	
		530	171012_194544	19:45	19:53	11043	167°	155	598	16	1.4	0.7	
		529	171012_195807	19:58	20:04	11100	347°	153	596	16	1.4	0.7	
		528	171012_201026	20:10	20:18	11208	167°	158	594	16	1.3	0.7	
		527	171012_202239	20:22	20:30	11309	347°	156	593	17	1.2	0.7	
		526	171012_203619	20:36	20:43	13916	167°	157	591	19	1	0.6	
		525	171012_204849	20:48	20:56	14046	347°	160	588	19	1	0.6	
		524	171012_210050	21:00	21:08	14236	167°	156	586	18	1.1	0.7	
		523	171012_211312	21:13	21:20	14300	347°	153	583	18	1.1	0.6	Brief IMU erro Afterline
		522	171012_212621	21:26	21:34	14467	167°	153	581	18	1.1	0.6	

Leica ALS80 Flight Log

Project:	NV_ Reno									Sensor Operator/s	
										Jackson Beebe	
Date/Julian:	10/12/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):				Pilot/s	
Hobbs End	3396.4					NV_Reno				Keith Morrel	
Hobbs ST	3394.9		LIFT			TARGET AIRSPD (KNTS)		BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	1.5		C			155		TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
C													
		521	171012_233310	23:33	23:40	14622	347°	155	578	22	1.1	0.6	
		520	171012_234537	23:45	23:53	14732	167°	150	575	22	1.1	0.6	
		519	171012_235755	23:57	:5	14883	347°	152	573	20	1.3	0.6	Broke 10 mi North/High
		518	171013_001017	:1		14892	167°	145	570	22	1.1	0.6	Pulled due to Turb
		239	171013_002151	:21	:21		41°		569				Too Fast / Refly

Leica ALS80 Flight Log

Project:	NV_ Reno											Sensor Operator/s	
												Jackson Beebe	
Date/Julian:	10/12/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):						Pilot/s	
Hobbs End	3396.4					NV_Reno						Keith Morrel	
Hobbs ST	3394.9		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:		Aircraft	Airport Idnt:
Flight Time	1.5		B			155		TEMP		1.500		C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
B													
		519	171014_204152	20:41	20:49	14800	347°	153	569	22	0.9	0.6	
		517	171014_205410	20:54	21:01	14935	187°	153	567	19	1	0.6	
		516	171014_210624	21:06	21:14	14927	347°	153	564	18	1.1	0.6	
		515	171014_211838	21:18	21:26	14921	167°	153	561	18	1.1	0.6	
		514	171014_213106	21:31	21:38	15003	347°	155	559	16	1.3	0.7	
		518	171014_214308	21:43	21:50	14888	167°	156	556	17	1.3	0.7	
		513	171014_215500	21:55	22:02	15067	347°	154	554	17	1.4	0.8	
		512	171014_220709	22:07	22:14	15157	167°	150	551	15	1.6	0.8	
		511	171014_221939	22:19	22:29	15277	347°	155	549	18	1.2	0.7	
		510	171014_223208	22:32	22:39	15488	167°	155	546	20	1	0.6	
		509	171014_224458	22:44	22:51	15529	347°	155	544	19	1.1	0.6	
		508	171014_225627	22:56	23:01	15437	167°	155	541	21	1	0.6	
		507	171014_230603	23:06	23:10	15524	347°	156	540	22	1	0.6	
		506	171014_231539	23:15	23:19	15492	167°	154	538	22	1	0.6	
		505	171014_232419	23:24	23:28	15370	347°	150	537	21	1.1	0.6	
		504	171014_233435	23:34	23:35	15815	167°	156	536	21	1.1	0.6	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/14/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3355.7					NV_Reno					Keith Morrel	
Hobbs ST	3351.2		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.5		B			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
B													
		503	171015_003548	:35	:36	13883	347°	152	535	19	1.2	0.6	
		502	171015_004116	:41	:42	13893	167°	151	535	19	1.2	0.6	
		501	171015_004706	:47	:48	13880	347°	151	535	18	1.4	0.7	
		500	171015_005306	:53	:55	13886	167°	152	534	19	1.3	0.6	
		499	171015_005931	:59	1:01	13868	347°	151	534	20	1.1	0.6	
		498	171015_010618	1:06	1:08	13847	167°	151	533	20	1.1	0.6	
		497	171015_011331	1:13	1:16	14039	347°	148	532	20	1.1	0.6	
		496	171015_012106	1:21	1:24	14214	167°	150	531	20	1.2	0.7	
		495	171015_012910	1:29	1:32	14276	347°	146	530	20	1.2	0.7	
		494	171015_013719	1:37	1:41	14315	167°	156	529	20	1.2	0.7	
		493	171015_014621	1:46	1:50	14324	347°	153	527	20	1.3	0.7	
		492	171015_015529	1:55	2:00	14100	167°	153	526	20	1.2	0.7	
		491	171015_020445	2:04	2:09	14071	347°	149	525	20	1.1	0.7	
		490	171015_021351	2:13	2:18	14096	167°	157	523	21	1.1	0.7	
		489	171015_022313	2:23	2:27	14110	347°	150	522	21	1.1	0.6	
		488	171015_023227	2:32	2:37	14242	167°	155	520	20	1.1	0.6	
		487	171015_024300	2:43		11690	346°	155	519	18	1.1	0.6	Pulled Due to EyeSafe Shut Off
		487	171015_025219	2:52	2:58	11716	167°	151	518	15	1.1	0.6	
		486	171015_030124	3:01	3:06	11730	346°	158	517	17	1.2	0.6	
		485	171015_031052	3:10	3:15	11825	166°	148	516	18	1.2	0.6	
		484	171015_031955	3:19	3:24	11766	346°	154	515	17	1.1	0.6	
		483	171015_032904	3:29	3:33	12025	166°	150	514	18	1.2	0.6	
		482	171015_033803	3:38	3:42	12222	346°	159	513	17	1.3	0.7	
		481	171015_034958	3:49	3:54	14883	166°	156	512	17	1.4	0.6	
		480	171015_035913	3:59	4:03	14001	346°	155	511	15	1.4	0.7	

Leica ALS80 Flight Log

		479	171015_040843	4:08	4:13	14987	166°	155	509	15	1.4	0.8	
		478	171015_041807	4:18	4:22	14978	346°	153	507	16	1.3	0.7	
		477	171015_042716	4:27	4:32	14815	166°	153	506	16	1.1	0.7	
		4	171015_043938	4:39	4:40	13414	274°	150	504	16	1.2	0.7	Cross Strip

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/15/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3360.5					NV_Reno					Keith Morrel	
Hobbs ST	3355.7		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.8		A			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A													
		476	171015_173400	17:34	17:38	14702	346°	159	503	21	1.1	0.6	
		475	171015_174639	17:46	17:51	11871	166°	150	502	21	1.1	0.6	
		474	171015_175549	17:55	18:00	11756	346°	157	501	21	1.1	0.6	
		473	171015_180500	18:05	18:09	11694	166°	152	500	21	1	0.6	
		472	171015_181404	18:14	18:18	11691	346°	157	499	19	1.1	0.6	
		471	171015_182315	18:23	18:27	11704	166°	150	597	19	1.1	0.6	
		470	171015_183233	18:32	18:37	11708	346°	153	596	19	1.1	0.6	
		469	171015_184201	18:42	18:46	11684	166°	156	495	20	1	0.6	
		468	171015_185107	18:51	18:55	11775	346°	156	494	21	0.9	0.6	
		467	171015_190031	19:00	19:03	11829	166°	157	493	19	1.1	0.6	
		466	171015_191000	19:10	19:14	11831	346°	154	492	19	1.2	0.7	
		465	171015_191935	19:19	19:24	11800	166°	156	491	17	1.4	0.7	
		464	171015_192850	19:28	19:33	11958	346°	159	490	16	1.5	0.7	
		463	171015_193820	19:38	19:42	12108	166°	157	489	16	1.5	0.7	
		462	171015_194716	19:47	19:51	12317	346°	156	488	16	1.4	0.7	
		461	171015_195639	19:56	20:01	12525	166°	156	487	16	1.3	0.7	
		460	171015_200547	20:05	20:10	12519	346°	154	486	16	1.3	0.7	
		459	171015_201440	20:14	20:19	12518	166°	154	485	17	1.1	0.7	
		458	171015_202405	20:24	20:28	12416	346°	160	484	19	1	0.6	
		457	171015_203343	20:33	20:32	12394	166°	156	483	21	0.9	0.6	
		456	171015_204211	20:42	20:46	12493	346°	154	482	20	0.9	0.6	
		455	171015_205112	20:51	20:55	12388	166°	154	481	19	1	0.6	
		454	171015_210010	21:00	21:04	12430	346°	160	480	18	1	0.6	
		453	171015_210934	21:09	21:13	12529	166°	156	479	18	1.1	0.6	
		452	171015_211835	21:18	21:22	12552	346°	160	478	18	1.1	0.7	

Leica ALS80 Flight Log

		451	171015_212800	21:28	21:32	12515	166°	155	477	16	1.3	0.7	
		450	171015_213722	21:37	21:41	12532	346°	156	476	16	1.4	0.7	
		449	171015_214703	21:47	21:51	12499	166°	150	475	17	1.4	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno									Sensor Operator/s	
										Jackson Beebe	
Date/Julian:	10/15/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):				Pilot/s	
Hobbs End	3364.9					NV_Reno				Keith Morrel	
Hobbs ST	3360.5		LIFT			TARGET AIRSPD (KNTS)		BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	4.4		C			155		TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
C													
		448	171015_233111	23:31	23:35	12592	346°	154	474	21	1.1	0.6	
		447	171015_234107	23:41	23:45	12604	166°	150	473	19	1.3	0.7	
		446	171015_235014	23:50	23:54	13256	346°	157	472	19	1.3	0.7	
		421	171016_000307	:3	:8	11251	166°	151	470	20	1.2	0.7	
		422	171016_001249	:12	:17	11251	346°	157	469	20	1.2	0.7	
		423	171016_002251	:22	:27	11231	166°	154	468	21	1.1	0.7	
		424	171016_003300	:33	:37	11272	346°	158	462	20	1.2	0.7	
		425	171016_004307	:43	:48	11253	166°	149	466	19	1.2	0.7	
		426	171016_005254	:52	:58	11260	346°	148	464	19	1.2	0.7	
		427	171016_010249	1:02	1:07	11247	166°	152	463	20	1.3	0.7	
		428	171016_011234	1:12	1:17	11133	346°	157	462	18	1.2	0.7	
		429	171016_012236	1:22	1:27	11108	166°	149	461	20	1.3	0.6	
		430	171016_013225	1:32	1:37	11146	346°	159	460	20	1.2	0.6	
		431	171016_014222	1:42	1:47	11140	166°	150	457	19	1.3	0.7	
		432	171016_015211	1:52	1:57	11157	346°	159	458	20	1.2	0.6	
		433	171016_020208	2:02	2:06	11289	166°	158	457	20	1.1	0.6	
		434	171016_021201	2:12	2:16	11390	346°	159	456	20	1.1	0.7	
		435	171016_022159	2:21	2:26	11509	166°	151	454	20	1.1	0.6	
		436	171016_023144	2:31	2:36	11709	346°	161	453	19	1	0.6	
		437	171016_024127	2:41	2:46	11787	166°	152	452	20	1	0.6	
		438	171016_025108	2:51	2:57	11998	316°	154	451	19	1	0.6	
		439	171016_030148	3:01	3:06	14804	166°	158	450	17	1.1	0.7	
		440	171016_031137	3:11	3:16	14950	346°	155	449	17	1.1	0.7	
		441	171016_032112	3:21	3:26	15112	166°	153	447	17	1.1	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/16/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3369.6					NV_Reno					Keith Morrel	
Hobbs ST	3364.9		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.7		A			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A													
		445	171016_173416	17:34	17:38	15260	346°	151	445	20	1.1	0.6	
		444	171016_174345	17:43	17:48	15420	166°	158	444	20	1.1	0.6	
		443	171016_175337	17:53	17:58	15425	346°	148	443	20	1	0.6	
		442	171016_180310	18:03	18:07	15297	166°	159	4441	19	1.1	0.6	
		420	171016_181343	18:13	18:21	13769	346°	159	440	19	1.1	0.6	
		419	171016_182624	18:26	18:33	13741	166°	156	437	19	1.1	0.6	
		418	171016_183830	18:38	18:46	13757	346°	154	435	21	1	0.5	
		417	171016_185100	18:51	18:58	13765	166°	154	433	18	1.1	0.6	
		416	171016_190329	19:03	19:11	13887	346°	153	430	19	1	0.6	
		415	171016_191553	19:15	19:23	13942	166°	156	428	17	1.3	0.7	
		414	171016_192825	19:28	19:36	13930	346°	147	426	16	1.4	0.7	
		413	171016_194119	19:41	19:48	13935	166°	155	423	16	1.4	0.7	
		412	171016_195338	19:53	20:07	13944	346°	156	421	16	1.3	0.7	
		411	171016_200556	20:05	20:12	13907	166°	156	419	17	1.1	0.7	
		410	171016_201754	20:17	20:25	13972	346°	157	416	19	1.1	0.7	
		409	171016_203020	20:30	20:36	14014	166°	158	414	20	0.9	0.6	
		408	171016_204145	20:41	20:48	13994	346°	157	412	19	0.9	0.6	
		407	171016_205318	20:53	20:54	14018	166°	157	410	17	1.1	0.6	
		406	171016_210406	21:04	21:10	14188	346°	158	408	17	1.1	0.6	
		405	171016_211456	21:14	21:21	14324	166°	154	406	17	1.1	0.7	
		404	171016_212546	21:25	21:31	14353	346°	154	404	15	1.4	0.7	
		403	171016_213555	213:35	21:41	14525	166°	157	403	16	1.4	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/16/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3373.8					NV_Reno					Keith Morrel	
Hobbs ST	3369.6		LIFT			TARGET AIRSPD (KNTS)		BASE PID:	Base Height:		Aircraft	Airport Idnt:
Flight Time	4.2		B			155		TEMP	1.500		C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
B		402	171016_232606	23:26	23:31	14502	346°	154	401	24	1	0.6	
		401	171016_233636	23:36	23:41	15493	166°	152	399	21	1.3	0.6	
		400	171016_234609	23:46	23:51	1425	346°	152	397	22	1.3	0.6	
		399	171016_235547	23:55	:	14712	166°	152	396	21	1.3	0.7	
		398	171017_000535	:5	:10	14807	346°	1524	394	22	1.1	0.6	
		397	171017_001515	:15	:20	14932	166°	149	393	22	1.1	0.6	
		396	171017_002631	:26	:29	15039	346°	154	391	22	1.1	0.6	
		395	171017_003448	:34	:37	14996	166°	150	390	22	1.1	0.6	
		394	171017_004220	:42	:45	15024	346°	156	382	21	1.2	0.6	
		393	171017_005026	:50	:53	14930	166°	155	389	21	1.3	0.6	
		392	171017_005817	:58	1:01	14734	346°	150	387	21	1.1	0.7	
		391	171017_010532	1:05	1:09	14351	166°	150	386	21	1.1	0.6	
		390	171017_011422	1:14	1:18	14374	346°	152	385	21	1.3	0.6	
		389	171017_012336	1:23	1:25	14371	1666°	150	384	21	1.3	0.7	
		388	171017_013229	1:32	1:35	14360	346°	156	383	21	1.3	0.6	
		387	171017_014152	1:41	1:44	14438	166°	150	381	21	1.1	0.6	
		386	171017_014951	1:49	1:52	14431	346°	153	380	21	1.1	0.6	
		385	171017_015818	1:58	2:00	14526	160°	145	379	21	1.1	0.6	
		384	171017_020547	2:05	2:08	14505	346°	154	379	22	1	0.6	
		383	171017_021415	2:14	2:15	14512	166°	148	378	21	1	0.6	
		382	171017_022207	2:22	2:25	14655	346°	160	377	22	1	0.6	
		381	171017_023038	2:30	2:34	14122	166°	156	376	23	1	0.6	
		380	171017_023940	2:39	2:42	14160	346°	152	395	23	1.9	0.6	
		379	171017_024741	2:47	2:50	14150	166°	148	374	22	1.1	0.6	
		378	171017_025520	2:55	2:58	14230	346°	148	373	21	1	0.6	
		377	171017_030326	3:03	3:06	14224	166°	163	372	19	1.1	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/17/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3382.9					NV_Reno					Keith Morrel	
Hobbs ST	3378.4		LIFT			TARGET AIRSPD (KNTS)		BASE PID:	Base Height:		Aircraft	Airport Idnt:
Flight Time	4.5		A			155		TEMP	1.500		C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		376	171017_180802	18:07	18:10	14315	346°	152	1118	20	1.1	0.6	
		375	171017_181740	18:17	18:20	14324	166°	156	1117	20	1.1	0.6	
		374	171017_182515	18:25	18:27	14475	346°	151	1116	20	1	0.6	
		373	171017_183302	18:33	18:35	14320	166°	151	1115	20	1	0.6	
		372	171017_184022	18:40	18:42	14649	346°	154	1114	21	1	0.6	
		371	171017_184754	18:47	18:49	14741	166°	150	1113	21	1	0.6	
		370	171017_185443	18:54	18:56	14852	346°	153	1113	19	1	0.7	
		369	171017_190152	19:01	19:04	15025	166°	149	1112	19	1.2	0.7	
		368	171017_190942	19:09	19:10	14948	346°	153	1111	19	1.2	0.7	
		367	171017_191544	19:15	19:16	14914	166°	151	1111	18	1.3	0.7	
		366	171017_192125	19:21	19:22	14932	346°	150	1111	17	1.4	0.7	
		365	171017_192706	19:27	19:27	14935	166°	157	1110	17	1.4	0.7	
		240	171017_193538	19:35	19:46	13412	166°	154	1110	17	1.4	0.7	
		241	171017_194535	19:45	19:50	13420	346°	152	1109	19	1.3	0.7	
		242	171017_195518	19:55	20:00	13380	166°	153	1108	17	1.3	0.7	
		243	171017_200455	20:04	20:09	13443	346°	155	1106	17	1.2	0.7	
		244	171017_201454	20:14	20:19	13357	166°	151	1104	19	1	0.6	
		245	171017_202418	20:24	20:29	13373	346°	157	1103	21	0.9	0.6	
		246	171017_203407	20:34	20:39	13355	166°	155	1101	20	1	0.6	
		247	171017_204346	20:43	20:49	13358	346°	154	1099	17	1.1	0.6	
		248	171017_205405	20:54	20:59	133367	166°	155	1098	17	1.1	0.6	
		249	171017_210434	21:04	21:09	133341	346°	152	1096	17	1.1	0.6	
		250	171017_211444	21:14	21:20	13395	166°	150	1094	16	1.2	0.7	
		251	171017_212514	21:25	21:30	13342	346°	156	1093	15	1.4	0.7	
		252	171017_213516	21:35	21:40	13389	166°	155	1091	16	1.3	0.7	
		253	171017_214532	21:45	21:50	13325	346°	152	1089	16	1.4	0.8	

Leica ALS80 Flight Log

		254	171017_215537	21:55	21:60	13389	166°	158	1088	15	1.5	0.8	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/18/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3387.6					NV_Reno					Keith Morrel	
Hobbs ST	3382.9		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.7		A			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		280	171017_233821	23:38	23:43	13126	346°	157	1086	20	1.1	0.6	
		279	171017_234820	23:48	23:53	13156	166°	150	1084	19	1.3	0.7	
		278	171017_235835	23:58	:3	13140	346°	152	1083	21	1.1	0.6	
		277	171018_000845	:8	:13	13181	166°	150	1081	22	1.1	0.6	
		276	171018_001854	:18	:24	13161	346°	146	1079	21	1.1	0.6	
		275	171018_002900	:29	:34	13189	166°	158	1078	21	1.1	0.6	
		274	171018_003906	:39	:44	13154	346°	154	1076	21	1.2	0.6	
		273	171018_004859	:48	:54	13195	166°	158	1074	21	1.1	0.6	
		272	171018_005909	:59	1:04	13181	346°	152	1073	22	1.1	0.6	
		271	171018_010930	1:09	1:14	13183	166°	157	1071	21	1.2	0.6	
		270	171018_011958	1:19		10637	346°	146	1070	21	1.2	0.6	EyeSafe/Refly
		269	171018_013152	1:31	1:37	10661	166°	150	1069	20	1.2	0.6	
		270	171018_014218	1:42	1:47	10620	346°	156	1068	20	1.2	0.6	
		268	171018_015218	1:52	1:57	10676	166°	154	1067	21	1.1	0.6	
		267	171018_020215	2:02	2:07	10637	346°	148	1066	22	1	0.6	
		266	171018_021142	2:11	2:16	10629	166°	155	1064	21	1	0.6	
		265	171018_022128	2:21	2:26	10642	346°	148	1063	22	1	0.6	
		264	171018_023123	2:31	2:36	10692	166°	156	1062	22	1	0.6	
		263	171018_024315	2:43	2:48	13185	346°	157	1061	21	1	0.6	
		262	171018_025333	2:53	2:58	13242	166°	158	1057	20	1	0.6	
		261	171018_030346	3:03	3:09	13231	346°	155	1058	19	1.1	0.7	
		260	171018_031358	3:13	3:19	13151	166°	156	1056	20	1.1	0.6	
		259	171018_032356	3:23	3:29	13204	346°	158	1054	19	1.2	0.6	
		258	171018_033419	3:34	3:34	13199	166°	154	1052	18	1.2	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno								Sensor Operator/s	
									Jackson Beebe	
Date/Julian:	10/18/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):			Pilot/s	
Hobbs End	3387.6					NV_Reno			Keith Morrel	
Hobbs ST	3382.9		LIFT			TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	4.7		A			155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		257	171018_171238	17:12	17:18	13222	346°	153	371	20	1.1	0.6	
		256	171018_172319	17:23	17:28	13247	166°	147	369	20	1.1	0.6	
		255	171018_173336	17:33	17:39	13267	346°	153	368	20	1.1	0.6	
		364	171018_174739	17:47	17:48	13530	166°	156	366	21	1	0.6	
		363	171018_175220	17:52	17:54	1368	346°	154	366	21	1	0.6	
		362	171018_175930	17:59	18:01	13306	166°	151	365	20	1.1	0.6	
		361	171018_180642	18:06	18:08	31246	346°	152	364	19	1.2	0.6	
		360	171018_181352	18:13	18:16	13044	166°	158	364	20	1.1	0.6	
		359	171018_182145	18:21	18:24	13061	346°	154	363	20	1	0.6	
		358	171018_182944	18:29	18:32	13059	166°	155	362	20	1	0.6	
		357	171018_183727	18:37	18:40	13067	346°	155	361	22	0.9	0.5	
		356	171018_184516	18:45	18:48	13036	166°	152	360	18	1.2	0.5	
		355	171018_190006	19:00	19:03	13074	346°	153	357	19	1.2	0.5	
		354	171018_190852	19:08	19:12	13058	166°	150	356	17	1.4	0.7	
		353	171018_191735	19:17	19:21	1300	346°	154	355	16	1.4	0.7	
		352	171018_192648	19:26	19:30	12962	166°	141	354	16	1.4	0.7	
		351	171018_193555	19:35	19:37	13078	346°	156	352	16	1.4	0.7	
		350	171018_194516	19:45	19:49	12902	166°	154	351	16	1.3	0.7	
		349	171018_195546	19:55	20:00	12912	346°	157	350	16	1.2	0.7	
		348	171018_200620	20:06	20:11	12893	166°	150	357	17	1.1	0.7	
		347	171018_201641	20:16	20:21	12987	346°	153	350	20	1	0.6	
		346	171018_202721	20:27	20:34	12900	166°	151	347	20	0.9	0.6	
		345	171018_203934	20:39	20:46	12926	346°	157	345	18	1	0.6	
		344	171018_205151	20:51	20:58	12924	166°	156	343	18	1.1	0.6	
		343	171018_210426	21:04	21:12	12941	346°	158	341	18	1.1	0.6	
		342	171018_211755	21:17	21:25	12920	166°	155	339	16	1.3	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/18/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3391.9					NV_Reno					Keith Morrel	
Hobbs ST	3387.6		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.3		B			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
B		156	171018_231806	23:18	23:18	15128	41°	159	336	20	1.1	0.6	
		157	171018_232421	23:24	23:23	14905	221°	147	336	19	1.3		
		158	171018_233027	23:30	23:30	14563	41°	155	335	19	1.3		
		159	171018_233647	23:36	23:37	14128	221°	145	3335	19	1.3		
		160	171018_234204	23:42	23:42	13907	41°	156	335	20	1.2		
		161	171018_234758	23:47	23:48	13834	221°	152	335	19	1.3		
		162	171018_235343	23:53	23:54	13803	41°	154	336	19	1.2		
		163	171019_000027	:	:1	13716	221°	155	334	20	1.1		
		164	171019_000629	:6	:8	13450	41°	157	334	21	1		
		165	171019_001426	:14	:17	13383	221°	154	333	20	2.1		
		166	171019_002207	:22	:24	13326	41°	156	332	20	1.1		
		167	171019_002956	:29	:32	13211	221°	151	3331	19	1.2		
		168	171019_003735	:37	:40	13191	41°	152	330	18	1.2		
		169	171019_004550	:45	:48	13095	221°	150	329	18	1.2		
		170	171019_005350	:53	:56	13145	41°	154	328	18	1.2		
		171	171019_010211	1:02	1:06	13060	221°	152	327	20	1.2		
		172	171019_011116	1:11	1:16	13002	41°	158	326	20	1.2		
		173	171019_012142	1:21	1:26	12950	221°	154	324	20	1.2		
		174	171019_013056	1:30	1:35	12885	41°	154	323	19	1.2		
		341	171019_014829	1:48	1:56	12935	346°	152	321	21	1.1		
		340	171019_020153	2:01	2:10	12919	166°	153	319	21	1		
		339	171019_021501	2:15	2:23	12917	346°	158	316	20	1		
		338	171019_022848	2:28	2:36	12901	166°	155	314	22	0.9		
		337	171019_024204	2:42	2:50	12927	346°	156	311	19	1		
		336	171019_025549	2:55	3:03	12875	160°	155	309	18	1		

Leica ALS80 Flight Log

Project:	NV_ Reno									Sensor Operator/s	
										Jackson Beebe	
Date/Julian:	10/22/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):				Pilot/s	
Hobbs End						NV_Reno				Keith Morrel	
Hobbs ST	3392.8		LIFT			TARGET AIRSPD (KNTS)		BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time			A			155		TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		334	171022_155331	15:22	16:01	12875	346°	150	305	19	1.1	0.6	BREAKER TRIP

Leica ALS80 Flight Log

Project:	NV_ Reno						Sensor Operator/s	
							Jackson Beebe	
Date/Julian:	10/22/2018	ALS80 SN# 8137	Disk Drive MM70	Flight Plan(s):			Pilot/s	
Hobbs End	3397.5			NV_Reno			Keith Morrel	
Hobbs ST	3392.8	LIFT		TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	4.7	B		155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
B		334	171022_155331	15:53	16:01	12876	166°	160	304	19	1.3	0.7	
		333	171022_160641	16:06	16:14	12938	346°	153	301	19	1.3	0.7	
		332	171022_162016	16:20	16:27	12929	166°	157	299	18	1.5	0.7	
		331	171022_163300	16:33	16:40	12921	346°	153	297	20	1.3	0.7	
		330	171022_164623	16:46	1:53	12930	166°	154	294	22	1	0.6	
		329	171022_165902	16:59	17:05	12936	346°	152	292	21	1.1	0.6	
		328	171022_171123	17:11	17:18	12941	166°	154	290	21	1.1	0.6	
		327	171022_172353	17:23	17:30	12943	346°	158	288	22	1	0.6	
		326	171022_173637	17:36	17:43	12949	166°	156	286	22	1.1	0.6	
		325	171022_174900	17:49	17:55	129630	346°	159	284	19	1.2	0.6	
		324	171022_180127	18:01	18:08	12950	166°	160	282	20	1.1	0.6	
		323	171022_181315	18:13	18:19	12959	346°	156	280	21	1	0.6	
		322	171022_182515	18:25	18:31	12936	166°	159	278	22	1	0.6	
		321	171022_183713	18:37	18:44	12885	346°	158	276	19	1.2	0.7	
		320	171022_184909	18:49	18:55	12876	166°	158	273	19	1.2	0.7	
		319	171022_190017	19:00	19:06	12855	346°	157	271	16	1.3	0.7	
		318	171022_191210	19:12	19:18	12907	166°	156	269	16	1.4	0.7	
		317	171022_192353	19:23	19:30	12902	346°	152	267	16	1.4	0.7	
		316	171022_193540	19:35	19:42	12919	166°	155	265	16	1.3	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno									Sensor Operator/s	
										Jackson Beebe	
Date/Julian:	10/22/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):				Pilot/s	
Hobbs End	3397.5					NV_Reno				Keith Morrel	
Hobbs ST	3392.8		LIFT			TARGET AIRSPD (KNTS)		BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	4.7		C			155		TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
C		315	171022_212704	21:27	21:34	12950	346°	150	263	16	1.4	0.8	
		314	171022_213912	21:39	21:45	12906	166°	154	260	17	1.6	0.8	
		313	171022_215147	21:51	21:58	12941	346°	153	255	19	1.1	0.6	
		312	171022_220347	22:03	22:10	12936	166°	153	256	20	1.1	0.6	
		311	171022_221623	22:16	22:25	12935	346°	157	254	19	1.2	0.7	
		310	171022_223008	22:30	22:38	12946	166°	160	251	24	1	0.6	
		309	171022_224346	22:43	22:52	12937	346°	152	249	24	1	0.6	
		308	171022_225752	22:57	23:06	12939	166°	157	246	23	1.1	0.6	
		307	171022_231202	23:12	23:20	12957	346°	154	243	20	1.3	0.6	
		306	171022_232631	23:26		13031	166°	158	241	20	1.3	0.7	Red Error/ GPS/Air Start
		306	171022_235137	23:51	24:00	13056	346°	154	239	23	1.1	0.6	
		305	171023_000554	:5	:15	12995	166°	153	236	22	1.1	0.6	
		304	171023_002130	:21	:36	13056	346°	152	233	21	1.1	0.6	
		303	171023_003616	:36	:45	13021	166°	154	231	20	1.1	0.6	

Leica ALS80 Flight Log

Project:	NV_ Reno								Sensor Operator/s	
									Jackson Beebe	
Date/Julian:	10/22/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):			Pilot/s	
Hobbs End						NV_Reno			Keith Morrel	
Hobbs ST	3392.8		LIFT			TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time			D			155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
D		306	171022_235137	23:51	24:00	13056	346°	154	239	23	1.1	0.6	
		305	171023_000554	:5	:15	12995	166°	153	236	22	1.1	0.6	
		304	171023_002130	:21	:36	13056	346°	152	233	21	1.1	0.6	
		303	171023_003616	:36	:45	13021	166°	154	231	20	1.1	0.6	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/23/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3406					NV_Reno					Keith Morrel	
Hobbs ST	3401.3		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.7		A			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		302	171023_014820	1:48	1:57	12992	346°	150	228	21	1	0.6	
		301	171023_020310	2:03	2:12	13054	166°	157	225	22	1	0.6	
		300	171023_021753	2:17	2:27	13041	346°	157	223	21	1	0.6	
		299	171023_023233	2:32	2:41	13048	166°	154	219	220	1	0.6	
		298	171023_024803	2:48	2:57	13062	346°	151	216	190	1.2	0.7	
		297	171023_030238	3:02	3:11	13107	166°	154	213	20	1.1	0.6	
		296	171023_031808	3:18	3:26	13062	346°	152	210	18	1.2	0.7	
		295	171023_033206	3:32	3:40	13065	166°	150	208	17	1.4	0.7	
		294	171023_034626	3:46	3:54	13075	346°	154	206	17	1.3	0.7	
		293	171023_035940	3:59	4:00	13085	166°	161	203	18	1.1	0.7	
		292	171023_041341	4:13	4:20	13096	346°	152	200	17	1.3	0.8	
		291	171023_042606	4:26	4:32	13082	166°	153	198	19	1.1	0.7	
		290	171023_043859	4:38	4:45	13092	346°	153	196	20	1.1	0.7	
		289	171023_045048	4:50	4:56	13106	166°	154	194	19	1.2	0.7	Brief IMU Error Refresh
		288	171023_050247	5:02	5:08	13106	346°	155	192	18	1.3	0.7	
		287	171023_051335	5:13	5:18	13116	166°	158	190	19	1.2	0.7	
		286	171023_052357	5:23	5:29	13103	346°	151	189	20	1.2	0.7	
		285	171023_053433	5:34	5:36	13123	166°	157	187	20	1.2	0.7	
		284	171023_054517	5:45	5:50	13125	346°	150	185	20	1.1	0.6	
		283	171023_055526	5:55	6:03	13125	166°	154	183	21	1.1	0.6	

Leica ALS80 Flight Log

Project:	NV_ Reno						Sensor Operator/s	
							Jackson Beebe	
Date/Julian:	10/23/2018	ALS80 SN# 8137	Disk Drive MM70	Flight Plan(s):			Pilot/s	
Hobbs End	3410.9			NV_Reno			Keith Morrel	
Hobbs ST	3406	LIFT		TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	4.9	B		155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
B		282	171023_173352	17:33	17:39	13116	346°	153	182	20	1.1	0.6	
		281	171023_174355	17:43	17:49	13162	166°	155	180	20	1.1	0.6	
		3	171023_180018	18:00	18:08	13225	76°	155	178	21	1	0.6	
		335	171023_181845	18:18	18:26	12914	166°	158	176	21	0.9	0.6	
		81	171023_183342	18:33	18:40	13182	166°	158	174	18	1.2	0.7	
		239	171023_184743	18:47	18:48	15092	41°	152	172	16	1.5	0.7	
		238	171023_185353	18:53	18:54	15314	221°	159	171	16	1.5	0.7	
		237	171023_190022	19:00	19:00	150064	41°	157	171	16	1.5	0.7	
		236	171023_190632	19:06	19:07	14736	221°	157	171	16	1.4	0.7	
		235	171023_191303	19:13	19:14	14530	41°	157	171	16	1.4	0.7	
		234	171023_191933	19:19	19:20	14388	221°	155	170	16	1.3	0.7	
		233	171023_192632	19:26	19:27	14171	41°	150	170	16	1.3	0.7	
		218	171023_193458	19:34	19:37	12670	221°	154	169	16	1.3	0.7	
		217	171023_194313	19:43	19:46	12661	41°	155	168	17	1.1	0.7	
		216	171023_195142	19:51	19:54	12593	221°	155	167	19	1	0.6	
		215	171023_200016	20:00	20:03	12553	41°	149	166	20	0.9	0.6	
		214	171023_200857	20:08	20:12	12488	221°	153	165	19	0.9	0.6	
		213	171023_201736	20:17	20:21	12429	41°	151	164	18	1	0.6	
		212	171023_202612	20:26	20:29	12431	221°	155	163	18	1	0.6	
		211	171023_203508	20:35	20:39	12360	41°	154	162	17	1.1	0.6	
		210	171023_204423	20:44	20:48	12378	221°	157	160	17	1.1	0.7	
		209	171023_205329	20:53	20:57	12361	41°	153	159	15	1.3	0.7	
		208	171023_210249	21:02	21:07	12395	221°	156	158	15	1.4	0.7	
		207	171023_211231	21:12	21:16	1295	41°	154	157	16	1.4	0.7	
		206	171023_212143	21:21	21:26	12279	221°	153	155	16	1.4	0.8	
		205	171023_213126	21:31	21:35	12289	41°	155	153	16	1.5	0.8	

Leica ALS80 Flight Log

		204	171023_214055	21:40	214:54	12328	221°	158	152	16	1.5	0.8	
		203	171023_215029	21:50	21:53	12301	41°	152	150	18	1.2	0.7	
		202	171023_215955	21:59	22:04	12278	221°	150	149	19	1.1	0.6	

Leica ALS80 Flight Log

Project:	NV_ Reno								Sensor Operator/s	
									Jackson Beebe	
Date/Julian:	10/24/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):			Pilot/s	
Hobbs End	3415.5					NV_Reno			Keith Morrel	
Hobbs ST	3410.9		LIFT			TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	4.6		A			155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		201	171023_235715	23:57	:1	12297	41°	148	147	23	1.2	0.6	
		200	171024_000703	:7	:11	12324	221°	144	146	21	1.3	0.7	
		199	171024_001630	:16	:20	12283	41°	149	144	21	1.3	0.7	
		198	171024_002608	:26	:30	12300	221°	159	143	23	1.2	0.6	
		197	171024_003547	:35	:40	12339	41°	150	141	22	1.2	0.6	
		196	171024_004544	:45	:50	12324	221°	155	139	22	1.2	0.6	
		195	171024_005546	:55	1:00	12333	41°	152	138	22	1.2	0.6	
		194	171024_010523	1:05	1:10	12341	221°	159	136	21	1.2	0.6	
		193	171024_011519	1:15	11:20	12340	41°	154	135	21	1.1	0.6	
		192	171024_012458	1:24	1:29	12342	221°	158	133	21	1.1	0.6	
		191	171024_013521	1:35	1:40	13342	41°	152	131	21	1.1	0.6	
		190	171024_014533	1:45	1:50	12355	221°	157	130	21	1	0.6	
		189	171024_015618	1:56	2:01	12343	41°	152	128	23	1	0.6	
		188	171024_020633	2:06	2:11	12420	221°	158	126	24	0.9	0.6	
		187	171024_021610	2:16	2:21	12322	41°	154	124	23	0.9	0.6	
		186	171024_022612	2:26	2:31	12451	221°	154	123	21	1	0.7	
		185	171024_023644	2:36	2:42	12431	41°	153	121	20	1.1	0.7	
		184	171024_024652	2:46	2:52	12397	221°	159	119	20	1.1	0.7	
		183	171024_025648	2:56	3:02	12422	41°	150	117	19	1.1	0.6	
		182	171024_030641	3:06	3:11	12523	221°	158	116	19	1.1	0.6	
		181	171024_031708	3:17	3:22	12525	41°	153	114	18	1.2	0.7	
		180	171024_032654	3:26	3:31	12670	221°	156	112	17	1.4	0.7	
		179	171024_033720	3:37	3:42	12665	41°	155	111	17	1.3	0.7	
		178	171024_034646	3:46	3:51	12783	221°	160	109	18	1.1	0.7	
		177	171024_035630	3:56	4:01	12757	41°	159	108	17	1.2	0.7	
		176	171024_040622	4:06	4:11	12801	221°	159	106	16	1.3	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/24/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3419.9					NV_Reno					Keith Morrel	
Hobbs ST	3415.5		LIFT			TARGET AIRSPD (KNTS)		BASE PID:	Base Height:		Aircraft	Airport Idnt:
Flight Time	4.4		B			155		TEMP	1.500		C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
B		175	171024_174829	17:48	17:53	12809	41°	160	310	20	1.1	0.6	
		155	171024_180021	18:00	18:07	13120	346°	156	308	20	1.1	0.6	
		154	171024_181140	18:11	18:18	13158	166°	152	308	22	0.9	0.5	
		153	171024_182300	18:23	18:29	13139	346°	154	304	19	1.1	0.6	
		152	171024_183500	18:35	18:41	13166	166°	154	302	20	1	0.6	
		151	171024_184641	18:46	18:53	13158	346°	154	300	17	1.4	0.7	
		150	171024_185801	18:58	19:04	13120	166°	149	298	17	1.4	0.7	
		149	171024_190930	19:09	19:16	13149	346°	159	298	17	1.4	0.7	
		148	171024_192106	19:21	19:27	13137	166°	150	294	17	1.3	0.7	
		147	171024_193231	19:32	19:39	13225	346°	155	293	17	1.2	0.7	
		146	171024_194406	19:44	19:50	13232	166°	153	291	18	1.1	0.7	
		145	171024_195533	19:55	20:02	13232	346°	154	289	21	1	0.6	
		144	171024_200708	20:07	20:13	13214	166°	154	287	21	0.9	0.6	
		143	171024_201847	20:18	20:25	13209	346°	156	285	19	1	0.6	
		142	171024_203031	20:30	20:37	13185	166°	156	283	18	1.1	0.6	
		141	171024_204211	20:42	20:48	13205	346°	155	281	18	1.1	0.7	
		140	171024_205404	20:54	21:00	13225	166°	156	279	16	1.4	0.7	
		139	171024_210528	21:05	21:12	13207	346°	155	277	17	1.4	0.7	
		138	171024_211656	21:16	21:23	13232	166°	156	274	16	1.6	0.8	
		137	171024_212836	21:28	21:35	13245	346°	155	273	16	1.6	0.8	
		136	171024_214023	21:40	21:46	13225	166°	156	271	17	1.5	0.8	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/25/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3424.4					NV_Reno					Keith Morrel	
Hobbs ST	3419.9		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.5		A			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		135	171024_235828	23:58	:5	13184	346°	155	269	20	1.1	0.6	
		134	171025_000945	:9	:16	13193	166°	158	267	19	1.2	0.6	
		133	171025_002132	:21	:28	13231	346°	154	265	20	1.1	0.6	
		132	171025_003331	:33	:40	13219	166°	154	263	20	1.1	0.6	
		131	171025_004523	:45	:51	13212	346°	153	262	21	1.2	0.6	
		130	171025_005654	:56	1:03	13234	166°	155	260	21	1.2	0.6	
		129	171025_010838	1:08	1:15	12315	346°	151	258	20	1.2	0.6	
		128	171025_012015	1:20	1:27	13216	166°	153	256	21	1.1	0.6	
		127	171025_013300	1:33	1:40	13217	346°	153	253	22	1	0.6	
		126	171025_014520	1:45	1:52	13213	166°	152	251	21	1	0.6	
		125	171025_015805	1:58	2:05	13235	346°	152	249	21	1	0.6	
		124	171025_021058	2:10	2:18	13240	166°	153	249	21	1	0.6	
		123	171025_022333	2:23	2:31	13214	346°	148	245	18	1.1	0.7	
		122	171025_023557	2:35	2:43	13232	166°	155	242	17	1.2	0.8	
		121	171025_024845	2:48	2:56	13212	346°	153	240	17	1.1	0.7	
		120	171025_030145	3:01	3:09	13288	166°	158	238	18	1.1	0.7	
		119	171025_031429	3:14	3:22	13323	346°	155	236	15	1.3	0.8	
		118	171025_032712	3:27	3:34	13304	166°	154	234	15	1.3	0.8	
		117	171025_033957	3:39	3:47	13310	346°	156	231	15	1.4	0.8	
		116	171025_035226	3:52	3:59	13318	166°	156	229	14	1.6	0.9	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/25/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3429.2					NV_Reno					Keith Morrel	
Hobbs ST	3424.4		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.8		B			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
B		105	171025_173037	17:30	17:34	13359	346°	152	226	18	1.2	0.6	
		106	171025_173847	17:38	17:42	13359	166°	152	225	18	1.2	0.6	
		107	171025_174652	17:46	17:53	13356	346°	153	224	19	1.1	0.6	
		108	171025_175727	17:57	18:03	13338	166°	159	223	20	1	0.6	
		109	171025_180850	18:08	18:15	13391	346°	140	221	20	1	0.6	
		110	171025_182005	18:20	18:26	13370	166°	1458	219	18	1.1	0.6	
		111	171025_183139	18:31	18:37	13379	346°	157	217	18	1.2	0.7	
		112	171025_184346	18:43	18:51	13333	166°	153	215	16	1.4	0.7	
		113	171025_185532	18:55	19:02	13374	346°	153	213	16	1.4	0.7	
		114	171025_190841	19:08	19:16	13363	166°	156	211	16	1.4	0.7	
		115	171025_192139	19:21	19:29	13365	346°	153	209	16	1.3	0.7	
		5	171025_193738	19:37	19:43	125723	346°	158	207	17	1.1	0.7	
		6	171025_194858	19:48	19:55	12602	166°	156	205	21	0.9	0.6	
		7	171025_200106	20:01	20:07	12598	346°	154	203	20	0.9	0.6	
		8	171025_201303	20:13	20:19	12472	166°	153	201	18	1.1	0.6	
		9	171025_202414	20:24	20:30	12470	346°	156	199	18	1.1	0.6	
		10	171025_203540	20:35	20:41	12471	166°	151	197	18	1.1	0.6	
		11	171025_204702	20:47	20:53	12463	346°	149	195	16	1.3	0.7	
		12	171025_205819	20:58	21:04	12489	166°	154	193	17	1.3	0.7	
		13	171025_210930	21:09	22:14	12496	346°	153	191	17	1.4	0.7	
		14	171025_212054	21:20	21:27	1244	166°	150	189	16	1.5	0.8	
		15	171025_213241	21:32	21:38	12527	346°	154	187	18	1.2	0.7	
		16	171025_214409	21:44	21:50	12450	166°	155	185	19	1.1	0.6	

Leica ALS80 Flight Log

Project:	NV_ Reno								Sensor Operator/s	
									Jackson Beebe	
Date/Julian:	10/25/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):			Pilot/s	
Hobbs End	3433.3					NV_Reno			Keith Morrel	
Hobbs ST	3429.2		LIFT			TARGET AIRSPD (KNTS)	BASE PID:	Base Height:	Aircraft	Airport Idnt:
Flight Time	4.1		C			155	TEMP	1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
C		17	171025_235307	23:53	23:59	12411	345°	151	183	21	1.1	0.6	
		18	171026_000436	:4	:10	12445	165°	159	181	20	1.2	0.6	
		19	171026_001714	:17	:21	12440	345°	151	180	20	1.1	0.6	
		20	171026_002634	:26	:31	12435	165°	154	178	20	1.1	0.7	
		21	171026_003612	:36	:40	12432	345°	151	177	16	1.5	1	High PDOP/HDOP
		22	171026_004546	:45	:50	12428	165°	150	176	18	1.4	0.9	
		23	171026_005510	:55	:59	12429	345°	155	174	20	1.2	0.7	
		24	171026_010448	1:04	1:10	12446	165°	153	173	19	1.2	0.7	
		25	171026_011428	1:14	1:19	12509	345°	152	171	20	1.1	0.6	
		26	171026_012411	1:24	1:29	12492	165°	154	170	20	1.1	0.6	
		27	171026_013414	1:34	1:40	12697	345°	150	168	20	1	0.6	
		28	171026_014458	1:44	1:52	12927	165°	160	166	20	1.1	0.7	
		29	171026_015625	1:56	2:02	12934	345°	156	164	18	1.1	0.7	
		30	171026_020744	2:07	2:13	13052	165°	156	162	19	1.1	0.6	
		31	171026_021857	2:18	2:25	13052	346°	154	160	18	1.1	0.6	
		32	171026_023028	2:30	2:36	13084	165°	156	158	19	1.2	0.7	
		33	171026_024208	2:42	2:48	13050	345°	155	156	18	1.2	0.7	
		34	171026_025344	2:53	3:00	13183	165°	155	154	17	1.2	0.6	
		35	171026_030513	3:05	3:11	13189	345°	159	152	16	1.3	0.7	
		36	171026_031642	3:16	3:23	13180	165°	159	150	15	1.4	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/26/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3438					NV_Reno					Keith Morrel	
Hobbs ST	3433.3		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.7		A			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
A		37	171026_170355	17:03	17:10	13128	345°	150	284	18	1.1	0.6	
		38	171026_171455	17:14	17:21	13164	166°	152	282	20	1	0.6	
		39	171026_172514	17:25	17:31	13125	345°	152	280	18	1.1	0.6	
		40	171026_173622	17:36	17:40	13137	166°	156	278	17	1.2	0.7	
		41	171026_174556	17:45	17:50	13146	345°	154	276	18	1.1	0.6	
		42	171026_175509	17:55	17:59	13150	166°	158	275	19	1	0.6	
		43	171026_180430	18:04	18:09	13142	345°	156	274	20	0.9	0.6	
		44	171026_181349	18:13	18:18	13275	165°	153	272	17	1.2	0.7	
		45	171026_182330	18:23	18:28	13273	345°	148	271	18	1.2	0.7	
		46	171026_183249	18:32	18:37	13777	166°	156	269	17	1.3	0.7	
		47	171026_184240	18:42	18:47	13304	345°	154	268	17	1.3	0.7	
		48	171026_185207	18:52	18:56	13017	166°	155	267	16	1.4	0.7	
		49	171026_190147	19:01	19:06	13028	345°	154	265	16	1.4	0.7	
		50	171026_191120	19:11	19:15	13030	166°	153	264	16	1.3	0.7	
		51	171026_192042	19:20	19:25	13003	343°	153	262	16	1.2	0.7	
		52	171026_193007	19:30	19:34	13012	165°	160	261	17	1.1	0.7	
		53	171026_193943	19:39	19:44	13028	345°	155	259	19	1.1	0.6	
		54	171026_194908	19:49	19:53	13028	165°	155	258	19	1	0.6	
		55	171026_195852	19:58	20:03	13042	345°	155	257	19	0.9	0.6	
		56	171026_200801	20:08	20:12	13034	165°	153	255	17	1	0.6	
		57	171026_201702	20:17	20:21	13231	345°	154	254	17	1.1	0.6	
		58	171026_202652	20:26	20:31	13314	165°	154	252	17	1.1	0.6	
		59	171026_203643	20:36	20:41	13306	345°	155	251	17	1.1	0.6	
		60	171026_204627	20:46	20:57	13311	165°	157	250	15	1.3	0.7	
		61	171026_205630	20:56	21:01	13228	345°	157	248	16	1.3	0.7	

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/26/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3442.5					NV_Reno					Keith Morrel	
Hobbs ST	3438		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	4.5		A			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
		1	171026_225618	22:56	23:04	13733	76°	151	246	21	1.3	0.6	cross/strip
		2	171026_231717	23:17	23:23	13613	256°	150	244	22	1.2	0.6	cross/strip
		R05	171026_233106	23:31		14343	166°		242				
		R02	171026_233321	23:33									
		R01	171026_233831	23:38									
		R08	171026_234332	23:43									
		R06	171026_234910	23:49									
		R37	171026_235446	23:54									
		R38	171027_000023	:									
		R39	171027_000614	:6									
		R40	171027_001237	:12	:13								
		R41	171027_001839	:18	:19								
		R36	171027_002430	:24	:25								
		R35	171027_003032	:30	:31								
		R34	171027_003605	:36									
		R33	171027_004212	:42									
		R32	171027_004824	:48									
		R31	171027_005422	:54									
		R30	171027_010025	1:00	1:01								
		R23	171027_010616	1:06									
		R17	171027_011104	1:11									
		R18	171027_011642	1:16									
		R16	171027_012233	1:22									
		R15	171027_012847	1:28									
		R14	171027_013416	1:34									
		R13	171027_014014	1:40									

Leica ALS80 Flight Log

		R12	171027_014541	1:45									
		R11	171027_015142	1:51									
		R10	171027_015727	1:57									
		R09	171027_020350	2:03									
		R07	171027_020949	2:09									
		R24	171027_021348	2:13									
		R20	171027_021532	2:15									
		R04	171027_022053	2:20									
		R29	171027_022614	2:26									
		R28	171027_023210	2:32									
		R19	171027_023306	2:33									
		R26	171027_024011	2:40									
		R25	171027_024428	2:44									
		R22	171027_024929	2:49									

Leica ALS80 Flight Log

Project:	NV_ Reno										Sensor Operator/s	
											Jackson Beebe	
Date/Julian:	10/26/2018	ALS80 SN# 8137		Disk Drive MM70		Flight Plan(s):					Pilot/s	
Hobbs End	3443.2					NV_Reno					Keith Morrel	
Hobbs ST	3442.5		LIFT			TARGET AIRSPD (KNTS)		BASE PID:		Base Height:	Aircraft	Airport Idnt:
Flight Time	0.7		C			155		TEMP		1.500	C421-N13RF	KMEV (Minden, NV)

Lift	#	Flight Line	Mission Line	UTC time:		GPS Altitude: ASL:	Direction	Speed: kts:	Available	S/Vs:	Position Acc.		Comments and Conditions:
				Begin:	End:				MM Space		PDOP	HDOP	
C		R27	171027_180434	18:04			348°		232				
		R21	171027_180917	18:09									
		R03	171027_181514	18:15									

Appendix B. Vertical Accuracy Calculations

Project Information

Prepared By: Kenneth L Coffey
Project Name: NV Reno Carson City
Sensor Info: Leica ALS80
Required Nominal Pulse Spacing: 0.35
Vendor Name: Digital Aerial Solutions .LLC
Units: Meters
Percent of Extent Tolerance: Extents Not Checked
Date of Aquisition: Start: 9/19/2017 Finish: 10/27/2017

Metadata Information

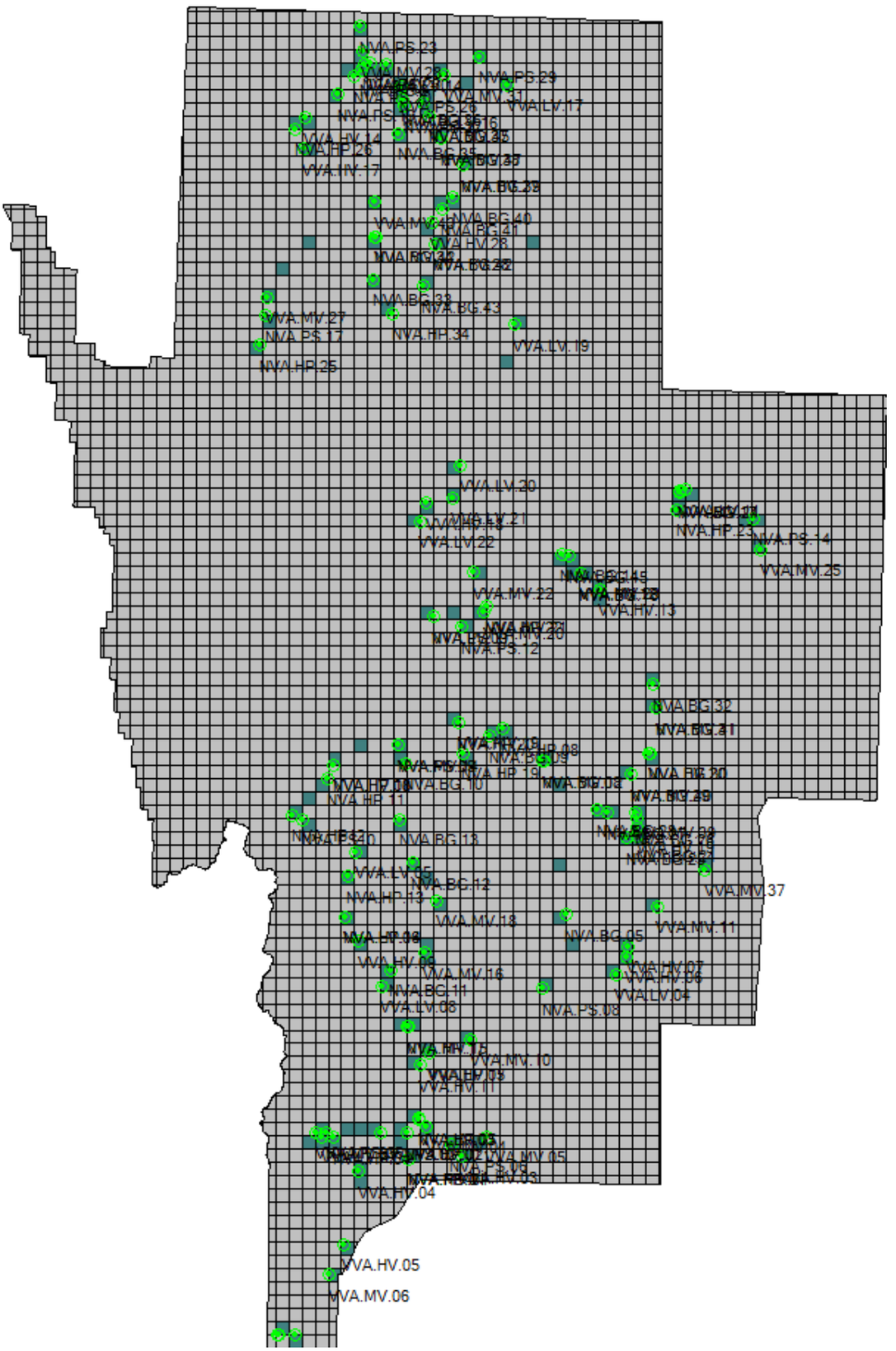
Tile Index:
- Filename: CLIP_NV_1K_LAS_Tiles.shp
- Number of Polys: 0

Intensity:
- Tile Index Attribute: Not Specified
- Data Filename: Not Specified

DEM:
- Tile Index Attribute: NAME
- Data Filename: Clipped

LAS:
- Tile Index Attribute: NAME
- Data Filename: LAS

Tiled-Data Area



LiDAR Accuracy Assessment Summary

LC Type	# of Points	NVA	VVA	
LAS				
Bare Ground	32	0.098		
Hard Pavement	20	0.112		
High Vegetation	17		0.110	
Low Vegetation	18		0.073	
Medium Vegetation	32		0.093	
Pack Sand	19	0.089		
Total	138			
DEM				
Bare Ground	32	0.100		
Hard Pavement	20	0.119		
High Vegetation	17		0.148	
Low Vegetation	18		0.104	
Medium Vegetation	32		0.106	
Pack Sand	19	0.094		
Total	138			

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)	☑	**NVA.BG.03A**					
			250244.122	4318038.929	2163.561	2163.484	2163.508
					Bare Ground	-0.077	-0.053
2)	☑	**NVA.BG.05**					
			271973.423	4349694.748	1560.549	1560.535	1560.528
					Bare Ground	-0.014	-0.021
3)	☑	**NVA.BG.08**					
			270241.281	4361309.801	1934.795	1934.726	1934.72
					Bare Ground	-0.069	-0.075
4)	☑	**NVA.BG.09**					
			266248.56	4363224.658	1481.683	1481.622	1481.6
					Bare Ground	-0.061	-0.083
5)	☑	**NVA.BG.10**					
			259795.06	4361167.423	1838.814	1838.798	1838.802
					Bare Ground	-0.016	-0.012
6)	☑	**NVA.BG.11**					
			258724.86	4345532.127	1543.781	1543.749	1543.744
					Bare Ground	-0.032	-0.037
7)	☑	**NVA.BG.12**					
			260353.727	4353643.357	1552.69	1552.714	1552.715
					Bare Ground	0.024	0.025

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
8)	☑	**NVA.BG.13**					
			259421.284	4356882.446	1547.528	1547.527	1547.532
					Bare Ground	-0.001	0.004
9)	☑	**NVA.BG.14**					
			271607.062	4376914.191	1354.109	1354.085	1354.09
					Bare Ground	-0.024	-0.019
10)	☑	**NVA.BG.15**					
			272251.052	4376819.247	1331.011	1331.008	1331.023
					Bare Ground	-0.003	0.012
11)	☑	**NVA.BG.16**					
			273058.573	4375480.444	1345.184	1345.164	1345.18
					Bare Ground	-0.02	-0.004
12)	☑	**NVA.BG.17**					
			280558.528	4381665.727	1304.147	1304.105	1304.109
					Bare Ground	-0.042	-0.038
13)	☑	**NVA.BG.24**					
			277346.7	4355681.048	1537.208	1537.307	1537.295
					Bare Ground	0.099	0.087
14)	☑	**NVA.BG.25**					
			276571.055	4355540.406	1558.04	1558.068	1558.051
					Bare Ground	0.028	0.011

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
15)	☑	**NVA.BG.26**					
			277323.692	4356988.818	1736.75	1736.742	1736.766
					Bare Ground	-0.008	0.016
16)	☑	**NVA.BG.27**					
			275141.375	4357400.1	1778.342	1778.356	1778.35
					Bare Ground	0.014	0.008
17)	☑	**NVA.BG.28**					
			274341.871	4357659.906	1931.523	1931.503	1931.505
					Bare Ground	-0.02	-0.018
18)	☑	**NVA.BG.29**					
			276948.999	4360293.082	1837.21	1837.22	1837.223
					Bare Ground	0.01	0.013
19)	☑	**NVA.BG.30**					
			278296.379	4361923.176	1793.652	1793.612	1793.636
					Bare Ground	-0.04	-0.016
20)	☑	**NVA.BG.31**					
			278800.915	4365322.289	1758.492	1758.362	1758.37
					Bare Ground	-0.13	-0.122
21)	☑	**NVA.BG.32**					
			278601.896	4367091.565	1714.901	1714.756	1714.764
					Bare Ground	-0.145	-0.137

Coordinates and Offsets of Analyzed Locations (Continued)

	ID			Z1	Z DEM	Z LAS
				LC Type	ΔZ DEM	ΔZ LAS
22)	NVA.BG.33					
		257416.204	4397686.049	1543.609	1543.614	1543.622
				Bare Ground	0.005	0.013
23)	NVA.BG.34					
		257536.856	4400939.036	1675.732	1675.773	1675.783
				Bare Ground	0.041	0.051
24)	NVA.BG.35					
		259328.032	4408701.385	1579.476	1579.474	1579.47
				Bare Ground	-0.002	-0.006
25)	NVA.BG.36					
		259678.057	4411293.895	1616.269	1616.329	1616.341
				Bare Ground	0.06	0.072
26)	NVA.BG.37					
		261661.994	4410052.846	1627.899	1627.902	1627.894
				Bare Ground	0.003	-0.005
27)	NVA.BG.38					
		262545.573	4408347.662	1746.511	1746.539	1746.54
				Bare Ground	0.028	0.029
28)	NVA.BG.39					
		264149.326	4406305.152	1543.064	1543.045	1543.056
				Bare Ground	-0.019	-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
29)	**NVA.BG.40**					
		263437.076	4403900.184	1562.443	1562.497	1562.471
				Bare Ground	0.054	0.028
30)	**NVA.BG.41**					
		262593.578	4403012.766	1598.613	1598.628	1598.658
				Bare Ground	0.015	0.045
31)	**NVA.BG.42**					
		262060.194	4400355.207	1549.99	1550.033	1550.058
				Bare Ground	0.043	0.068
32)	**NVA.BG.43**					
		261180.16	4397202.348	1551.117	1551.157	1551.147
				Bare Ground	0.04	0.03
33)	**NVA.HP.01**					
		260090.266	4331304.003	1501.797	1501.813	1501.816
				Hard Pavement	0.016	0.019
34)	**NVA.HP.02**					
		259930.611	4333245.923	1454.073	1454.099	1454.1
				Hard Pavement	0.026	0.027
35)	**NVA.HP.04**					
		254432.307	4332876.681	1708.791	1708.847	1708.833
				Hard Pavement	0.056	0.042

Coordinates and Offsets of Analyzed Locations (Continued)

	ID					
		Survey X	Survey Y	Z1	Z DEM	Z LAS
				LC Type	ΔZ DEM	ΔZ LAS
36)	NVA.HP.05					
		260856.059	4334298.574	1445.82	1445.791	1445.788
				Hard Pavement	-0.029	-0.032
37)	NVA.HP.07					
		251482.829	4317967.107	2075.945	2075.817	2075.816
				Hard Pavement	-0.128	-0.129
38)	NVA.HP.08					
		267162.876	4363743.27	1642.658	1642.58	1642.607
				Hard Pavement	-0.078	-0.051
39)	NVA.HP.10					
		254431.015	4361015.03	1849.759	1849.662	1849.656
				Hard Pavement	-0.097	-0.103
40)	NVA.HP.11					
		253952.746	4359955.868	1906.247	1906.203	1906.159
				Hard Pavement	-0.044	-0.088
41)	NVA.HP.13					
		255477.844	4352644.52	1549.053	1548.977	1549.023
				Hard Pavement	-0.076	-0.03
42)	NVA.HP.14					
		255258.558	4349548.263	1541.022	1540.94	1540.956
				Hard Pavement	-0.082	-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
43)	☑	**NVA.HP.17**					
			259991.982	4341231.157	1450.091	1450.076	1450.08
					Hard Pavement	-0.015	-0.011
44)	☑	**NVA.HP.19**					
			264174.186	4361930.152	1413.747	1413.753	1413.772
					Hard Pavement	0.006	0.025
45)	☑	**NVA.HP.20**					
			263855.503	4364228.647	1390.093	1390.087	1390.085
					Hard Pavement	-0.006	-0.008
46)	☑	**NVA.HP.22**					
			265964.295	4372987.633	1364.119	1364.16	1364.156
					Hard Pavement	0.041	0.037
47)	☑	**NVA.HP.23**					
			280396.462	4380333.896	1310.768	1310.73	1310.739
					Hard Pavement	-0.038	-0.029
48)	☑	**NVA.HP.25**					
			248838.345	4392713.852	1519.603	1519.552	1519.567
					Hard Pavement	-0.051	-0.036
49)	☑	**NVA.HP.26**					
			251494.758	4409036.363	1759.634	1759.573	1759.615
					Hard Pavement	-0.061	-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
50)	NVA.HP.34					
		258876.235	4395146.386	1509.969	1509.929	1510.003
				Hard Pavement	-0.04	0.034
51)	NVA.HP12					
		251311.849	4357262.871	2515.081	2514.976	2514.969
				Hard Pavement	-0.105	-0.112
52)	VVA.HP.15					
		261606.381	4339243.81	1423.046	1423.045	1423.045
				Hard Pavement	-0.001	-0.001
53)	NVA.PS.01					
		260077.748	4331270.429	1499.361	1499.378	1499.405
				Pack Sand	0.017	0.044
54)	NVA.PS.02					
		257949.35	4333225.197	1534.277	1534.321	1534.334
				Pack Sand	0.044	0.057
55)	NVA.PS.05					
		253843.07	4333261.732	1763.536	1763.508	1763.511
				Pack Sand	-0.028	-0.025
56)	NVA.PS.06					
		263283.818	4332312.137	1439.166	1439.088	1439.113
				Pack Sand	-0.078	-0.053

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
57)	☑	**NVA.PS.08**					
			270232.562	4344152.078	1481.648	1481.603	1481.622
					Pack Sand	-0.045	-0.026
58)	☑	**NVA.PS.09**					
			259304.563	4362515.291	1673.398	1673.414	1673.424
					Pack Sand	0.016	0.026
59)	☑	**NVA.PS.11**					
			261949.149	4372209.098	1352.894	1352.941	1352.943
					Pack Sand	0.047	0.049
60)	☑	**NVA.PS.12**					
			264091.47	4371438.505	1373.478	1373.512	1373.501
					Pack Sand	0.034	0.023
61)	☑	**NVA.PS.14**					
			286148.928	4379619.688	1376.758	1376.75	1376.742
					Pack Sand	-0.008	-0.016
62)	☑	**NVA.PS.17**					
			249279.308	4394940.003	1549.494	1549.465	1549.468
					Pack Sand	-0.029	-0.026
63)	☑	**NVA.PS.19**					
			254736.826	4411680.533	1609.864	1609.874	1609.865
					Pack Sand	0.01	0.001

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
64)	☑	**NVA.PS.20**					
			255956.585	4413033.566	1575.988	1576.051	1576.053
					Pack Sand	0.063	0.065
65)	☑	**NVA.PS.21**					
			256466.575	4413504.973	1561.61	1561.667	1561.628
					Pack Sand	0.057	0.018
66)	☑	**NVA.PS.22**					
			256684.262	4413982.568	1552.958	1552.982	1552.983
					Pack Sand	0.024	0.025
67)	☑	**NVA.PS.23**					
			256429.905	4416791.861	1514.027	1514.052	1514.053
					Pack Sand	0.025	0.025
68)	☑	**NVA.PS.26**					
			259511.422	4412301.519	1603.816	1603.853	1603.868
					Pack Sand	0.037	0.052
69)	☑	**NVA.PS.27**					
			259741.516	4410771.315	1624.1	1624.116	1624.124
					Pack Sand	0.016	0.024
70)	☑	**NVA.PS.29**					
			265439.212	4414492.122	1408.449	1408.498	1408.51
					Pack Sand	0.049	0.061

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
71)	☑	**NVA.PS10**					
			252100.416	4356929.867	2413.397	2413.272	2413.284
					Pack Sand	-0.125	-0.113
72)	☑	**VVA.HV.03**					
			264053.116	4331467.387	1413.68	1413.77	1413.743
					High Vegetation	0.09	0.063
73)	☑	**VVA.HV.04**					
			256327.202	4330313.766	1571.086	1571.253	1571.196
					High Vegetation	0.167	0.11
74)	☑	**VVA.HV.05**					
			255144.678	4324824.1	1448.548	1448.696	1448.649
					High Vegetation	0.148	0.101
75)	☑	**VVA.HV.06**					
			276516.238	4346526.834	1327.67	1327.647	1327.669
					High Vegetation	-0.023	-0.001
76)	☑	**VVA.HV.07**					
			276669.651	4347338.265	1321.574	1321.651	1321.71
					High Vegetation	0.077	0.136
77)	☑	**VVA.HV.08**					
			254408.565	4361040.25	1850.649	1850.658	1850.672
					High Vegetation	0.009	0.023

Coordinates and Offsets of Analyzed Locations (Continued)

	ID	Survey X	Survey Y	Z1	Z DEM	Z LAS
				LC Type	ΔZ DEM	ΔZ LAS
78)	**VVA.HV.09**					
		256290.205	4347719.943	1543.684	1543.65	1543.643
				High Vegetation	-0.034	-0.042
79)	**VVA.HV.11**					
		260946.977	4338375.064	1424.562	1424.535	1424.556
				High Vegetation	-0.027	-0.006
80)	**VVA.HV.12**					
		273066.04	4375519.736	1344.23	1344.307	1344.265
				High Vegetation	0.077	0.035
81)	**VVA.HV.13**					
		274508.97	4374275.62	1370.766	1370.807	1370.795
				High Vegetation	0.041	0.029
82)	**VVA.HV.14**					
		252236.994	4409888.614	1677.846	1677.863	1677.863
				High Vegetation	0.017	0.017
83)	**VVA.HV.17**					
		252114.228	4407548.112	1766.893	1766.962	1766.978
				High Vegetation	0.069	0.084
84)	**VVA.HV.18**					
		261410.453	4380811.423	1353.853	1353.771	1353.775
				High Vegetation	-0.082	-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
85)	**VVA.HV.19**					
		277397.356	4356344.905	1645.479	1645.47	1645.52
				High Vegetation	-0.009	0.041
86)	**VVA.HV.20**					
		278279.178	4361935.702	1794.376	1794.246	1794.29
				High Vegetation	-0.13	-0.086
87)	**VVA.HV.27**					
		264170.594	4406300.763	1542.25	1542.272	1542.267
				High Vegetation	0.022	0.017
88)	**VVA.HV.28**					
		261825.682	4401955.08	1589.923	1590.029	1589.988
				High Vegetation	0.106	0.065
89)	**VVA.LV.01**					
		259940.397	4333201.911	1454.564	1454.59	1454.594
				Low Vegetation	0.026	0.03
90)	**VVA.LV.02**					
		253498.44	4332973.635	1740.606	1740.603	1740.605
				Low Vegetation	-0.003	-0.001
91)	**VVA.LV.03**					
		260858.66	4334330.938	1446.07	1446.06	1446.073
				Low Vegetation	-0.01	0.003

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
92)	☑	**VVA.LV.04**					
			275740.261	4345190.586	1330.834	1330.856	1330.868
					Low Vegetation	0.022	0.034
93)	☑	**VVA.LV.05**					
			256089.83	4354472.255	1556.336	1556.298	1556.291
					Low Vegetation	-0.038	-0.045
94)	☑	**VVA.LV.06**					
			255272.953	4349568.976	1539.967	1539.955	1539.979
					Low Vegetation	-0.012	0.012
95)	☑	**VVA.LV.07**					
			261655.447	4339236.857	1422.16	1422.149	1422.143
					Low Vegetation	-0.011	-0.018
96)	☑	**VVA.LV.08**					
			258033.599	4344308.81	1550.807	1550.801	1550.812
					Low Vegetation	-0.006	0.005
97)	☑	**VVA.LV.09**					
			261929.033	4372226.508	1353.061	1353.093	1353.107
					Low Vegetation	0.032	0.046
98)	☑	**VVA.LV.11**					
			281000.312	4381820.762	1307.682	1307.651	1307.651
					Low Vegetation	-0.031	-0.031

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
99)	☑	**VVA.LV.14**					
			258406.485	4413882.723	1541.97	1541.94	1541.953
					Low Vegetation	-0.03	-0.017
100)	☑	**VVA.LV.16**					
			261156.124	4411042.802	1599.527	1599.631	1599.584
					Low Vegetation	0.104	0.057
101)	☑	**VVA.LV.17**					
			267569.48	4412428.563	1316.993	1317.036	1317.036
					Low Vegetation	0.043	0.043
102)	☑	**VVA.LV.19**					
			268087.132	4394276.469	1386.738	1386.85	1386.788
					Low Vegetation	0.112	0.05
103)	☑	**VVA.LV.20**					
			263977.132	4383624.562	1391.741	1391.7	1391.683
					Low Vegetation	-0.041	-0.058
104)	☑	**VVA.LV.21**					
			263370.479	4381176.125	1347.699	1347.616	1347.626
					Low Vegetation	-0.083	-0.073
105)	☑	**VVA.LV.22**					
			260908.054	4379408.603	1353.934	1353.884	1353.87
					Low Vegetation	-0.05	-0.064

Coordinates and Offsets of Analyzed Locations (Continued)

	ID	Survey X	Survey Y	Z1	Z DEM	Z LAS
				LC Type	ΔZ DEM	ΔZ LAS
106)	**VVA.LV.28**					
		262075.273	4400359.356	1549.826	1549.898	1549.907
				Low Vegetation	0.072	0.081
107)	**VVA.MV.01**					
		260123.163	4331257.599	1502.811	1502.917	1502.904
				Medium Vegetation	0.106	0.093
108)	**VVA.MV.03**					
		253103.693	4333306.699	1794.299	1794.315	1794.303
				Medium Vegetation	0.016	0.004
109)	**VVA.MV.04**					
		261453.963	4333719.388	1439.973	1439.998	1440.01
				Medium Vegetation	0.025	0.037
110)	**VVA.MV.05**					
		265944.636	4332937.55	1418.247	1418.296	1418.281
				Medium Vegetation	0.049	0.034
111)	**VVA.MV.06**					
		254068.118	4322510.346	1460.026	1460.136	1460.126
				Medium Vegetation	0.11	0.1
112)	**VVA.MV.08**					
		250189.547	4318008.106	2166.073	2166.106	2166.074
				Medium Vegetation	0.033	0.001

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
113)	☑	**VVA.MV.10**					
			264764.773	4340278.581	1412.03	1411.953	1411.958
					Medium Vegetation	-0.077	-0.072
114)	☑	**VVA.MV.11**					
			278855.283	4350324.596	1326.654	1326.722	1326.729
					Medium Vegetation	0.068	0.075
115)	☑	**VVA.MV.12**					
			270277.978	4361313.335	1932.919	1932.881	1932.84
					Medium Vegetation	-0.038	-0.079
116)	☑	**VVA.MV.14**					
			259321.83	4362521.322	1672.985	1673.022	1673.012
					Medium Vegetation	0.037	0.027
117)	☑	**VVA.MV.15**					
			260036.705	4341230.108	1448.416	1448.557	1448.5
					Medium Vegetation	0.141	0.084
118)	☑	**VVA.MV.16**					
			261250.282	4346845.995	1549.494	1549.544	1549.492
					Medium Vegetation	0.05	-0.002
119)	☑	**VVA.MV.18**					
			262230.859	4350800.154	1561.104	1561.159	1561.166
					Medium Vegetation	0.055	0.062

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
120)	☑	**VVA.MV.19**					
			263874.341	4364265.688	1389.309	1389.324	1389.349
					Medium Vegetation	0.015	0.04
121)	☑	**VVA.MV.20**					
			265801.209	4372569.162	1386.607	1386.652	1386.688
					Medium Vegetation	0.045	0.081
122)	☑	**VVA.MV.21**					
			265983.351	4372995.75	1365.034	1365.091	1365.085
					Medium Vegetation	0.057	0.051
123)	☑	**VVA.MV.22**					
			265023.936	4375571.919	1338.797	1338.869	1338.891
					Medium Vegetation	0.072	0.094
124)	☑	**VVA.MV.23**					
			273103.663	4375508.195	1345.511	1345.534	1345.554
					Medium Vegetation	0.023	0.043
125)	☑	**VVA.MV.24**					
			280543.625	4381675.251	1304.599	1304.571	1304.608
					Medium Vegetation	-0.028	0.009
126)	☑	**VVA.MV.25**					
			286709.35	4377289.998	1457.819	1457.78	1457.776
					Medium Vegetation	-0.039	-0.043

Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
127)	☑	**VVA.MV.27**					
			249355.773	4396343.949	1578.84	1578.85	1578.875
					Medium Vegetation	0.01	0.035
128)	☑	**VVA.MV.28**					
			256604.726	4414894.456	1546.168	1546.222	1546.229
					Medium Vegetation	0.054	0.061
129)	☑	**VVA.MV.30**					
			257149.992	4413997.34	1546.964	1546.987	1546.997
					Medium Vegetation	0.023	0.033
130)	☑	**VVA.MV.31**					
			262784.504	4413127.863	1531.308	1531.359	1531.37
					Medium Vegetation	0.051	0.062
131)	☑	**VVA.MV.37**					
			282521.392	4353137.669	1322.79	1322.824	1322.812
					Medium Vegetation	0.034	0.022
132)	☑	**VVA.MV.39**					
			277274.264	4357491.917	1773.836	1773.82	1773.848
					Medium Vegetation	-0.016	0.012
133)	☑	**VVA.MV.40**					
			276930.14	4360314.501	1835.441	1835.451	1835.466
					Medium Vegetation	0.01	0.025

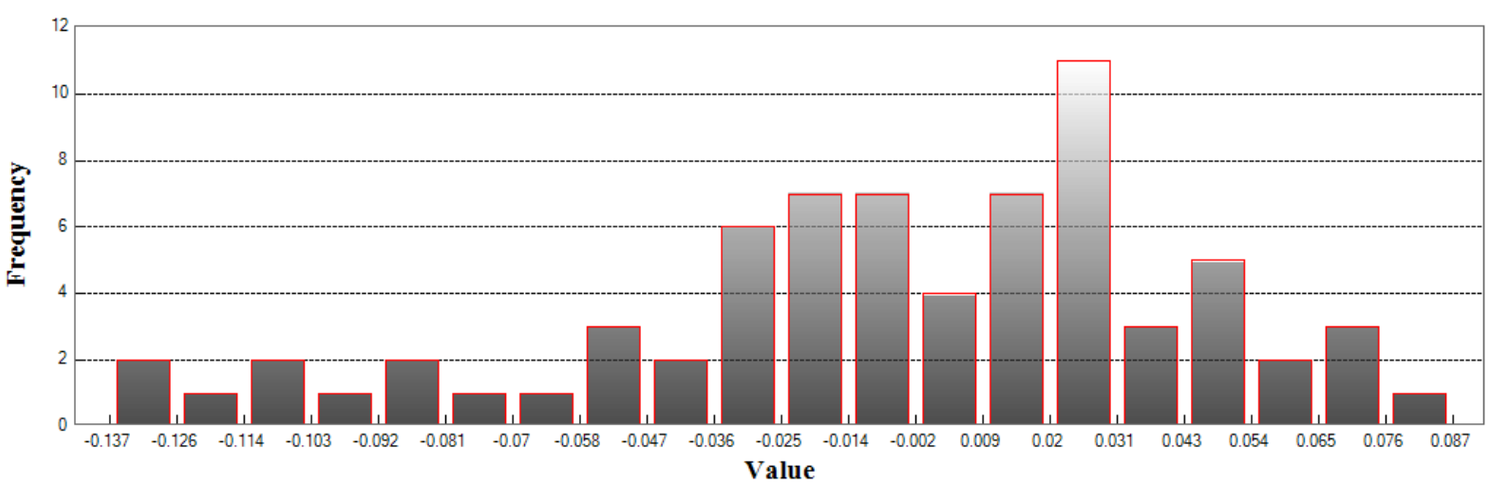
Coordinates and Offsets of Analyzed Locations (Continued)

		ID					
			Survey X	Survey Y	Z1	Z DEM	Z LAS
					LC Type	ΔZ DEM	ΔZ LAS
134)	☑	VVA.MV.41					
			278801.133	4365338.805	1758.597	1758.539	1758.566
					Medium Vegetation	-0.058	-0.031
135)	☑	VVA.MV.42					
			257564.889	4400938.394	1676.647	1676.667	1676.728
					Medium Vegetation	0.02	0.081
136)	☑	VVA.MV.43					
			257515.177	4403556.876	1563.513	1563.554	1563.575
					Medium Vegetation	0.041	0.062
137)	☑	VVA.MV.45					
			261651.638	4410039.138	1627.872	1627.877	1627.892
					Medium Vegetation	0.005	0.02
138)	☑	VVA.MV.47					
			262558.096	4408354.54	1746.299	1746.344	1746.353
					Medium Vegetation	0.045	0.054

LAS

Nonvegetated Vertical Accuracy
LandCover Type: Bare Ground, Hard Pavement, Pack Sand
Minimum DZ: -0.137
Maximum DZ: 0.087
Mean DZ: -0.006
Mean Magnitude DZ: 0.198
Number Observations: 71
Standard Deviation DZ: 0.051
RMSE Z: 0.051
95% Confidence Level Z: 0.1
Units: Meters

Histogram



Min: -0.137
Max: 0.087
Number Of Bins: 20
Bin Interval: 0.011

LAS (Continued)

Vegetated Vertical Accuracy

LandCover Type: High Vegetation

Minimum DZ: -0.086

Maximum DZ: 0.136

Mean DZ: 0.03

Mean Magnitude DZ: 0.234

Number Observations: 17

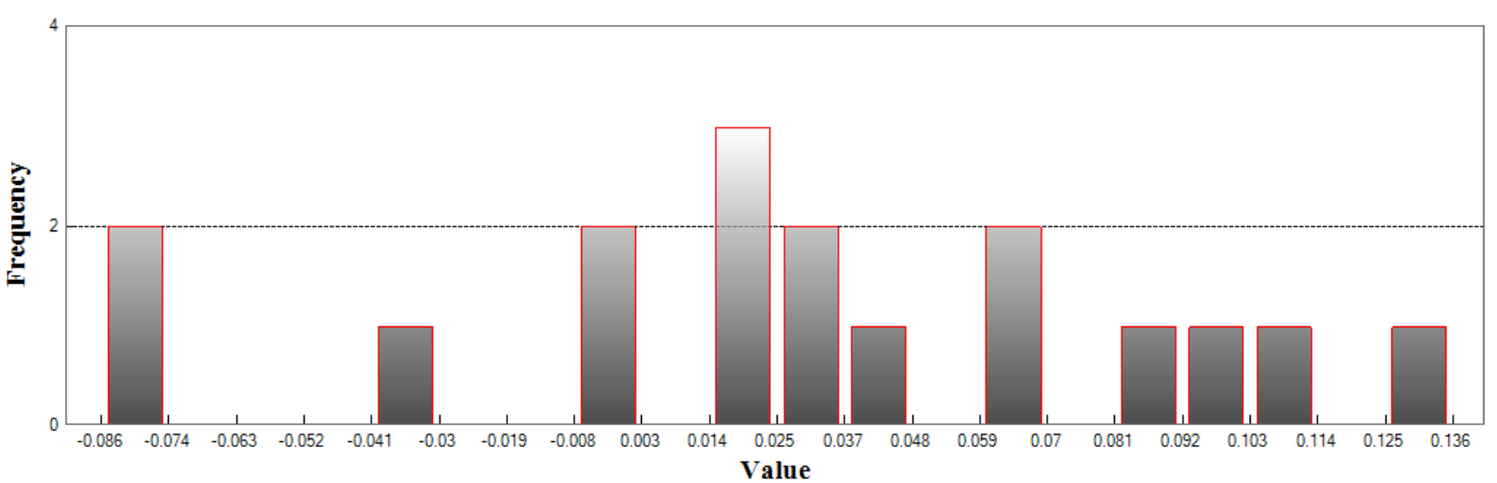
Standard Deviation DZ: 0.062

RMSE Z: 0.067

95th Percentile: 0.11

Units: Meters

Histogram



Min: -0.086

Max: 0.136

Number Of Bins: 20

Bin Interval: 0.011

LAS (Continued)

Vegetated Vertical Accuracy

LandCover Type: Low Vegetation

Minimum DZ: -0.073

Maximum DZ: 0.081

Mean DZ: 0.003

Mean Magnitude DZ: 0.192

Number Observations: 18

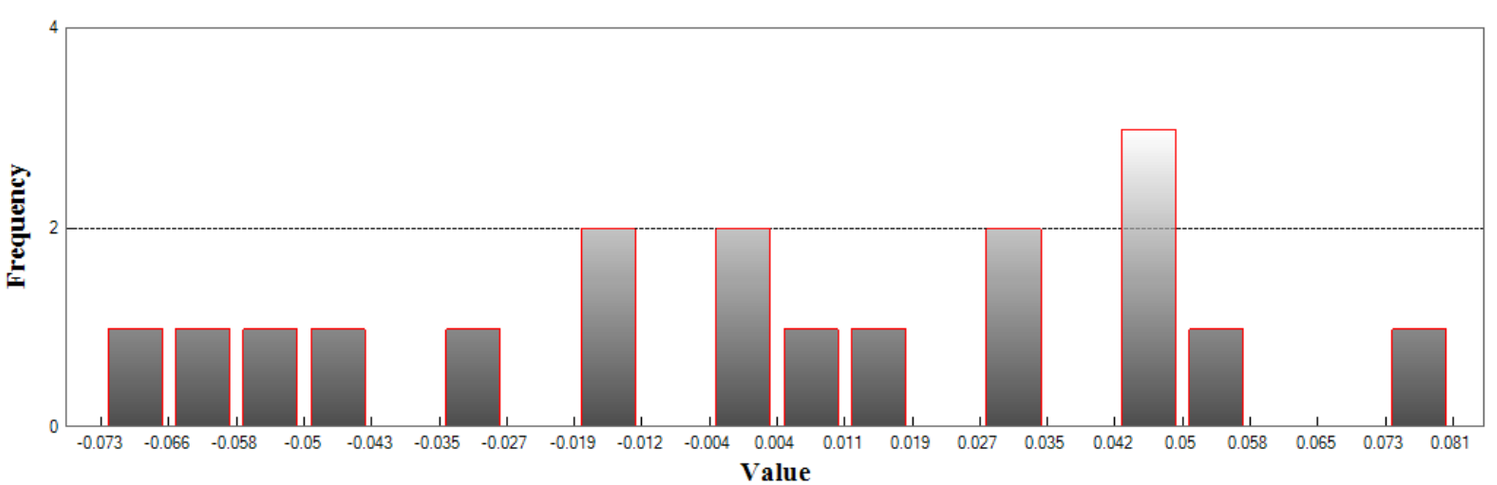
Standard Deviation DZ: 0.045

RMSE Z: 0.044

95th Percentile: 0.073

Units: Meters

Histogram



Min: -0.073

Max: 0.081

Number Of Bins: 20

Bin Interval: 0.008

LAS (Continued)

Vegetated Vertical Accuracy

LandCover Type: Medium Vegetation

Minimum DZ: -0.079

Maximum DZ: 0.1

Mean DZ: 0.034

Mean Magnitude DZ: 0.219

Number Observations: 32

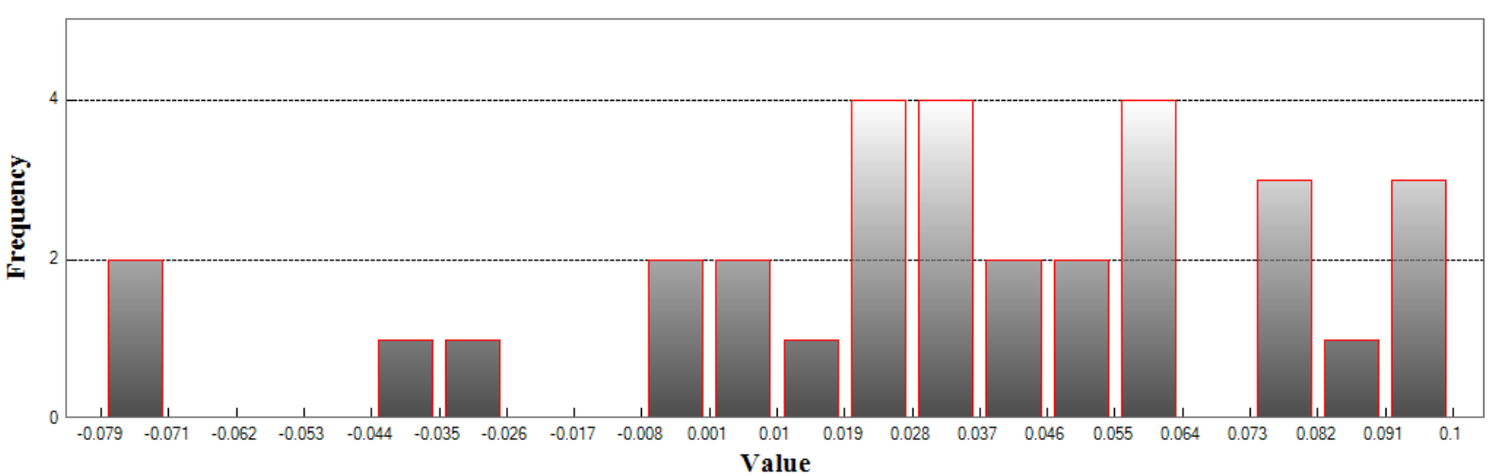
Standard Deviation DZ: 0.045

RMSE Z: 0.056

95th Percentile: 0.093

Units: Meters

Histogram



Min: -0.079

Max: 0.1

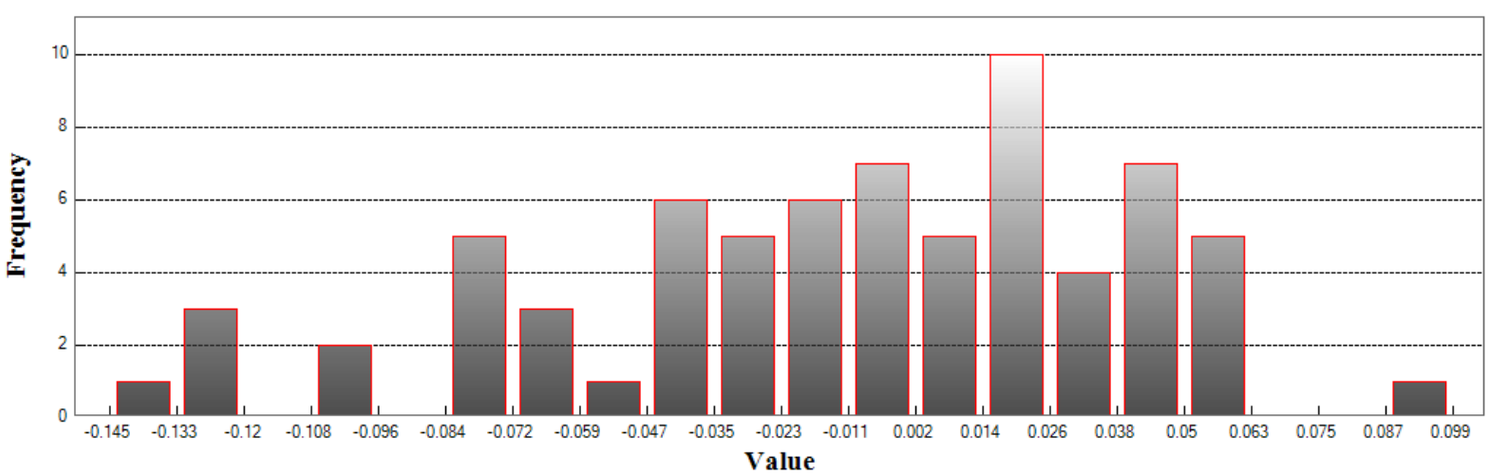
Number Of Bins: 20

Bin Interval: 0.009

DEM

Nonvegetated Vertical Accuracy
LandCover Type: Bare Ground, Hard Pavement, Pack Sand
Minimum DZ: -0.145
Maximum DZ: 0.099
Mean DZ: -0.012
Mean Magnitude DZ: 0.203
Number Observations: 71
Standard Deviation DZ: 0.052
RMSE Z: 0.053
95% Confidence Level Z: 0.104
Units: Meters

Histogram



Min: -0.145
Max: 0.099
Number Of Bins: 20
Bin Interval: 0.012

DEM (Continued)

Vegetated Vertical Accuracy

LandCover Type: High Vegetation

Minimum DZ: -0.13

Maximum DZ: 0.167

Mean DZ: 0.03

Mean Magnitude DZ: 0.257

Number Observations: 17

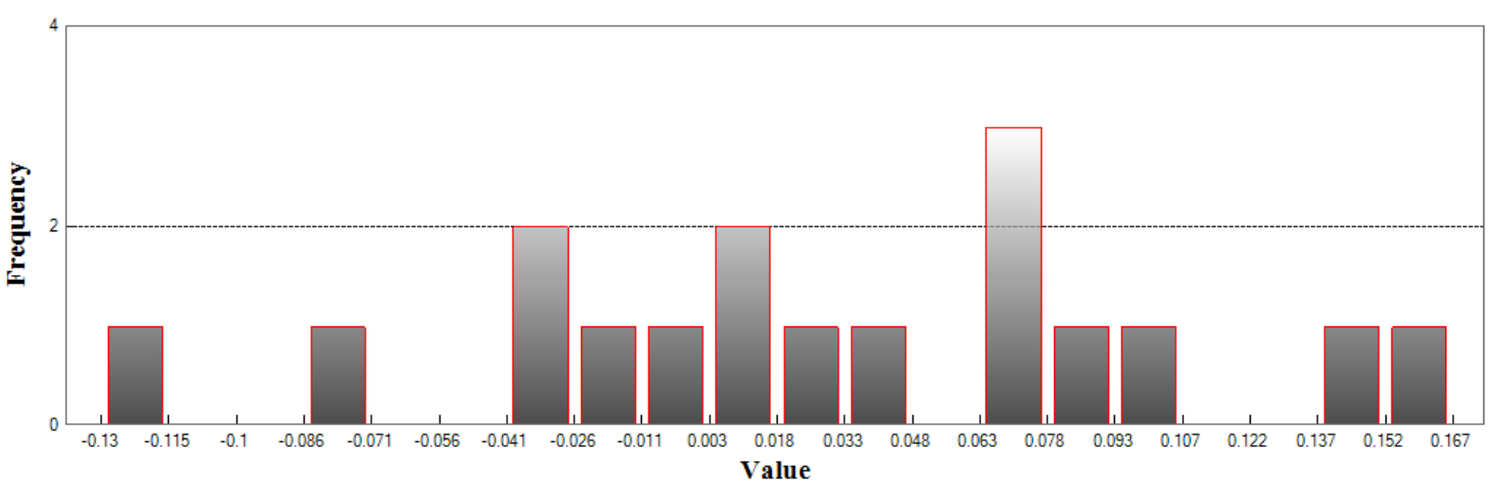
Standard Deviation DZ: 0.078

RMSE Z: 0.082

95th Percentile: 0.148

Units: Meters

Histogram



Min: -0.13

Max: 0.167

Number Of Bins: 20

Bin Interval: 0.015

DEM (Continued)

Vegetated Vertical Accuracy

LandCover Type: Low Vegetation

Minimum DZ: -0.083

Maximum DZ: 0.112

Mean DZ: 0.005

Mean Magnitude DZ: 0.201

Number Observations: 18

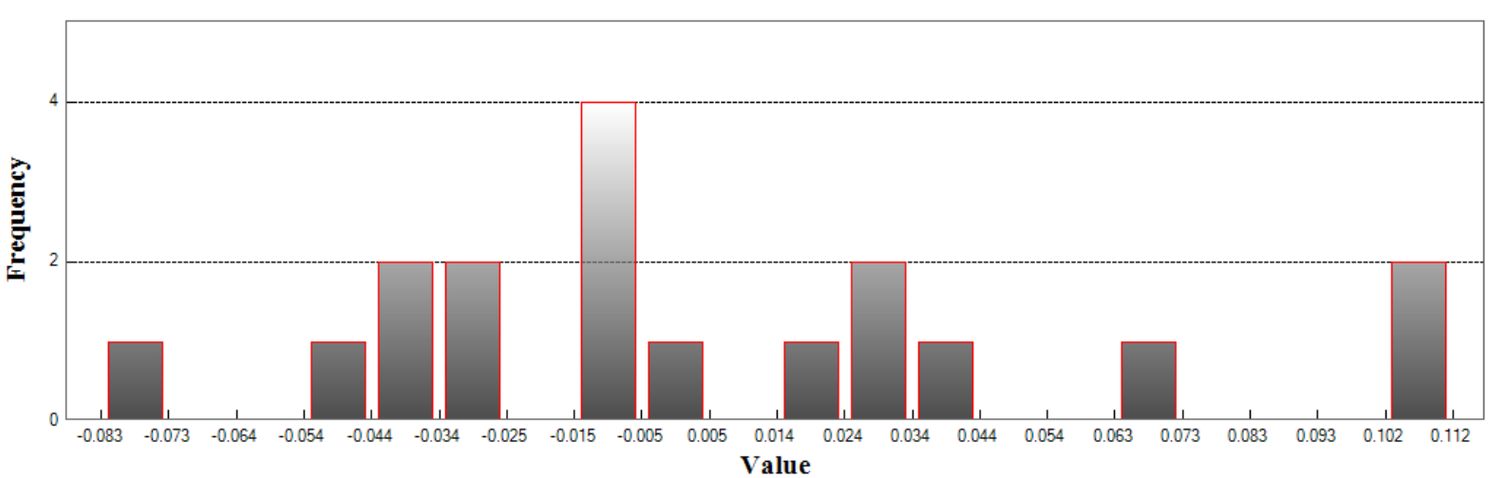
Standard Deviation DZ: 0.052

RMSE Z: 0.051

95th Percentile: 0.104

Units: Meters

Histogram



Min: -0.083

Max: 0.112

Number Of Bins: 20

Bin Interval: 0.01

DEM (Continued)

Vegetated Vertical Accuracy

LandCover Type: Medium Vegetation

Minimum DZ: -0.077

Maximum DZ: 0.141

Mean DZ: 0.029

Mean Magnitude DZ: 0.213

Number Observations: 32

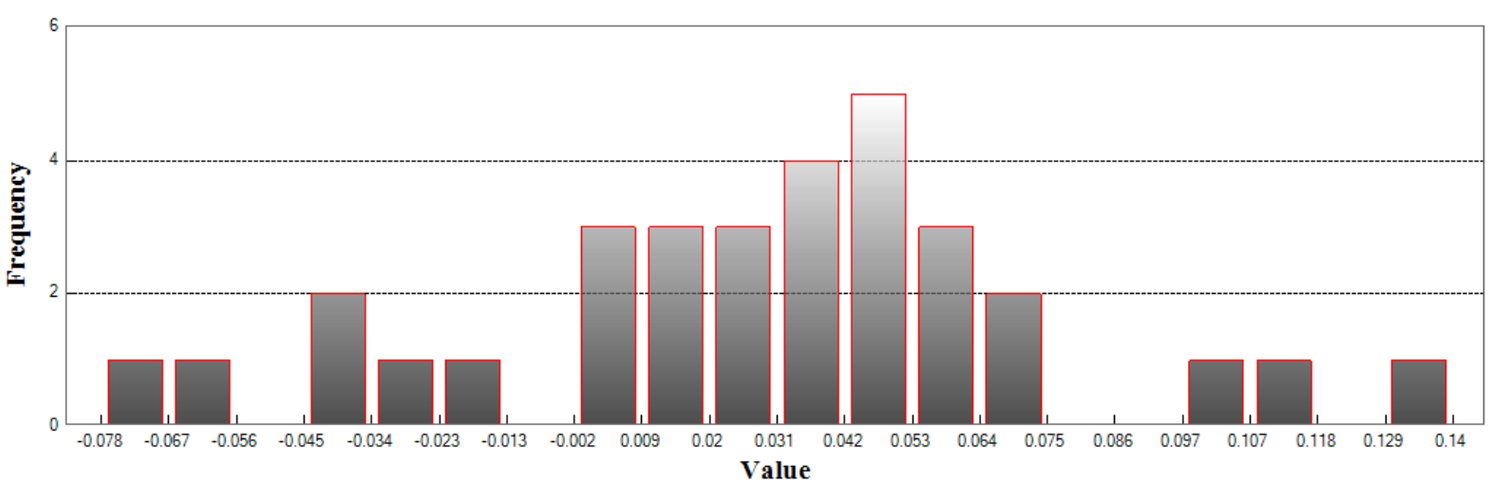
Standard Deviation DZ: 0.047

RMSE Z: 0.055

95th Percentile: 0.106

Units: Meters

Histogram



Min: -0.077

Max: 0.141

Number Of Bins: 20

Bin Interval: 0.011