Airborne Lidar Report

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WOOLPERT

NM North Central FEMA R6 Lidar 2016 D17

Contract Number: G16PC00022
Task Number: G17PD00011

Contractor: Woolpert, Inc.
Woolpert Project # 76922

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Section 1: Overview

TASK ORDER NAME: NM North Central FEMA R6 Lidar 2016 D17

Project: # 76922

This report contains a comprehensive outline of the NM North Central FEMA R6 Lidar 2016 D17 task order. Processing task order for the United States Geological Survey (USGS). This task is issued under USGS Contract No. G10PC00057, Task Order No. G15PD00915 This task order requires lidar data to be acquired over 2, 636 square miles of V.1.2 lidar, for the area of interest (AOI) collected at a nominal pulse spacing (NPS) of 0.7 meters. The NPS assessment is made against single swath, first return data located within the geometrically usable center portion (typically ~90%) of each swath.

The data was collected using three Leica ALS80 HP 1000 kHz Multiple Pulses in Air (MPiA) lidar systems on board Woolpert aircraft. The ALS80 sensor collects up to four returns per pulse, as well as intensity data, for the first three returns. If a fourth return was captured, the system does not record an associated intensity value. The aerial lidar was collected at the following sensor specifications:

Table 1.1: ALS80 Specifications	
Post Spacing	0.70 m
AGL (Above Ground Level) average flying height	1,981 m
Average Ground Speed:	150 knots
Field of View (full)	40 degrees
Pulse Rate	272 kHz
Scan Rate	42.9 Hz
Side Lap	25%

The horizontal datum used for the task order was referenced to NAD83 (2011), Zone 13, Meters. The vertical datum used for the task order was referenced to NAVD 1988, Meters, GEOID12B.

Figure 1.1: NM North Central FEMA R6 Lidar 2016 D17 QL2 Lidar Task Order AOI
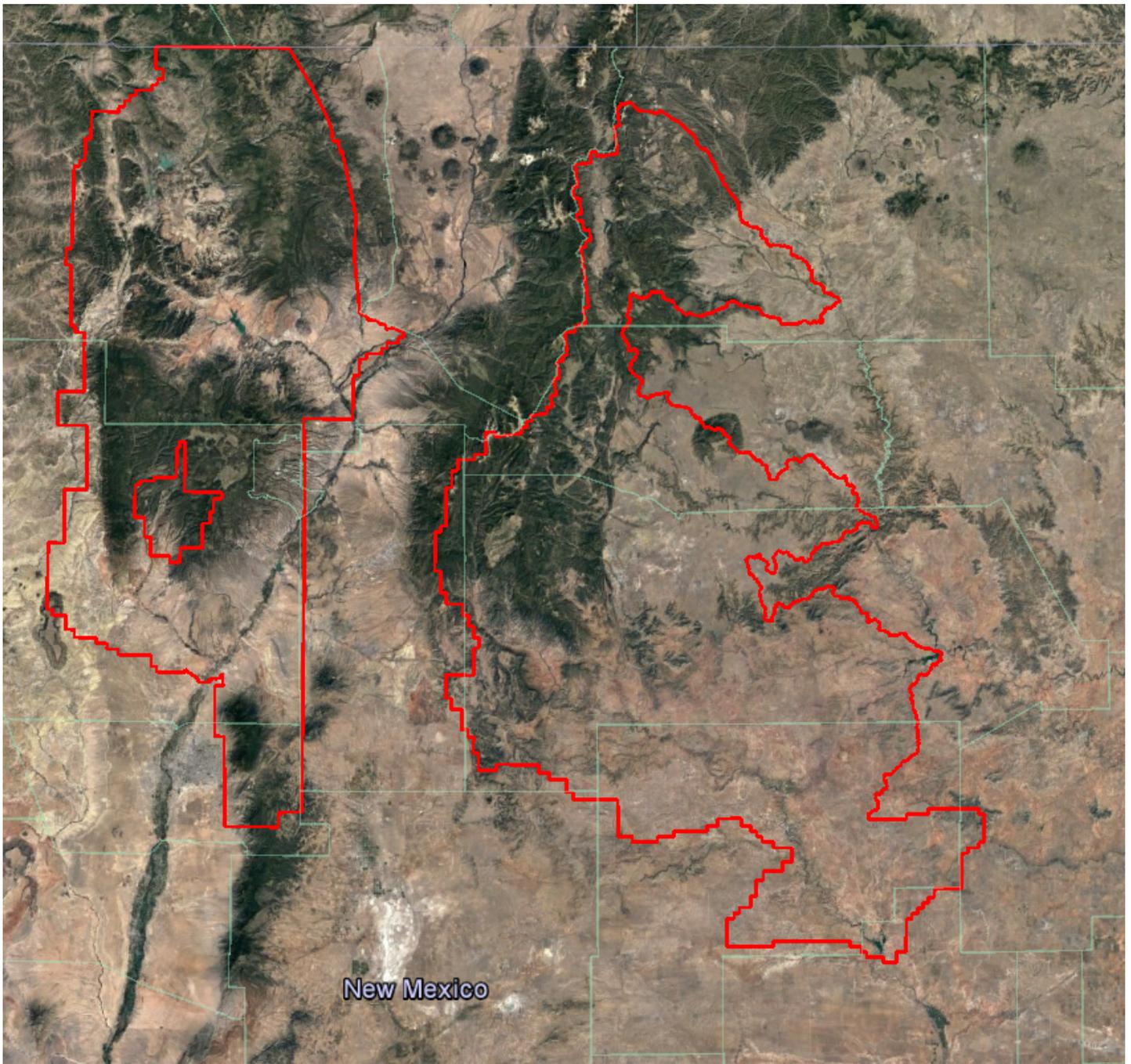
Section 2: Acquisition

The lidar data was acquired with three Leica ALS80HP 1000 kHz Multiple Pulses in Air (MPiA) Lidar Sensor Systems. The ALS80 HP lidar system, developed by Leica Geosystems of Heerbrugg, Switzerland, includes the simultaneous first, intermediate and last pulse data capture module, the extended altitude range module, and the target signal intensity capture module.

The ALS80HP 1000 kHz Multiple Pulses in Air (MPiA) Lidar System has the following specifications:

Table 2.1: ALS80 HP Lidar System Specifications	
Operating Altitude	100 – 7,620 meters
Scan Angle	0 to 72° (variable)
Swath Width	0 to 1.5 X altitude (variable)
Scan Frequency	0 – 200 Hz (variable based on scan angle)
Maximum Pulse Rate	1000 kHz (Effective)
Range Resolution	Better than 1 cm
Elevation Accuracy	6 - 19 cm single shot (one standard deviation)
Horizontal Accuracy	5 – 43 cm (one standard deviation)
Number of Returns per Pulse	Unlimited
Number of Intensities	3 (first, second, third)
Intensity Digitization	8 bit intensity + 8 bit AGC (Automatic Gain Control) level
MPiA (Multiple Pulses in Air)	8 bits @ 1nsec interval @ 50kHz
Laser Beam Divergence	0.22 mrad @ $1/e^2$ (~0.15 mrad @ 1/e)
Laser Classification	Class IV laser product (FDA CFR 21)
Eye Safe Range	400m single shot depending on laser repetition rate
Roll Stabilization	Automatic adaptive, range = 75 degrees minus current FOV
Power Requirements	28 VDC @ 25A
Operating Temperature	0-40°C
Humidity	0-95% non-condensing
Supported GNSS Receivers	Ashtech Z12, Trimble 7400, Novatel Millenium

Prior to mobilizing to the project site, flight crews coordinated with the necessary Air Traffic Control personnel to ensure airspace access.

Crews were onsite, operating a Global Navigation Satellite System (GNSS) Base Station for the airborne GPS support.

The Lidar data was collected in seventy-nine (79) missions, flown as close together as the weather permitted, to ensure consistent ground conditions across the project area. An initial quality control process was performed immediately on the Lidar data to review the data coverage, airborne GPS data, and trajectory solution. Collection of lidar data took place from October 2, 2016 through October 25, 2017.

Table 2.2: Airborne Lidar Acquisition Flight Summary

Date of Mission	Lines Flown	Mission Time (UTC)
October 2, 2016_SH8170	05042-05054	15:05 – 16:36
October 2, 2016_SH8191	06001, 06002	15:05 – 15:17
October 4, 2016_SH8191	05001-05041	15:53 – 19:31
October 4, 2016_SH8170	00001-00027	15:39 – 20:10
October 5, 2016_SH8170	00028-00039	17:28 – 21:13
October 5, 2016_SH8191	00049-00072	16:34 – 21:15
October 6, 2016_SH8170	02111-02128	17:10 – 20:34
October 6, 2016_SH8191	01001-01015, 00040-00048	15:54 – 19:59
October 7, 2016_SH8170_A	02095-02110	13:41 – 20:17
October 7, 2016_SH8191	02074-02078, 02201-02204, 03093-03107, 05046, 05047, 05053	16:32 – 21:22
October 11, 2016_SH8170	02066-02073, 02089-02093	15:44 – 19:54
October 11, 2016_SH8191	02171-02190	15:38 – 20:17
October 12, 2016_SH8170	02054-02065	14:17 – 17:50
October 13, 2016_SH8170	02016-02046	16:31 – 21:13
October 13, 2016_SH8191	02001-02004, 02191-02200	17:49 – 21:55
October 14, 2016_SH8170	02038-02042, 02047-02052	14:14 – 16:29
October 14, 2016_SH8191	02005-02015, 02079-02082	14:52 – 19:22
October 15, 2016_SH8191	02083-02088, 02094, 02102, 02103, 02107, 02108	16:27 – 20:06
October 28, 2016_SH8191	04088 - 04108	17:46 – 21:43
October 29, 2016_SH8191	04056-04062	16:09 – 17:05
November 2, 2016_SH8170	04001-04021	16:09 – 19:00
November 2, 2016_SH8191	04065-04067, 04086	15:55 – 17:35
November 3, 2016_SH8191	04070-04073	15:42 – 16:48
November 10, 2016_SH8191	04063, 04064, 04068, 04069, 04074-04087, 04109	18:11 – 22:36
November 11, 2016_SH8170	00220-00229	20:33 – 23:31
November 12, 2016_SH8170	00198-00218	16:09 – 20:54
November 13, 2016_SH8170_A	00182-00197, 00219	14:29 – 17:58
November 13, 2016_SH8170_B	00166-00181	19:55 – 22:55
November 14, 2016_SH8170_A	00148-00165	14:54 – 18:29

November 14, 2016_SH8170_B	**00136-00147**	**20:56 – 23:47**
November 15, 2016_SH8170	**00114-00135**	**16:04 – 18:36**
November 16, 2016_SH8170	**00086-00113**	**14:46 – 19:39**
November 18, 2016_SH8170_A	**00072-00085**	**15:11 – 18:57**
November 18, 2016_SH8170_B	**00056-00071**	**21:01 – 23:34**
November 18, 2016_SH8191	**04042-04055, 04110, 04111**	**21:20 – 0:04**
November 19, 2016_SH8170_A	**00246-00264, 00270-00274**	**15:36 – 19:18**
November 19, 2016_SH8170_B	**00230-00245**	**21:10 – 23:47**
November 19, 2016_SH8191	**03032-03040, 04006, 04022-04041**	**17:34 – 23:45**
November 20, 2016_SH8170	**01257-01288**	**15:24 – 20:11**
November 20, 2016_SH8191	**03009-03031, 03081-03092**	**15:26 – 22:30**
November 23, 2016_SH8170	**01213-01227, 01251-01256, 03178-03200**	**15:28 – 23:28**
November 23, 2016_SH8191_A	**03001-03008, 03056-03064**	**15:24 – 19:14**
November 23, 2016_SH8191_B	**03051-03055, 03201-03217**	**20:01 – 23:28**
November 24, 2016_SH8170	**01194-01250**	**15:16 – 19:58**
November 25, 2016_SH8170	**01186-01193, 07001-07028**	**15:41 – 23:29**
November 25, 2016_SH8191	**03041-03050, 03065-03080**	**15:49 – 23:00**
November 26, 2016_SH8170	**00001-00021, 00035-00055**	**16:23 – 21:14**
November 26, 2016_SH8191	**03108-03140**	**15:46-21:21**
November 30, 2016_SH8170	**07029-07048**	**16:21- 21:32**
November 30, 2016_SH8191	**07075-07094, 09001-09023**	**16:13 – 21:59**
December 1, 2016_SH8170_A	**07049-07067**	**16:13 – 19:57**
December 1, 2016_SH8170_B	**07068-07074**	**20:52 – 22:00**
December 1, 2016_SH8191	**03141-03177**	**16:13 – 22:08**
December 4, 2016_SH8191_A	**02129-02170**	**17:22 – 23:32**
December 4, 2016_SH8191_B	**02053**	**1:21 – 1:37**
May 24, 2017_SH8191	**02136-02142**	**19:52 – 20:34**
May 25, 2017_SH8191	**02066, 02088-02102, 02110**	**16:30 – 18:29**
May 26, 2017_SH8191	**01126-01139**	**17:05 – 20:59**
May 27, 2017_SH8191	**01114-01125**	**16:02 – 20:04**
May 28, 2017_SH8191	**01113**	**18:46 – 19:08**
June 5, 2017_SH8191	**02067-02087**	**16:02 – 18:43**
June 6, 2017_SH8191	**02103-02108**	**16:35 – 17:42**
June 7, 2017_SH8191	**01140-01142, 01182-01185, 02109, 02111, 02113, 02132-02135**	**16:38 – 19:57**
June 8, 2017_SH8191	**02123-02130**	**15:24 – 16:30**

June 13, 2017_SH8191	**01143-01146, 02112, 02114-02122, 02131, 11126**	**14:17 – 17:38**
June 14, 2017_SH8191	**01110-01112, 01147-01161**	**14:04 – 19:28**
June 15, 2017_SH8191	**01162-01181**	**14:22 – 20:00**
June 16, 2017_SH8191	**01052-01073**	**15:46 – 20:53**
June 17, 2017_SH8191	**01020-01051, 01109**	**15:38 – 21:08**
June 18, 2017_SH8191	**00022-00034, 01100-01108**	**15:56 – 20:31**
June 19, 2017_SH8191	**01080-01099**	**14:27 – 20:35**
June 20, 2017_SH8191	**01001-01019, 01074-01079**	**14:49 – 18:32**
June 21, 2017_SH8191	**02041-02065**	**15:00 – 19:15**
July 17, 2017_SH8191	**02001-02019**	**14:58 – 16:43**
July 18, 2017_SH8191	**02020-02028**	**14:33 – 16:17**
July 19, 2017_SH8191	**02029-02035, 12028**	**14:17 – 16:30**
July 20, 2017_SH8191	**02036-02040, 12035**	**14:25 – 15:50**
July 22, 2017_SH8191	**12024, 12036, 22028**	**14:16 – 14:39**
October 25, 2017_SH8194	**21111**	**17:38 – 17:41**

Section 3: LiDAR Data Processing

Applications and Work Flow Overview

1. Resolved kinematic corrections for three subsystems: inertial measurement unit (IMU), sensor orientation information and airborne GPS data. Developed a blending post-processed aircraft position with attitude data using Kalman filtering technology or the smoothed best estimate trajectory (SBET).
Software: POSPac Software v. 5.3, IPAS Pro v.1.35., Novatel Inertial Explorer v8.60.6129
2. Calculated laser point position by associating the SBET position to each laser point return time, scan angle, intensity, etc. Created raw laser point cloud data for the entire survey in LAS format. Automated line-to-line calibrations were then performed for system attitude parameters (pitch, roll, heading), mirror flex (scale) and GPS/IMU drift.
Software: ALS Post Processing Software v.2.75 build #25, Proprietary Software, TerraMatch v. 17.01., Add Leica Cloud Pro v1.2.3
3. Imported processed LAS point cloud data into the task order tiles. Resulting data were classified as ground and non-ground points with additional filters created to meet the task order classification specifications. Statistical absolute accuracy was assessed via direct comparisons of ground classified points to ground RTK survey data. Based on the statistical analysis, the lidar data was then adjusted to reduce the vertical bias when compared to the survey ground control.
Software: TerraScan v.17.01.
4. The LAS files were evaluated through a series of manual QA/QC steps to eliminate remaining artifacts from the ground class.
Software: TerraScan v.17.01.

Global Navigation Satellite System (GNSS)–Inertial Measurement Unit (IMU) Trajectory Processing

Equipment

The pilots are skilled at maintaining their planned trajectory, while holding the aircraft steady and level. If atmospheric conditions are such that the trajectory, ground speed, roll, pitch and/or heading cannot be properly maintained, the mission is aborted until suitable conditions occur.

Base stations were set by acquisition staff and were used to support the Lidar data acquisition. The GNSS base station operated during the Lidar acquisition missions is listed below:

Table 3.1: GNSS Base Station			
Station (Name)	Latitude (DMS)	Longitude (DMS)	Ellipsoid Height (L1 Phase center) (Meters)
KSKX Airport	36°27'32.83631"	105°40'22.50155"	2135.417
Taos Base	36°27'05.05270"	105°36'07.05326"	2158.736
P036 CORS	36°25'12.96967"	105°17'37.10984"	2530.954
P070 CORS	36°02'41.18981"	104°41'52.75837"	1884.598
NMSF CORS	35°40'25.62401"	105°57'30.93090"	2097.305
NGS PID EP0642	34°56'22.87091"	104°38'32.96894"	1434.147
P120 CORS	35°00'26.82345"	105°37'33.83181"	2090.640
NGS PID FN0737	35°39'03.05221"	105°08'48.49428"	2073.470

NGS PID FN0737	35°39'03.05221"	105°08'48.49428"	2073.470
NGS PID AC7060	36°44'45.72706"	104°30'09.96723"	1919.691

Data Processing

All airborne GNSS and IMU data was post-processed and quality controlled using Applanix MMS software. GNSS data was processed at a 1 and 2 Hz data capture rate and the IMU data was processed at 200 Hz.

Trajectory Quality

The GNSS Trajectory, along with high quality IMU data are key factors in determining the overall positional accuracy of the final sensor data. Within the trajectory processing, there are many factors that affect the overall quality, but the most indicative are the combined separation, the estimated positional accuracy, and the Positional Dilution of Precision (PDOP).

Figure 3.1: Trajectory, Day27616_SH8191
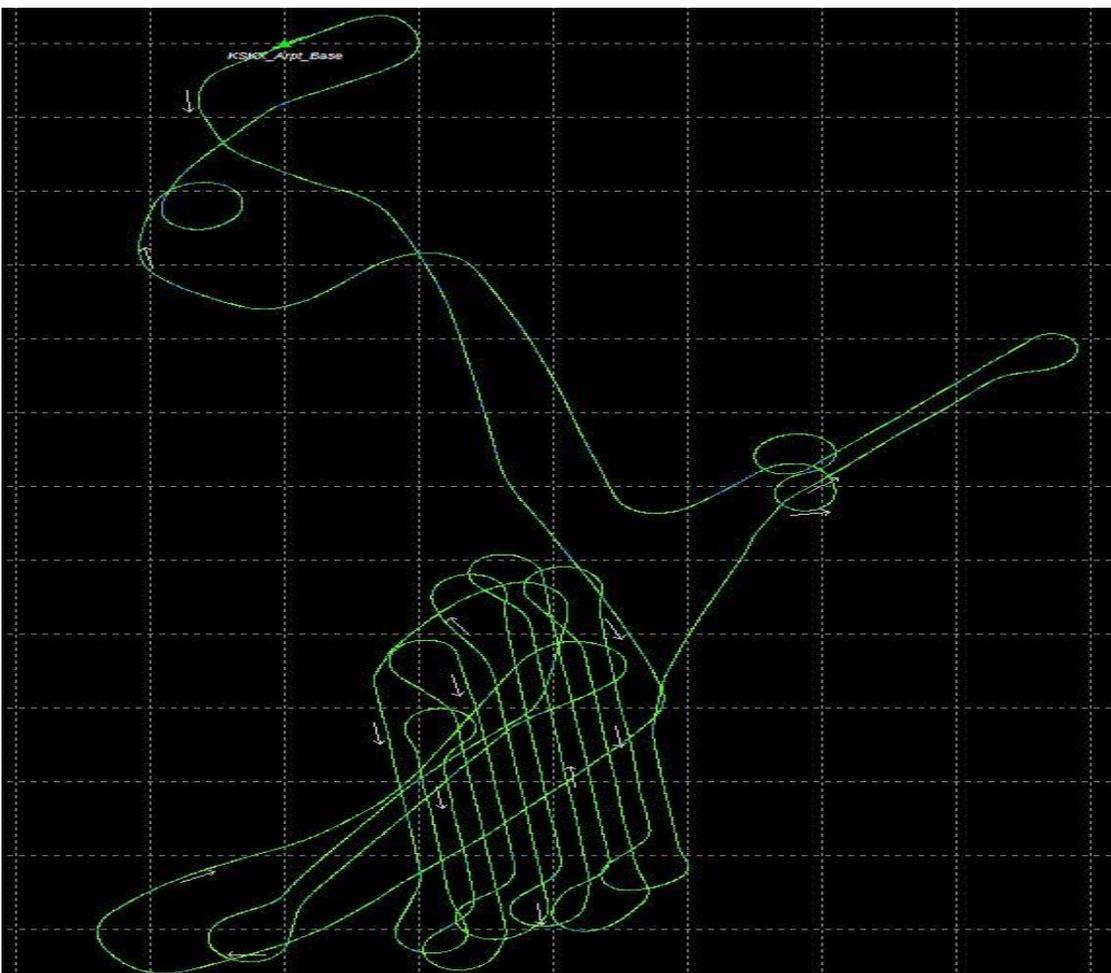
Combination Separation

The Combined Separation is a measure of the difference between the forward run and the backward run solution of the trajectory. The Kalman filter is processed in both directions to remove the combined directional anomalies. In general, when these two solutions match closely, an optimally accurate reliable solution is achieved.

Woolpert's goal is to maintain a Combined Separation Difference of less than ten (10) centimeters. In most cases we achieve results below this threshold.

Figure 3.2: Combined Separation, Day27616_SH8191
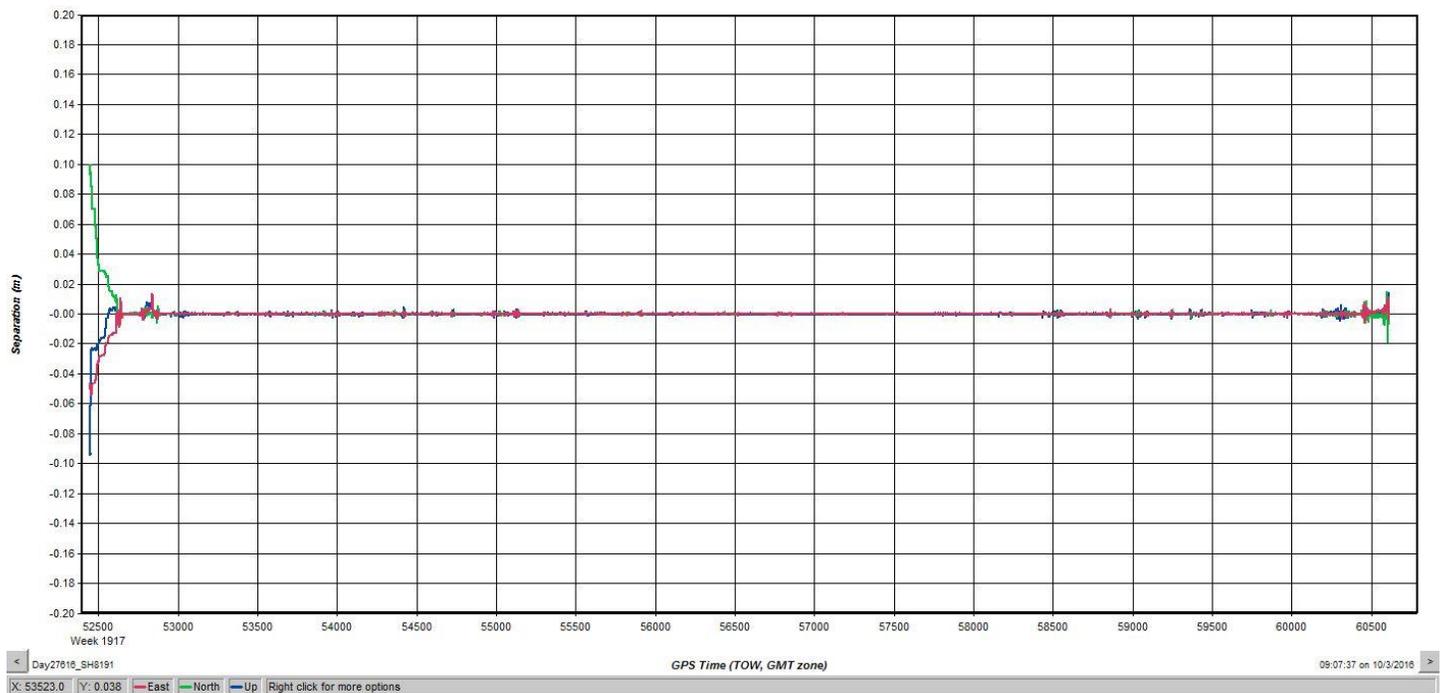
Estimated Positional Accuracy

The Estimated Positional Accuracy plots the standard deviations of the east, north, and vertical directions along a time scale of the trajectory. It illustrates loss of satellite lock issues, as well as issues arising from long baselines, noise, and/or other atmospheric interference.

Woolpert's goal is to maintain an Estimated Positional Accuracy of less than ten (10) centimeters, often achieving results well below this threshold.

Figure 3.3: Estimated Positional Accuracy, Day27616_SH8191
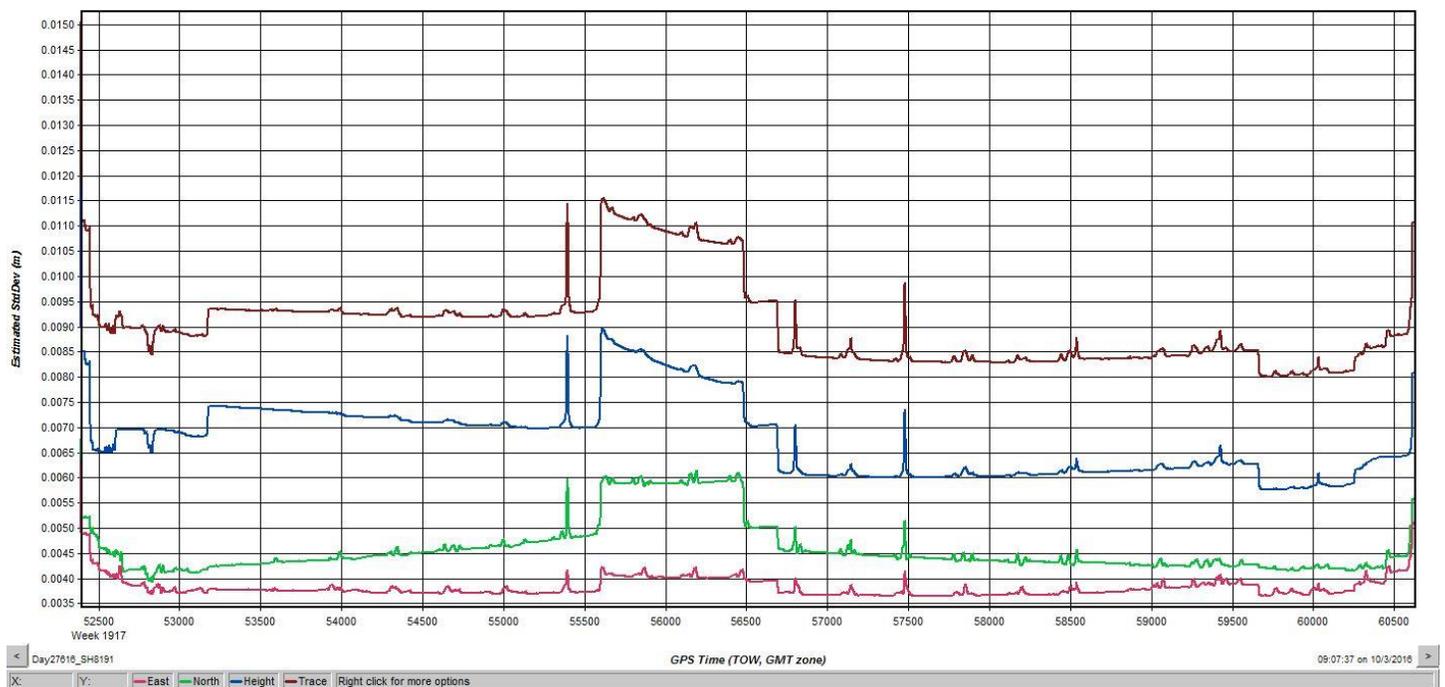
PDOP

The PDOP measures the precision of the GPS solution in regards to the geometry of the satellites acquired and used for the solution.

Woolpert's goal is to maintain an average PDOP value below 3.0. Brief periods of PDOP over 3.0 are acceptable due to the calibration and control process if other metrics are within specification.

Figure 3.4: PDOP, Day27616_SH8191

LiDAR Data Processing

When the sensor calibration, data acquisition, and GPS processing phases were complete, the formal data reduction processes by Woolpert lidar specialists included:

- Processed individual flight lines to derive a raw "Point Cloud" LAS file. Matched overlapping flight lines, generated statistics for evaluation comparisons, and made the necessary adjustments to remove any residual systematic error.
- Calibrated LAS files were imported into the task order tiles and initially filtered to create a ground and non-ground class. Then additional classes were filtered as necessary to meet client specified classes.
- Once all project data was imported and classified, survey ground control data was imported and calculated for an accuracy assessment. As a QC measure, Woolpert has developed a routine to generate accuracy statistical reports by comparisons against the TIN and the DEM using surveyed ground control of higher accuracy. The lidar is adjusted accordingly to meet or exceed the vertical accuracy requirements.
- The lidar tiles were reviewed using a series of proprietary QA/QC procedures to ensure it fulfills the task order requirements. A portion of this requires a manual step to ensure anomalies have been removed from the ground class.
- The lidar LAS files are classified into the Processed but Unclassified (Class 1), Ground (Class 2), Low Noise (Class 7), Water (Class 9), Ignored ground (Class10), Bridge Decks (Class 17), High Noise (Class 18) classifications.
- FGDC Compliant metadata was developed for the task order in .xml format per product.
- The horizontal datum used for the task order was referenced to NAD83 (2011), Zone 13, Meters. The vertical datum used for the task order was referenced to NAVD 1988, Meters, GEOID12B
- The NM_North Central FEMA R6 Lidar _2016_D17 task order shares an acquisition border with the Southern San Luis Basin (Upper Rio Grande) NM-CO QL2 Lidar (FY15) task order. A small amount of Southern San Luis Basin data was used to fill out coverage in the NM_North Central project. Tiles 13SDA635095,13SDA635080, 13SDA650080, 13SDA635065, 13SDA035275, 13SDA020260 and 13SDA035260 contain data from San Luis Basin.

Section 4: Hydrologic Flattening

HYDROLOGIC FLATTENING OF LIDAR DEM DATA

NM North Central FEMA R6 Lidar 2016 D17 QL2 Lidar processing task order required the compilation of breaklines defining water bodies and rivers. The breaklines were used to perform the hydrologic flattening of water bodies, and gradient hydrologic flattening of double line streams and rivers. Lakes, reservoirs and ponds, at a minimum size of 2-acre or greater, were compiled as closed polygons. The closed water bodies were collected at a constant elevation. Rivers and streams, at a nominal minimum width of 30 meters (100 feet), were compiled in the direction of flow with both sides of the stream maintaining an equal gradient elevation.

LIDAR DATA REVIEW AND PROCESSING

Woolpert utilized the following steps to hydrologically flatten the water bodies and for gradient hydrologic flattening of the double line streams within the existing lidar data.

1. Woolpert used the newly acquired lidar data to manually draw the hydrologic features in a 2D environment using the lidar intensity and bare earth surface. Open Source imagery was used as reference when necessary.
2. Woolpert utilizes an integrated software approach to combine the lidar data and 2D breaklines. This process "drapes" the 2D breaklines onto the 3D lidar surface model to assign an elevation. A monotonic process is performed to ensure the streams are consistently flowing in a gradient manner. A secondary step within the program verifies an equally matching elevation of both stream edges. The breaklines that characterize the closed water bodies are draped onto the 3D lidar surface and assigned a constant elevation at or just below ground elevation.
3. The lakes, reservoirs and ponds, at a minimum size of 2-acre or greater and streams at a minimum size of 30 meters (100 feet) nominal width, were compiled to meet task order requirements. **Figure 4.1** illustrates an example of 30 meters (100 feet) nominal streams identified and defined with hydrologic breaklines. The breaklines defining rivers and streams, at a nominal minimum width of 30 meters (100 feet), were draped with both sides of the stream maintaining an equal gradient elevation.
4. All ground points were reclassified from inside the hydrologic feature polygons to water, class nine (9).
5. All ground points were reclassified from within a buffer along the hydrologic feature breaklines to buffered ground, class ten (10).
6. The lidar ground points and hydrologic feature breaklines were used to generate a new digital elevation model (DEM).

Figure 4.1: Example Hydrologic Breaklines
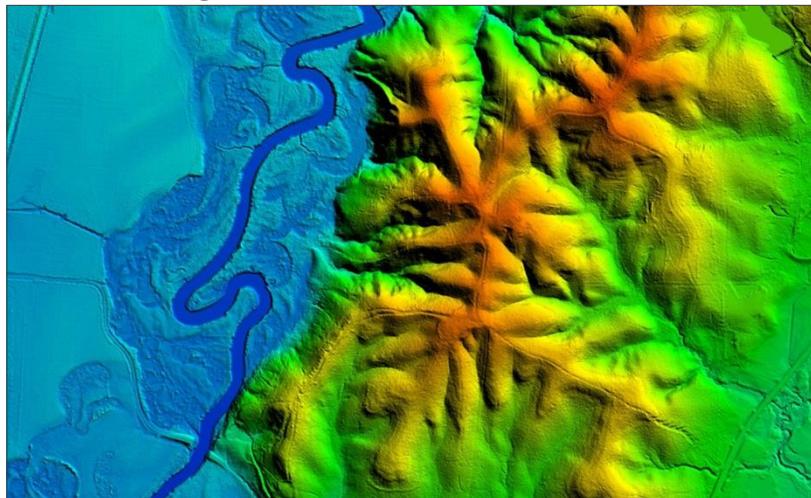
Figure 4.2 reflects a DEM generated from original lidar bare earth point data prior to the hydrologic flattening process. Note the "tinning" across the lake surface.

Figure 4.3 reflects a DEM generated from lidar with breaklines compiled to define the hydrologic features. This figure illustrates the results of adding the breaklines to hydrologically flatten the DEM data. Note the smooth appearance of the lake surface in the DEM.

Figure 4.2

Figure 4.3

Terrascan was used to add the hydrologic breakline vertices and export the lattice models. The hydrologically flattened DEM data was provided to USGS in ERDAS .IMG format.

The hydrologic breaklines compiled as part of the flattening process were provided to the USGS in ESRI shapefile format. The breaklines defining the water bodies greater than 2-acre and for the gradient flattening of all rivers and streams at a nominal minimum width of 30 meters (100 feet) were provided in geodatabase as a Polygon-Z and Polyline-Z shape file, respectively.

DATA QA/QC

Initial QA/QC for this task order was performed in Global Mapper v18, by reviewing the grids and hydrologic breakline features. Additionally, ESRI software and proprietary methods were used to review the overall connectivity of the hydrologic breaklines.

Edits and corrections were addressed individually by tile. If a water body breakline needed to be adjusted to improve the flattening of the DEM data, the area was cross referenced by tile number, corrected accordingly, a new DEM file was regenerated and reviewed.

Section 5: ACCURACY ASSESSMENT

Accuracy Assessment

The vertical accuracy statistics were calculated by comparison of all lidar points to the ground surveyed QC points.

Table 5.1: Overall Vertical Accuracy Statistics		
Average error	0.004	Meter
Minimum error	-0.124	Meter
Maximum error	+0.143	Meter
Average magnitude	0.031	Meter
Root mean square	0.040	Meter
Standard deviation	0.040	Meter

Table 5.2: RAW Swath Quality Check Point Analysis NVA					
Point ID	Easting (Meter)	Northing (Meter)	Elevation (Meter)	TIN Elevation (Meter)	Dz (Meter)
2001	358999.600	4084107.230	2385.580	2385.590	0.010
2001A	358990.590	4084079.810	2385.420	2385.430	0.010
2002	363283.950	4093913.540	2557.820	2557.770	-0.050
2003	375535.180	3888347.610	2082.700	2082.700	0.000
2004	361735.500	4088872.720	2479.300	2479.330	0.030
2004A	361729.440	4088858.950	2478.790	2478.850	0.060
2005	366039.990	4067527.250	2318.230	2318.270	0.040
2005A	366076.870	4067526.410	2318.950	2318.960	0.010
2006	374582.950	4075700.800	3236.680	3236.710	0.030
2007	396801.690	4063586.090	2659.800	2659.840	0.040
2008	391824.290	4069292.220	2975.570	2975.590	0.020
2009	393307.020	4050053.400	2519.320	2519.370	0.050
2009A	393297.620	4050072.030	2520.710	2520.720	0.010
2010	397152.600	4058595.820	2855.070	2855.140	0.070
2011	403513.010	4043677.600	2586.330	2586.310	-0.020
2012	400270.850	4040833.390	2292.580	2292.550	-0.030
2012A	400251.960	4040825.130	2291.160	2291.180	0.020
2013	405453.330	4013091.470	1866.710	1866.760	0.050
2014	402860.330	4023271.950	2044.210	2044.260	0.050
2014_A	402896.500	4023300.460	2043.060	2043.060	0.000
2015	390631.260	4049194.190	2678.850	2678.860	0.010
2016	386523.790	4039721.360	2606.870	2606.820	-0.050
2016_A	386507.650	4039676.310	2605.360	2605.340	-0.020
2017	381582.340	4024880.000	2454.540	2454.490	-0.050
2017_A	381560.180	4024903.880	2453.520	2453.450	-0.070
2018	396113.110	4020584.450	2025.450	2025.470	0.020

2019	384293.330	4011474.490	1916.510	1916.490	-0.020
2019_A	384319.110	4011462.370	1913.850	1913.800	-0.050
2020	367901.970	4010503.970	1983.670	1983.690	0.020
2021	398911.740	3993445.890	1736.490	1736.510	0.020
2022	358043.270	3910108.720	1552.260	1552.280	0.020
2022_A	358070.110	3910131.970	1552.210	1552.260	0.050
2023	378713.190	3987205.760	2908.020	2908.010	-0.010
2023_A	378678.820	3987194.720	2909.080	2909.090	0.010
2023_B	378644.300	3987252.200	2909.970	2909.950	-0.020
2024	365682.230	3905366.710	1854.970	1854.980	0.010
2024_A	365681.280	3905400.140	1852.640	1852.650	0.010
2025	388346.890	4085414.040	3070.450	3070.420	-0.030
2026	382840.380	4065960.040	2958.650	2958.660	0.010
2026A	382854.740	4065930.780	2958.830	2958.860	0.030
2027	383652.630	3972980.820	2231.820	2231.870	0.050
2027_A	383635.680	3972999.740	2231.880	2231.950	0.070
2028	377065.900	3966420.420	2323.870	2323.860	-0.010
2028_A	377108.010	3966409.290	2321.250	2321.250	0.000
2029	346699.010	3914702.090	1796.680	1796.650	-0.030
2030	401818.970	4037079.740	2224.930	2224.930	0.000
2030A	401830.040	4037060.610	2224.110	2224.160	0.050
2031	370251.480	3908480.160	1791.740	1791.770	0.030
2032	384703.850	3927447.350	1673.530	1673.500	-0.030
2033	387184.400	3914196.020	1927.180	1927.140	-0.040
2033_A	387215.610	3914204.220	1927.010	1926.990	-0.020
2034	373740.680	3909653.080	1878.780	1878.750	-0.030
2034_A	373715.020	3909673.990	1877.160	1877.120	-0.040
2035	362561.450	3894687.010	1804.060	1804.090	0.030
2036	371731.730	3905649.320	1940.980	1940.990	0.010
2036_A	371726.150	3905608.930	1942.560	1942.540	-0.020
2037	377844.520	3893366.250	2075.540	2075.530	-0.010
2038	369312.340	3897277.200	3032.240	3032.180	-0.060
2038_A	369313.360	3897345.300	3022.480	3022.430	-0.050
2039	371248.360	3882273.730	1874.410	1874.470	0.060
2039A	371229.080	3882289.710	1875.610	1875.620	0.010
2040	381968.890	3885198.920	2126.840	2126.840	0.000
2041	364712.510	3890999.030	1879.050	1879.080	0.030
2042	384739.540	3872837.890	2216.580	2216.630	0.050
2043	385115.500	3891109.940	2117.540	2117.500	-0.040
2044	382712.970	3889743.720	2070.790	2070.770	-0.020
2045	365103.220	4026592.820	2041.140	2041.150	0.010
2045_A	365067.340	4026575.450	2041.740	2041.760	0.020
2046	367878.070	4033674.740	2230.720	2230.760	0.040
2047	365806.710	3880996.090	1760.350	1760.400	0.050
2048	331519.990	4021743.970	2137.220	2137.250	0.030

2048_A	353092.800	4022616.120	1937.430	1937.450	0.020
2049	345165.760	4051453.440	2112.600	2112.650	0.050
2050	348974.780	4059688.390	2242.820	2242.870	0.050
2051	358355.450	4037546.310	2172.690	2172.620	-0.070
2052	349198.210	4025682.570	1954.680	1954.640	-0.040
2053	336851.020	4043023.370	2102.550	2102.590	0.040
2053A	336862.550	4043040.170	2102.240	2102.280	0.040
2054	338508.030	4035286.330	2221.910	2221.910	0.000
2054A	338505.540	4035257.350	2222.370	2222.350	-0.020
2055	329396.310	4016893.670	2215.190	2215.210	0.020
2056	367008.020	4019730.350	1925.590	1925.630	0.040
2057	354769.470	4003525.710	2047.020	2047.060	0.040
2057_A	354847.810	4003508.580	2044.790	2044.870	0.080
2058	374223.570	3958975.480	2384.410	2384.400	-0.010
2058_A	374258.810	3958999.150	2382.900	2382.890	-0.010
2059	383786.320	3978778.020	2308.900	2308.890	-0.010
2059_A	383753.570	3978760.950	2311.760	2311.780	0.020
2060	321578.380	3932481.160	1800.970	1800.960	-0.010
2061	339999.190	3937583.970	1669.080	1669.100	0.020
2062	314406.180	3950703.810	1904.760	1904.800	0.040
2062A	314430.180	3950738.850	1905.300	1905.320	0.020
2063	344815.630	3973305.200	2345.320	2345.320	0.000
2063_A	344847.130	3973292.320	2346.690	2346.610	-0.080
2064	337748.810	3961461.630	2100.090	2100.130	0.040
2065	333265.890	3984895.230	2624.760	2624.770	0.010
2066	316445.500	3993827.570	2208.060	2208.100	0.040
2066A	316456.730	3993827.290	2208.150	2208.220	0.070
2067	322632.870	3990448.530	2148.310	2148.340	0.030
2067A	322631.160	3990461.120	2148.310	2148.340	0.030
2068	327326.800	3990729.020	2272.610	2272.650	0.040
2068A	327345.490	3990745.830	2275.330	2275.360	0.030
2069	330032.300	3978544.340	2386.560	2386.570	0.010
2069A	330060.780	3978561.820	2387.250	2387.240	-0.010
2070	340075.680	3979006.310	2445.070	2445.110	0.040
2071	368434.860	3948601.270	2014.310	2014.320	0.010
2071_A	368487.120	3948605.900	2014.250	2014.260	0.010
2072	342665.780	3949238.360	1729.320	1729.270	-0.050
2073	394162.700	4002194.780	1772.490	1772.500	0.010
2073_A	394136.280	4002208.650	1773.030	1773.050	0.020
2074	341164.650	3969567.360	2282.260	2282.290	0.030
2075	338951.480	3990624.870	2808.670	2808.630	-0.040
2075A	338928.150	3990620.230	2810.190	2810.160	-0.030
2076	352002.360	4082014.080	2375.500	2375.460	-0.040
2076A	352050.350	4082045.870	2376.150	2376.170	0.020
2077	378383.130	4061510.750	3198.930	3198.980	0.050

2077A	378356.710	4061526.870	3198.830	3198.890	0.060
2078	353540.390	3948370.990	2246.810	2246.800	-0.010
2078_A	353569.290	3948351.820	2246.680	2246.620	-0.060
2079	353776.720	3983781.960	2709.690	2709.660	-0.030
2080	358443.350	3992940.820	2961.990	2961.940	-0.050
2081	364759.620	3965863.310	2637.020	2637.000	-0.020
2082	341560.370	4010767.410	2587.540	2587.520	-0.020
2083	368100.210	3981652.120	2720.970	2720.970	0.000
2083_A	368070.360	3981677.610	2721.630	2721.630	0.000
2084	379287.100	3924718.890	1703.730	1703.730	0.000
2085	328489.650	3928278.770	1772.190	1772.210	0.020
2085_A	328531.600	3928222.730	1773.910	1773.920	0.010
2086	343900.220	4002028.500	2467.250	2467.280	0.030
2086_A	343956.330	4002056.900	2465.000	2464.990	-0.010
2087	353462.360	3913593.180	1679.440	1679.460	0.020
2088	353197.150	4091914.420	2511.690	2511.660	-0.030
2088A	353186.380	4091947.280	2511.530	2511.480	-0.050
2089	377777.440	4089762.160	3103.500	3103.600	0.100
2089A	377786.730	4089781.480	3103.360	3103.430	0.070
2090	390342.520	4075714.710	2799.550	2799.580	0.030
2091	362998.550	4058886.880	2347.270	2347.280	0.010
2092	366987.820	4044453.260	2323.460	2323.400	-0.060
2093	387382.870	4029429.830	2320.870	2320.850	-0.020
2093_A	387391.290	4029393.090	2320.140	2320.160	0.020
2094	375648.580	3997846.740	2395.920	2395.920	0.000
2095	367993.150	3988348.130	3044.360	3044.350	-0.010
2096	382374.700	3879944.750	2166.910	2166.920	0.010
2097	379406.630	3871436.630	2289.650	2289.710	0.060
2098	376343.660	3877546.810	2131.540	2131.560	0.020
2099	364997.350	3885078.840	1875.160	1875.190	0.030
2100	383637.980	3904009.360	1911.620	1911.580	-0.040
2100A	383652.300	3903965.300	1913.170	1913.160	-0.010
2101	364554.100	3976299.980	2683.150	2683.170	0.020
2101_A	364581.300	3976274.920	2681.660	2681.670	0.010
2102	348645.580	3993507.870	2592.040	2591.970	-0.070
2103	374447.410	4041149.990	2507.290	2507.220	-0.070
2103_A	374481.530	4041156.100	2508.760	2508.660	-0.100
2104	376635.420	4052018.180	2826.460	2826.390	-0.070
2104_A	376370.260	4052185.340	2808.040	2807.920	-0.120
2105	350160.100	4048164.410	2101.790	2101.810	0.020
2107	357836.720	4019721.700	1908.790	1908.770	-0.020
2108	320140.250	4032996.190	2302.820	2302.900	0.080
2109	380777.080	4081451.580	3139.080	3139.100	0.020
2110	394247.880	4013326.680	1905.900	1905.860	-0.040
2111	386829.760	3961075.180	1910.010	1910.050	0.040

2111_A	386862.110	3961083.540	1910.190	1910.210	0.020
2112	375766.910	3948843.530	1771.310	1771.310	0.000
2112_A	375796.600	3948827.430	1770.900	1770.890	-0.010
2113	384077.620	3919565.860	1830.240	1830.280	0.040
2113_A	384050.290	3919587.590	1830.530	1830.580	0.050
2114	372521.380	3898257.720	2553.800	2553.770	-0.030
2115	363853.730	3908424.970	1676.300	1676.320	0.020
2115_A	363822.810	3908444.570	1673.750	1673.790	0.040
2116	387009.180	3900375.960	2007.720	2007.640	-0.080
2201	534749.651	3834096.788	1479.680	1479.650	-0.030
2202	562668.149	3833200.676	1353.124	1353.130	0.006
2203	556940.461	3840408.602	1316.753	1316.730	-0.023
2204	552056.248	3841842.094	1386.133	1386.090	-0.043
2204_A	552045.870	3841801.384	1386.121	1386.090	-0.031
2205	544128.798	3852554.108	1405.325	1405.270	-0.055
2206	524826.444	3926021.474	2060.981	2060.980	-0.001
2207	585118.463	3863446.097	1648.951	1648.980	0.029
2207_A	585111.835	3863483.416	1649.027	1649.070	0.043
2208	584596.719	3864910.187	1561.413	1561.440	0.027
2209	571657.958	3868254.859	1601.422	1601.330	-0.092
2210	557215.756	3868229.557	1516.777	1516.790	0.013
2210_A	557215.067	3868262.321	1516.212	1516.210	-0.002
2211	516932.866	3871039.275	1578.057	1578.020	-0.037
2211_A	516924.322	3871069.981	1578.602	1578.560	-0.042
2212	500871.832	3870706.627	1628.860	1628.860	0.000
2213	499850.345	3876628.489	1624.469	1624.440	-0.029
2214	528460.697	3902658.618	1581.521	1581.570	0.049
2215	521110.729	3934858.818	1985.755	1985.760	0.005
2216	519533.099	3898271.641	1676.273	1676.350	0.077
2217	494176.410	3894438.109	1590.342	1590.380	0.038
2218	487159.079	3900968.850	1686.714	1686.710	-0.004
2219	483084.811	3913845.216	1829.801	1829.780	-0.021
2220	455722.852	3886343.422	2054.029	2054.090	0.061
2220_A	455692.010	3886326.103	2055.257	2055.320	0.063
2221	442946.746	3884286.006	2254.473	2254.470	-0.003
2221_A	442976.899	3884330.899	2254.627	2254.620	-0.007
2222	434253.669	3896791.507	2145.875	2145.820	-0.055
2223	442422.311	3899144.013	1991.270	1991.260	-0.010
2224	431577.921	3908646.059	2174.095	2174.080	-0.015
2224_A	431572.447	3908613.144	2173.614	2173.570	-0.044
2225	470687.842	3916804.493	1897.652	1897.710	0.058
2226	456804.666	3917196.926	1861.815	1861.830	0.015
2227	448581.088	3925280.398	2044.678	2044.750	0.072
2228	447108.449	3932546.351	2116.708	2116.730	0.022
2229	531326.202	3930064.300	1668.563	1668.610	0.047

2229_A	531356.823	3930072.401	1668.021	1668.080	0.059
2230	438820.232	3927243.909	2076.771	2076.770	-0.001
2231	439298.727	3932680.340	2075.140	2075.200	0.060
2232	438122.166	3937665.301	2136.531	2136.530	-0.001
2233	479371.388	3933203.796	1948.086	1948.060	-0.026
2234	500879.703	3938978.527	2113.512	2113.520	0.008
2235	511230.006	3934158.838	1914.832	1914.840	0.008
2236	476988.879	3944148.384	2017.790	2017.800	0.010
2237	440466.998	3963345.912	2485.302	2485.340	0.038
2238	438530.857	3953247.262	2312.491	2312.530	0.039
2239	540326.080	3949967.816	1900.029	1900.010	-0.019
2239_A	540282.068	3949956.598	1900.387	1900.380	-0.007
2240	521661.635	3945396.584	2015.251	2015.270	0.019
2241	503019.940	3945001.008	2078.717	2078.730	0.013
2242	491078.523	3950641.722	2057.393	2057.460	0.067
2242_A	491119.740	3950603.683	2056.834	2056.920	0.086
2243	497589.471	3955909.147	1987.311	1987.320	0.009
2244	501576.421	3960890.715	1954.462	1954.500	0.038
2245	516450.187	3942329.699	2020.320	2020.300	-0.020
2246	498806.856	3969336.748	2029.353	2029.380	0.027
2247	492864.025	3965043.212	2044.336	2044.330	-0.006
2247_A	492872.534	3965079.340	2042.935	2042.950	0.015
2248	533866.705	3895783.302	1557.311	1557.350	0.039
2249	487587.287	3970821.533	2072.852	2072.880	0.028
2250	507984.437	3975924.164	2181.511	2181.540	0.029
2251	515526.392	3973630.813	1976.698	1976.700	0.002
2252	496276.376	3974826.833	2078.998	2078.990	-0.008
2253	460009.798	3986090.632	2702.665	2702.640	-0.025
2254	466204.469	3987159.633	2314.950	2314.980	0.030
2255	461642.974	3990910.090	2551.221	2551.200	-0.021
2256	476129.150	3987977.226	2327.257	2327.240	-0.017
2257	473112.836	3994154.704	2391.229	2391.210	-0.019
2258	488501.933	3990907.475	2332.170	2332.080	-0.090
2259	466622.052	3998294.961	2434.134	2434.110	-0.024
2259_A	466607.813	3998265.262	2433.333	2433.310	-0.023
2260	477930.747	4005267.672	2487.430	2487.390	-0.040
2260_A	477949.442	4005224.242	2490.087	2490.060	-0.027
2261	478319.627	4012223.004	2635.307	2635.270	-0.037
2262	482853.799	4014404.484	3008.936	3008.890	-0.046
2263	469039.674	4012353.071	3265.774	3265.690	-0.084
2264	471084.473	4014137.678	3221.462	3221.430	-0.032
2264_A	471061.469	4014107.158	3221.053	3221.040	-0.013
2265	471828.989	4016923.271	3035.544	3035.490	-0.054
2266	474403.669	4024105.913	2619.436	2619.460	0.024
2267	477840.747	4027476.909	2932.972	2932.970	-0.002

2268	470375.948	4031442.147	2767.026	2767.030	0.004
2269	472545.956	4045363.724	2653.802	2653.800	-0.002
2269_A	472547.876	4045325.456	2654.763	2654.760	-0.003
2270	480153.936	4044495.022	2861.953	2861.960	0.007
2270_A	480121.803	4044549.862	2868.085	2868.040	-0.045
2271	484171.731	4042272.233	2388.195	2388.180	-0.015
2272	487927.220	4044340.152	2299.974	2299.970	-0.004
2273	499065.986	4030726.721	2230.672	2230.630	-0.042
2274	498694.899	4037535.327	2155.939	2155.920	-0.019
2275	509645.939	4022041.760	1949.551	1949.550	-0.001
2276	506733.299	4017388.279	2041.095	2041.080	-0.015
2276_A	506741.967	4017417.833	2040.263	2040.230	-0.033
2277	508040.755	4024161.238	1955.205	1955.200	-0.005
2278	518802.135	4035740.734	1862.725	1862.710	-0.015
2279	537552.489	4024771.317	1808.796	1808.860	0.064
2280	534540.645	4021348.148	1796.191	1796.230	0.039
2280_A	534617.060	4021214.669	1792.270	1792.300	0.030
2281	514669.651	4043536.572	1947.471	1947.430	-0.041
2282	512927.996	4047715.740	1986.252	1986.230	-0.022
2283	509390.607	4056231.714	2169.419	2169.380	-0.039
2284	484028.669	4052626.906	2807.137	2807.190	0.053
2284_A	484052.472	4052607.100	2804.218	2804.250	0.032
2285	470090.593	4059383.413	2794.147	2794.210	0.063
2286	482108.694	4067814.766	2816.144	2816.020	-0.124
2287	494956.405	3921274.795	1763.898	1763.870	-0.028
2288	486342.935	4068968.638	2563.456	2563.460	0.004
2288_A	486130.894	4069032.132	2566.544	2566.470	-0.074
2289	489321.293	4075531.731	2722.007	2722.000	-0.007
2290	494366.000	4073784.749	2531.342	2531.340	-0.002
2291	496975.277	4052582.542	2163.410	2163.430	0.020
2292	499834.377	4064989.231	2490.860	2490.890	0.030
2293	491849.681	4070159.946	2472.460	2472.480	0.020
2294	498575.164	4026176.393	2217.388	2217.380	-0.008
2295	526954.942	4025431.165	1841.056	1841.130	0.074
2296	480442.930	3997600.612	2263.257	2263.310	0.053
2297	483344.181	3982804.035	2146.324	2146.410	0.086
2298	474724.556	3958940.947	2167.400	2167.390	-0.010
2299	460513.835	3946669.505	2326.549	2326.530	-0.019
2299_A	460526.759	3946640.390	2324.561	2324.540	-0.021
2300	471887.137	3901719.914	1816.991	1816.970	-0.021
2300_A	471889.456	3901775.878	1813.985	1813.970	-0.015
2301	517410.425	4026545.315	1877.735	1877.740	0.005
2302	544598.954	4020872.194	1744.913	1744.900	-0.013
2303	475498.084	4038634.106	2511.316	2511.360	0.044
2304	474791.872	4033603.292	2544.093	2544.130	0.037

2305	471917.845	4003549.427	2613.245	2613.140	-0.105
2306	537495.690	3974502.765	1795.666	1795.650	-0.016
2306_A	537492.934	3974535.885	1795.621	1795.640	0.019
2307	533457.605	3961510.439	1855.357	1855.360	0.003
2308	514557.448	3961706.215	1913.176	1913.180	0.004
2309	566363.481	3855455.634	1396.913	1396.880	-0.033
2310	552253.172	3859920.769	1474.341	1474.320	-0.021
2310_A	552248.364	3859958.484	1474.643	1474.660	0.017
2311	478341.709	3890551.171	1786.795	1786.810	0.015
2311_A	478358.228	3890583.155	1786.739	1786.730	-0.009
2312	513337.286	3880003.719	1620.489	1620.460	-0.029
2312_A	513300.630	3879982.626	1621.212	1621.160	-0.052
2313	478799.786	3877273.473	1819.560	1819.560	0.000
2314	463854.085	3896277.324	1890.009	1890.020	0.011
2315	488614.101	3871186.997	1738.324	1738.320	-0.004
2316	461114.857	3889970.510	1850.245	1850.250	0.005
2317	460822.002	3910148.689	1817.878	1817.890	0.012
2318	464164.088	3937475.930	2070.615	2070.590	-0.025
2319	460791.779	3979150.344	2578.363	2578.360	-0.003
2320	494965.981	4046636.324	2192.472	2192.610	0.138
2320_A	495000.078	4046637.725	2191.727	2191.870	0.143
2321	510522.281	4031237.781	1944.146	1944.180	0.034
2322	555460.743	3877637.021	1467.961	1468.050	0.089
2323	550188.986	3874824.410	1510.582	1510.630	0.048
2324	525154.439	3910233.397	1514.204	1514.260	0.056
2324_A	525181.320	3910208.168	1512.316	1512.400	0.084
2325	554504.381	3885885.559	1437.489	1437.560	0.071
2326	560336.095	3886249.105	1426.912	1426.970	0.058
2327	555565.213	3906095.661	1350.338	1350.380	0.042
2328	569975.839	3914055.366	1284.529	1284.530	0.001
2328_A	569975.823	3914093.215	1284.932	1284.920	-0.012
2329	545804.144	3924449.115	1487.756	1487.730	-0.026

VERTICAL ACCURACY CONCLUSIONS

Raw Swath Non-Vegetated Vertical Accuracy (NVA) Tested 0.078 Meters Non vegetated vertical accuracy at a 95 percent confidence level, derived according to NSSDA, in open terrain using (RMSEz) 0.040 meters x 1.96000 as defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASPRS Guidelines and tested against the TIN using all lidar points against 328 NVA points.

LAS Swath Non-Vegetated Vertical Accuracy (NVA) Tested 0.076 Meters Non vegetated vertical accuracy at a 95 percent confidence level, derived according to NSSDA, in open terrain using (RMSEz) 0.039 meters x 1.96000 as defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASPRS Guidelines and tested against the TIN using lidar ground points against 328 NVA points.

Table 5.3: NVA Check Point Analysis DEM				
Point ID	Easting (Meter)	Northing (Meter)	Elevation (Meter)	DEM Elevation (Meter)	Dz (Meter)
2001	358999.600	4084107.230	2385.580	2385.600	0.020
2001A	358990.590	4084079.810	2385.420	2385.400	-0.020
2002	363283.950	4093913.540	2557.820	2557.780	-0.040
2003	375535.180	3888347.610	2082.700	2082.640	-0.060
2004	361735.500	4088872.720	2479.300	2479.330	0.030
2004A	361729.440	4088858.950	2478.790	2478.840	0.050
2005	366039.990	4067527.250	2318.230	2318.260	0.030
2005A	366076.870	4067526.410	2318.950	2318.960	0.010
2006	374582.950	4075700.800	3236.680	3236.690	0.010
2007	396801.690	4063586.090	2659.800	2659.830	0.030
2008	391824.290	4069292.220	2975.570	2975.600	0.030
2009	393307.020	4050053.400	2519.320	2519.350	0.030
2009A	393297.620	4050072.030	2520.710	2520.770	0.060
2010	397152.600	4058595.820	2855.070	2855.180	0.110
2011	403513.010	4043677.600	2586.330	2586.280	-0.050
2012	400270.850	4040833.390	2292.580	2292.540	-0.040
2012A	400251.960	4040825.130	2291.160	2291.170	0.010
2013	405453.330	4013091.470	1866.710	1866.780	0.070
2014	402860.330	4023271.950	2044.210	2044.270	0.060
2014_A	402896.500	4023300.460	2043.060	2043.060	0.000
2015	390631.260	4049194.190	2678.850	2678.840	-0.010
2016	386523.790	4039721.360	2606.870	2606.820	-0.050
2016_A	386507.650	4039676.310	2605.360	2605.330	-0.030
2017	381582.340	4024880.000	2454.540	2454.520	-0.020
2017_A	381560.180	4024903.880	2453.520	2453.480	-0.040
2018	396113.110	4020584.450	2025.450	2025.430	-0.020
2019	384293.330	4011474.490	1916.510	1916.490	-0.020
2019_A	384319.110	4011462.370	1913.850	1913.760	-0.090
2020	367901.970	4010503.970	1983.670	1983.710	0.040
2021	398911.740	3993445.890	1736.490	1736.510	0.020
2022	358043.270	3910108.720	1552.260	1552.280	0.020
2022_A	358070.110	3910131.970	1552.210	1552.240	0.030
2023	378713.190	3987205.760	2908.020	2908.020	0.000
2023_A	378678.820	3987194.720	2909.080	2909.110	0.030
2023_B	378644.300	3987252.200	2909.970	2909.900	-0.070
2024	365682.230	3905366.710	1854.970	1855.010	0.040

2024_A	365681.280	3905400.140	1852.640	1852.630	-0.010
2025	388346.890	4085414.040	3070.450	3070.400	-0.050
2026	382840.380	4065960.040	2958.650	2958.670	0.020
2026A	382854.740	4065930.780	2958.830	2958.850	0.020
2027	383652.630	3972980.820	2231.820	2231.800	-0.020
2027_A	383635.680	3972999.740	2231.880	2231.880	0.000
2028	377065.900	3966420.420	2323.870	2323.890	0.020
2028_A	377108.010	3966409.290	2321.250	2321.210	-0.040
2029	346699.010	3914702.090	1796.680	1796.650	-0.030
2030	401818.970	4037079.740	2224.930	2224.900	-0.030
2030A	401830.040	4037060.610	2224.110	2224.170	0.060
2031	370251.480	3908480.160	1791.740	1791.720	-0.020
2032	384703.850	3927447.350	1673.530	1673.500	-0.030
2033	387184.400	3914196.020	1927.180	1927.160	-0.020
2033_A	387215.610	3914204.220	1927.010	1926.970	-0.040
2034	373740.680	3909653.080	1878.780	1878.730	-0.050
2034_A	373715.020	3909673.990	1877.160	1877.140	-0.020
2035	362561.450	3894687.010	1804.060	1804.100	0.040
2036	371731.730	3905649.320	1940.980	1941.000	0.020
2036_A	371726.150	3905608.930	1942.560	1942.560	0.000
2037	377844.520	3893366.250	2075.540	2075.510	-0.030
2038	369312.340	3897277.200	3032.240	3032.170	-0.070
2038_A	369313.360	3897345.300	3022.480	3022.380	-0.100
2039	371248.360	3882273.730	1874.410	1874.430	0.020
2039A	371229.080	3882289.710	1875.610	1875.630	0.020
2040	381968.890	3885198.920	2126.840	2126.820	-0.020
2041	364712.510	3890999.030	1879.050	1879.090	0.040
2042	384739.540	3872837.890	2216.580	2216.620	0.040
2043	385115.500	3891109.940	2117.540	2117.500	-0.040
2044	382712.970	3889743.720	2070.790	2070.750	-0.040
2045	365103.220	4026592.820	2041.140	2041.140	0.000
2045_A	365067.340	4026575.450	2041.740	2041.760	0.020
2046	367878.070	4033674.740	2230.720	2230.760	0.040
2047	365806.710	3880996.090	1760.350	1760.400	0.050
2048	331519.990	4021743.970	2137.220	2137.250	0.030
2048_A	353092.800	4022616.120	1937.430	1937.460	0.030
2049	345165.760	4051453.440	2112.600	2112.630	0.030
2050	348974.780	4059688.390	2242.820	2242.860	0.040
2051	358355.450	4037546.310	2172.690	2172.620	-0.070
2052	349198.210	4025682.570	1954.680	1954.630	-0.050
2053	336851.020	4043023.370	2102.550	2102.580	0.030
2053A	336862.550	4043040.170	2102.240	2102.260	0.020
2054	338508.030	4035286.330	2221.910	2221.910	0.000
2054A	338505.540	4035257.350	2222.370	2222.330	-0.040
2055	329396.310	4016893.670	2215.190	2215.190	0.000

2056	367008.020	4019730.350	1925.590	1925.610	0.020
2057	354769.470	4003525.710	2047.020	2047.040	0.020
2057_A	354847.810	4003508.580	2044.790	2044.870	0.080
2058	374223.570	3958975.480	2384.410	2384.390	-0.020
2058_A	374258.810	3958999.150	2382.900	2382.880	-0.020
2059	383786.320	3978778.020	2308.900	2308.840	-0.060
2059_A	383753.570	3978760.950	2311.760	2311.790	0.030
2060	321578.380	3932481.160	1800.970	1800.960	-0.010
2061	339999.190	3937583.970	1669.080	1669.080	0.000
2062	314406.180	3950703.810	1904.760	1904.750	-0.010
2062A	314430.180	3950738.850	1905.300	1905.330	0.030
2063	344815.630	3973305.200	2345.320	2345.310	-0.010
2063_A	344847.130	3973292.320	2346.690	2346.660	-0.030
2064	337748.810	3961461.630	2100.090	2100.130	0.040
2065	333265.890	3984895.230	2624.760	2624.770	0.010
2066	316445.500	3993827.570	2208.060	2208.080	0.020
2066A	316456.730	3993827.290	2208.150	2208.190	0.040
2067	322632.870	3990448.530	2148.310	2148.320	0.010
2067A	322631.160	3990461.120	2148.310	2148.350	0.040
2068	327326.800	3990729.020	2272.610	2272.680	0.070
2068A	327345.490	3990745.830	2275.330	2275.330	0.000
2069	330032.300	3978544.340	2386.560	2386.580	0.020
2069A	330060.780	3978561.820	2387.250	2387.240	-0.010
2070	340075.680	3979006.310	2445.070	2445.120	0.050
2071	368434.860	3948601.270	2014.310	2014.320	0.010
2071_A	368487.120	3948605.900	2014.250	2014.250	0.000
2072	342665.780	3949238.360	1729.320	1729.250	-0.070
2073	394162.700	4002194.780	1772.490	1772.500	0.010
2073_A	394136.280	4002208.650	1773.030	1772.970	-0.060
2074	341164.650	3969567.360	2282.260	2282.260	0.000
2075	338951.480	3990624.870	2808.670	2808.610	-0.060
2075A	338928.150	3990620.230	2810.190	2810.150	-0.040
2076	352002.360	4082014.080	2375.500	2375.470	-0.030
2076A	352050.350	4082045.870	2376.150	2376.190	0.040
2077	378383.130	4061510.750	3198.930	3198.980	0.050
2077A	378356.710	4061526.870	3198.830	3198.880	0.050
2078	353540.390	3948370.990	2246.810	2246.770	-0.040
2078_A	353569.290	3948351.820	2246.680	2246.590	-0.090
2079	353776.720	3983781.960	2709.690	2709.670	-0.020
2080	358443.350	3992940.820	2961.990	2961.930	-0.060
2081	364759.620	3965863.310	2637.020	2637.000	-0.020
2082	341560.370	4010767.410	2587.540	2587.520	-0.020
2083	368100.210	3981652.120	2720.970	2720.960	-0.010
2083_A	368070.360	3981677.610	2721.630	2721.620	-0.010
2084	379287.100	3924718.890	1703.730	1703.750	0.020

2085	328489.650	3928278.770	1772.190	1772.210	0.020
2085_A	328531.600	3928222.730	1773.910	1773.920	0.010
2086	343900.220	4002028.500	2467.250	2467.290	0.040
2086_A	343956.330	4002056.900	2465.000	2465.000	0.000
2087	353462.360	3913593.180	1679.440	1679.460	0.020
2088	353197.150	4091914.420	2511.690	2511.690	0.000
2088A	353186.380	4091947.280	2511.530	2511.470	-0.060
2089	377777.440	4089762.160	3103.500	3103.580	0.080
2089A	377786.730	4089781.480	3103.360	3103.430	0.070
2090	390342.520	4075714.710	2799.550	2799.560	0.010
2091	362998.550	4058886.880	2347.270	2347.310	0.040
2092	366987.820	4044453.260	2323.460	2323.390	-0.070
2093	387382.870	4029429.830	2320.870	2320.880	0.010
2093_A	387391.290	4029393.090	2320.140	2320.110	-0.030
2094	375648.580	3997846.740	2395.920	2395.900	-0.020
2095	367993.150	3988348.130	3044.360	3044.330	-0.030
2096	382374.700	3879944.750	2166.910	2166.920	0.010
2097	379406.630	3871436.630	2289.650	2289.720	0.070
2098	376343.660	3877546.810	2131.540	2131.570	0.030
2099	364997.350	3885078.840	1875.160	1875.190	0.030
2100	383637.980	3904009.360	1911.620	1911.580	-0.040
2100A	383652.300	3903965.300	1913.170	1913.150	-0.020
2101	364554.100	3976299.980	2683.150	2683.170	0.020
2101_A	364581.300	3976274.920	2681.660	2681.640	-0.020
2102	348645.580	3993507.870	2592.040	2591.980	-0.060
2103	374447.410	4041149.990	2507.290	2507.220	-0.070
2103_A	374481.530	4041156.100	2508.760	2508.660	-0.100
2104	376635.420	4052018.180	2826.460	2826.380	-0.080
2104_A	376370.260	4052185.340	2808.040	2807.940	-0.100
2105	350160.100	4048164.410	2101.790	2101.820	0.030
2107	357836.720	4019721.700	1908.790	1908.780	-0.010
2108	320140.250	4032996.190	2302.820	2302.920	0.100
2109	380777.080	4081451.580	3139.080	3139.080	0.000
2110	394247.880	4013326.680	1905.900	1905.870	-0.030
2111	386829.760	3961075.180	1910.010	1910.000	-0.010
2111_A	386862.110	3961083.540	1910.190	1910.200	0.010
2112	375766.910	3948843.530	1771.310	1771.380	0.070
2112_A	375796.600	3948827.430	1770.900	1770.910	0.010
2113	384077.620	3919565.860	1830.240	1830.270	0.030
2113_A	384050.290	3919587.590	1830.530	1830.560	0.030
2114	372521.380	3898257.720	2553.800	2553.740	-0.060
2115	363853.730	3908424.970	1676.300	1676.330	0.030
2115_A	363822.810	3908444.570	1673.750	1673.740	-0.010
2116	387009.180	3900375.960	2007.720	2007.680	-0.040
2201	534749.651	3834096.788	1479.680	1479.630	-0.050

2202	562668.149	3833200.676	1353.124	1353.100	-0.024
2203	556940.461	3840408.602	1316.753	1316.730	-0.023
2204	552056.248	3841842.094	1386.133	1386.120	-0.013
2204_A	552045.870	3841801.384	1386.121	1386.110	-0.011
2205	544128.798	3852554.108	1405.325	1405.300	-0.025
2206	524826.444	3926021.474	2060.981	2060.980	-0.001
2207	585118.463	3863446.097	1648.951	1648.990	0.039
2207_A	585111.835	3863483.416	1649.027	1649.040	0.013
2208	584596.719	3864910.187	1561.413	1561.390	-0.023
2209	571657.958	3868254.859	1601.422	1601.340	-0.082
2210	557215.756	3868229.557	1516.777	1516.820	0.043
2210_A	557215.067	3868262.321	1516.212	1516.220	0.008
2211	516932.866	3871039.275	1578.057	1578.020	-0.037
2211_A	516924.322	3871069.981	1578.602	1578.560	-0.042
2212	500871.832	3870706.627	1628.860	1628.850	-0.010
2213	499850.345	3876628.489	1624.469	1624.440	-0.029
2214	528460.697	3902658.618	1581.521	1581.590	0.069
2215	521110.729	3934858.818	1985.755	1985.770	0.015
2216	519533.099	3898271.641	1676.273	1676.320	0.047
2217	494176.410	3894438.109	1590.342	1590.370	0.028
2218	487159.079	3900968.850	1686.714	1686.750	0.036
2219	483084.811	3913845.216	1829.801	1829.780	-0.021
2220	455722.852	3886343.422	2054.029	2054.120	0.091
2220_A	455692.010	3886326.103	2055.257	2055.290	0.033
2221	442946.746	3884286.006	2254.473	2254.480	0.007
2221_A	442976.899	3884330.899	2254.627	2254.600	-0.027
2222	434253.669	3896791.507	2145.875	2145.830	-0.045
2223	442422.311	3899144.013	1991.270	1991.220	-0.050
2224	431577.921	3908646.059	2174.095	2174.080	-0.015
2224_A	431572.447	3908613.144	2173.614	2173.580	-0.034
2225	470687.842	3916804.493	1897.652	1897.650	-0.002
2226	456804.666	3917196.926	1861.815	1861.840	0.025
2227	448581.088	3925280.398	2044.678	2044.760	0.082
2228	447108.449	3932546.351	2116.708	2116.750	0.042
2229	531326.202	3930064.300	1668.563	1668.620	0.057
2229_A	531356.823	3930072.401	1668.021	1668.090	0.069
2230	438820.232	3927243.909	2076.771	2076.780	0.009
2231	439298.727	3932680.340	2075.140	2075.210	0.070
2232	438122.166	3937665.301	2136.531	2136.540	0.009
2233	479371.388	3933203.796	1948.086	1948.050	-0.036
2234	500879.703	3938978.527	2113.512	2113.520	0.008
2235	511230.006	3934158.838	1914.832	1914.850	0.018
2236	476988.879	3944148.384	2017.790	2017.770	-0.020
2237	440466.998	3963345.912	2485.302	2485.340	0.038
2238	438530.857	3953247.262	2312.491	2312.520	0.029

2239	540326.080	3949967.816	1900.029	1900.070	0.041
2239_A	540282.068	3949956.598	1900.387	1900.390	0.003
2240	521661.635	3945396.584	2015.251	2015.250	-0.001
2241	503019.940	3945001.008	2078.717	2078.710	-0.007
2242	491078.523	3950641.722	2057.393	2057.450	0.057
2242_A	491119.740	3950603.683	2056.834	2056.930	0.096
2243	497589.471	3955909.147	1987.311	1987.310	-0.001
2244	501576.421	3960890.715	1954.462	1954.500	0.038
2245	516450.187	3942329.699	2020.320	2020.280	-0.040
2246	498806.856	3969336.748	2029.353	2029.440	0.087
2247	492864.025	3965043.212	2044.336	2044.320	-0.016
2247_A	492872.534	3965079.340	2042.935	2042.930	-0.005
2248	533866.705	3895783.302	1557.311	1557.340	0.029
2249	487587.287	3970821.533	2072.852	2072.870	0.018
2250	507984.437	3975924.164	2181.511	2181.550	0.039
2251	515526.392	3973630.813	1976.698	1976.720	0.022
2252	496276.376	3974826.833	2078.998	2078.970	-0.028
2253	460009.798	3986090.632	2702.665	2702.650	-0.015
2254	466204.469	3987159.633	2314.950	2314.960	0.010
2255	461642.974	3990910.090	2551.221	2551.220	-0.001
2256	476129.150	3987977.226	2327.257	2327.240	-0.017
2257	473112.836	3994154.704	2391.229	2391.230	0.001
2258	488501.933	3990907.475	2332.170	2332.060	-0.110
2259	466622.052	3998294.961	2434.134	2434.130	-0.004
2259_A	466607.813	3998265.262	2433.333	2433.310	-0.023
2260	477930.747	4005267.672	2487.430	2487.410	-0.020
2260_A	477949.442	4005224.242	2490.087	2490.090	0.003
2261	478319.627	4012223.004	2635.307	2635.300	-0.007
2262	482853.799	4014404.484	3008.936	3008.860	-0.076
2263	469039.674	4012353.071	3265.774	3265.660	-0.114
2264	471084.473	4014137.678	3221.462	3221.430	-0.032
2264_A	471061.469	4014107.158	3221.053	3221.040	-0.013
2265	471828.989	4016923.271	3035.544	3035.500	-0.044
2266	474403.669	4024105.913	2619.436	2619.500	0.064
2267	477840.747	4027476.909	2932.972	2932.980	0.008
2268	470375.948	4031442.147	2767.026	2767.080	0.054
2269	472545.956	4045363.724	2653.802	2653.840	0.038
2269_A	472547.876	4045325.456	2654.763	2654.750	-0.013
2270	480153.936	4044495.022	2861.953	2861.940	-0.013
2270_A	480121.803	4044549.862	2868.085	2868.030	-0.055
2271	484171.731	4042272.233	2388.195	2388.200	0.005
2272	487927.220	4044340.152	2299.974	2299.970	-0.004
2273	499065.986	4030726.721	2230.672	2230.640	-0.032
2274	498694.899	4037535.327	2155.939	2155.940	0.001
2275	509645.939	4022041.760	1949.551	1949.570	0.019

2276	506733.299	4017388.279	2041.095	2041.070	-0.025
2276_A	506741.967	4017417.833	2040.263	2040.240	-0.023
2277	508040.755	4024161.238	1955.205	1955.210	0.005
2278	518802.135	4035740.734	1862.725	1862.710	-0.015
2279	537552.489	4024771.317	1808.796	1808.860	0.064
2280	534540.645	4021348.148	1796.191	1796.190	-0.001
2280_A	534617.060	4021214.669	1792.270	1792.350	0.080
2281	514669.651	4043536.572	1947.471	1947.440	-0.031
2282	512927.996	4047715.740	1986.252	1986.230	-0.022
2283	509390.607	4056231.714	2169.419	2169.390	-0.029
2284	484028.669	4052626.906	2807.137	2807.160	0.023
2284_A	484052.472	4052607.100	2804.218	2804.250	0.032
2285	470090.593	4059383.413	2794.147	2794.220	0.073
2286	482108.694	4067814.766	2816.144	2816.070	-0.074
2287	494956.405	3921274.795	1763.898	1763.860	-0.038
2288	486342.935	4068968.638	2563.456	2563.490	0.034
2288_A	486130.894	4069032.132	2566.544	2566.480	-0.064
2289	489321.293	4075531.731	2722.007	2721.980	-0.027
2290	494366.000	4073784.749	2531.342	2531.330	-0.012
2291	496975.277	4052582.542	2163.410	2163.420	0.010
2292	499834.377	4064989.231	2490.860	2490.900	0.040
2293	491849.681	4070159.946	2472.460	2472.460	0.000
2294	498575.164	4026176.393	2217.388	2217.430	0.042
2295	526954.942	4025431.165	1841.056	1841.100	0.044
2296	480442.930	3997600.612	2263.257	2263.280	0.023
2297	483344.181	3982804.035	2146.324	2146.420	0.096
2298	474724.556	3958940.947	2167.400	2167.370	-0.030
2299	460513.835	3946669.505	2326.549	2326.530	-0.019
2299_A	460526.759	3946640.390	2324.561	2324.550	-0.011
2300	471887.137	3901719.914	1816.991	1816.990	-0.001
2300_A	471889.456	3901775.878	1813.985	1813.980	-0.005
2301	517410.425	4026545.315	1877.735	1877.750	0.015
2302	544598.954	4020872.194	1744.913	1744.920	0.007
2303	475498.084	4038634.106	2511.316	2511.360	0.044
2304	474791.872	4033603.292	2544.093	2544.120	0.027
2305	471917.845	4003549.427	2613.245	2613.110	-0.135
2306	537495.690	3974502.765	1795.666	1795.650	-0.016
2306_A	537492.934	3974535.885	1795.621	1795.640	0.019
2307	533457.605	3961510.439	1855.357	1855.360	0.003
2308	514557.448	3961706.215	1913.176	1913.180	0.004
2309	566363.481	3855455.634	1396.913	1396.870	-0.043
2310	552253.172	3859920.769	1474.341	1474.310	-0.031
2310_A	552248.364	3859958.484	1474.643	1474.640	-0.003
2311	478341.709	3890551.171	1786.795	1786.840	0.045
2311_A	478358.228	3890583.155	1786.739	1786.720	-0.019

2312	513337.286	3880003.719	1620.489	1620.450	-0.039
2312_A	513300.630	3879982.626	1621.212	1621.150	-0.062
2313	478799.786	3877273.473	1819.560	1819.540	-0.020
2314	463854.085	3896277.324	1890.009	1889.990	-0.019
2315	488614.101	3871186.997	1738.324	1738.310	-0.014
2316	461114.857	3889970.510	1850.245	1850.230	-0.015
2317	460822.002	3910148.689	1817.878	1817.840	-0.038
2318	464164.088	3937475.930	2070.615	2070.570	-0.045
2319	460791.779	3979150.344	2578.363	2578.350	-0.013
2320	494965.981	4046636.324	2192.472	2192.640	0.168
2320_A	495000.078	4046637.725	2191.727	2191.840	0.113
2321	510522.281	4031237.781	1944.146	1944.170	0.024
2322	555460.743	3877637.021	1467.961	1468.060	0.099
2323	550188.986	3874824.410	1510.582	1510.600	0.018
2324	525154.439	3910233.397	1514.204	1514.270	0.066
2324_A	525181.320	3910208.168	1512.316	1512.420	0.104
2325	554504.381	3885885.559	1437.489	1437.560	0.071
2326	560336.095	3886249.105	1426.912	1426.970	0.058
2327	555565.213	3906095.661	1350.338	1350.360	0.022
2328	569975.839	3914055.366	1284.529	1284.520	-0.009
2328_A	569975.823	3914093.215	1284.932	1284.920	-0.012
2329	545804.144	3924449.115	1487.756	1487.740	-0.016

VERTICAL ACCURACY CONCLUSIONS

Bare-Earth DEM Non-Vegetated Vertical Accuracy (NVA) Tested 0.084 Meters Non-Vegetated vertical accuracy at a 95 percent confidence level, derived according to NSSDA, in open terrain using (RMSEz) 0.043 meters x 1.96000 as defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASPRS Guidelines and tested against the DEM against 328 NVA points.

Table 5.4: VVA Quality Check Point Analysis DEM					
Point ID	**Easting (Meter)**	**Northing (Meter)**	**Elevation (Meter)**	**DEM Elevation (Meter)**	**Dz (Meter)**
3001	359026.390	4084101.770	2385.770	2385.790	0.020
3001A	359010.950	4084079.860	2385.520	2385.510	-0.010
3002	363279.380	4093894.110	2557.390	2557.390	0.000
3003	343936.430	4002003.830	2466.630	2466.690	0.060
3003_A	343950.840	4002060.480	2465.310	2465.320	0.010
3004	361743.070	4088913.990	2479.740	2479.790	0.050
3004A	361742.450	4088897.640	2479.670	2479.690	0.020
3005	365985.590	4067528.890	2317.550	2317.590	0.040
3005A	365949.050	4067517.640	2316.960	2317.020	0.060
3006	374563.120	4075687.200	3237.050	3237.000	-0.050
3007	396784.110	4063610.850	2659.040	2659.140	0.100

3008	391798.650	4069348.920	2972.600	2972.640	0.040
3009	393640.080	4050189.730	2503.620	2503.620	0.000
3009A	393612.020	4050188.010	2505.920	2505.830	-0.090
3010	396964.940	4058402.750	2881.750	2881.890	0.140
3011	402610.050	4043831.810	2602.390	2602.410	0.020
3012	400285.060	4040785.040	2291.850	2291.920	0.070
3012A	400275.240	4040806.120	2292.110	2292.160	0.050
3013	405467.060	4013075.510	1868.540	1868.700	0.160
3014	402919.310	4023263.500	2046.730	2046.890	0.160
3014_A	402896.250	4023240.810	2047.920	2048.030	0.110
3015	390646.940	4049262.140	2676.130	2676.150	0.020
3016	386468.330	4039677.640	2606.430	2606.440	0.010
3016_A	386470.370	4039725.050	2608.350	2608.360	0.010
3017	381550.100	4024875.190	2455.180	2455.200	0.020
3017_A	381618.780	4024891.150	2454.560	2454.470	-0.090
3018	396063.230	4020544.510	2023.640	2023.640	0.000
3019	384321.400	4011482.730	1912.120	1912.090	-0.030
3020	367864.010	4010524.260	1982.750	1982.810	0.060
3021	398899.470	3993475.290	1736.810	1736.770	-0.040
3022	357071.650	3910814.440	1575.710	1575.770	0.060
3022_A	357077.970	3910795.290	1575.290	1575.340	0.050
3023	378626.320	3987208.910	2911.660	2911.640	-0.020
3023_A	378599.480	3987341.600	2907.830	2907.790	-0.040
3023_B	378574.610	3987296.660	2911.100	2911.030	-0.070
3024	353914.000	3913271.270	1673.890	1673.790	-0.100
3025	388801.950	4085227.940	3073.240	3073.270	0.030
3026	376541.470	4052065.650	2823.490	2823.450	-0.040
3026_A	376355.140	4052238.070	2807.590	2807.590	0.000
3027	383602.080	3972992.150	2231.820	2231.870	0.050
3027_A	383623.300	3972953.150	2231.920	2231.980	0.060
3028	377105.450	3966371.420	2320.790	2320.760	-0.030
3028_A	377059.610	3966378.120	2324.320	2324.390	0.070
3029	346641.200	3914677.220	1795.720	1795.740	0.020
3030	401830.790	4037124.240	2227.190	2227.180	-0.010
3031	370207.760	3908480.290	1789.720	1789.750	0.030
3032	384703.300	3927468.830	1673.060	1673.110	0.050
3033	387191.010	3914238.160	1926.690	1926.720	0.030
3033_A	387184.510	3914149.630	1928.230	1928.240	0.010
3034	373193.880	3910938.280	1848.890	1849.030	0.140
3034_A	373188.400	3910970.180	1849.040	1848.990	-0.050
3035	365137.790	3894013.260	1927.810	1927.910	0.100
3036	371761.400	3905693.700	1937.110	1937.070	-0.040
3036_A	371721.670	3905570.640	1945.230	1945.230	0.000
3037	377786.770	3893311.750	2079.940	2079.910	-0.030
3038	369279.970	3897369.630	3028.300	3028.670	0.370

3038_A	369344.510	3897364.730	3014.510	3014.610	0.100
3039	371259.210	3882267.650	1873.730	1873.760	0.030
3040	367642.740	3881015.130	1793.450	1793.510	0.060
3040A	367622.430	3881004.030	1792.980	1793.020	0.040
3041	365129.060	3885088.790	1883.060	1883.150	0.090
3042	384716.900	3872847.600	2217.810	2217.840	0.030
3043	385092.340	3891078.090	2115.360	2115.350	-0.010
3044	382694.590	3889711.130	2071.300	2071.300	0.000
3045	365070.250	4026559.160	2040.680	2040.740	0.060
3045_A	365100.220	4026635.160	2042.390	2042.450	0.060
3046	367845.390	4033569.540	2233.530	2233.610	0.080
3047	328525.820	3928180.010	1774.610	1774.630	0.020
3047_A	328568.980	3928131.610	1775.770	1775.780	0.010
3048	331754.220	4021295.400	2163.470	2163.530	0.060
3048_A	353140.660	4022636.590	1937.910	1937.940	0.030
3049	345222.150	4051430.040	2113.130	2113.210	0.080
3050	348995.510	4059703.340	2242.350	2242.410	0.060
3051	360657.070	4039733.060	2230.540	2230.600	0.060
3051_A	364127.710	4039897.510	2292.620	2292.520	-0.100
3052	349212.710	4025701.820	1955.110	1955.080	-0.030
3053	336880.300	4043040.730	2101.830	2101.930	0.100
3053A	336876.460	4043011.700	2102.250	2102.340	0.090
3054	338605.350	4035440.600	2225.790	2225.850	0.060
3054A	338616.900	4035416.230	2227.250	2227.270	0.020
3055	329343.970	4016858.020	2215.600	2215.640	0.040
3056	366987.370	4019749.400	1924.340	1924.600	0.260
3057	354806.360	4003500.770	2044.690	2044.650	-0.040
3057_A	354839.140	4003515.200	2044.400	2044.480	0.080
3058	374235.710	3959022.890	2381.680	2381.670	-0.010
3058_A	374200.470	3959025.760	2381.080	2381.150	0.070
3059	386189.710	3979860.460	2130.850	2130.870	0.020
3059_A	386197.250	3979892.210	2132.060	2132.120	0.060
3060	321569.860	3932456.670	1801.140	1801.160	0.020
3061	340010.950	3937586.540	1669.150	1669.140	-0.010
3061A	339994.910	3937567.060	1668.860	1669.110	0.250
3062	314409.230	3950728.570	1905.480	1905.520	0.040
3063	344807.480	3973271.270	2343.930	2343.950	0.020
3063_A	344840.490	3973272.620	2344.490	2344.480	-0.010
3064	337719.930	3961427.170	2104.340	2104.430	0.090
3065	333379.650	3984921.710	2631.620	2631.620	0.000
3065A	333453.850	3984897.550	2636.050	2636.020	-0.030
3066	316425.890	3993841.640	2206.900	2207.010	0.110
3066A	316443.180	3993841.540	2206.980	2207.090	0.110
3067	322646.770	3990515.710	2148.550	2148.600	0.050
3067A	322642.440	3990474.630	2148.240	2148.260	0.020

3068	327540.250	3990838.440	2286.070	2286.060	-0.010
3068A	327562.210	3990851.300	2286.990	2287.020	0.030
3069	330301.040	3978523.260	2418.580	2418.720	0.140
3069A	330309.090	3978516.300	2418.670	2418.780	0.110
3070	340082.140	3978955.630	2441.160	2441.270	0.110
3071	371348.600	3947389.240	1767.940	1767.860	-0.080
3071_A	371314.610	3947403.350	1769.870	1769.830	-0.040
3072	342630.080	3949299.600	1728.400	1728.430	0.030
3072_A	342630.930	3949254.530	1728.930	1728.890	-0.040
3073	394153.570	4002169.170	1773.910	1773.940	0.030
3073_A	394127.660	4002198.000	1773.860	1773.890	0.030
3074	341113.530	3969571.060	2287.990	2287.990	0.000
3075	338552.960	3990485.360	2812.790	2812.760	-0.030
3076	352017.890	4082045.070	2374.380	2374.420	0.040
3076A	352047.970	4082056.040	2375.310	2375.290	-0.020
3077	378520.750	4061417.590	3198.170	3198.220	0.050
3077A	378493.210	4061439.940	3197.510	3197.600	0.090
3078	353529.880	3948332.700	2245.260	2245.140	-0.120
3078_A	353501.090	3948371.080	2246.030	2245.950	-0.080
3079	353746.260	3983786.880	2714.050	2713.840	-0.210
3080	358451.080	3992919.800	2963.460	2963.460	0.000
3080_A	358376.500	3992971.220	2958.320	2958.320	0.000
3081	364794.570	3965743.380	2653.210	2653.220	0.010
3082	341541.120	4010794.140	2587.060	2587.050	-0.010
3083	368012.700	3981706.720	2723.010	2722.980	-0.030
3083_A	367984.490	3981723.860	2723.470	2723.500	0.030
3084	379258.510	3924693.000	1698.690	1698.750	0.060
3201	556978.189	3840416.017	1317.421	1317.410	-0.011
3202	534710.182	3834091.922	1480.045	1480.060	0.015
3203	552007.737	3841802.460	1386.187	1386.160	-0.027
3203_A	552017.410	3841845.687	1386.320	1386.330	0.010
3204	584875.513	3863379.444	1646.896	1646.940	0.044
3204_A	584942.760	3863379.157	1647.879	1647.990	0.111
3205	571685.771	3868214.916	1603.254	1603.350	0.096
3206	557215.531	3868181.421	1515.774	1515.860	0.086
3206_A	557249.301	3868180.980	1515.600	1515.660	0.060
3207	544209.946	3852504.976	1404.559	1404.540	-0.019
3208	567147.505	3897635.526	1398.573	1398.600	0.027
3208_A	567170.516	3897595.557	1397.973	1397.960	-0.013
3209	500915.559	3866218.385	1669.656	1669.640	-0.016
3210	499848.297	3876587.745	1624.497	1624.540	0.043
3211	528510.866	3902659.979	1581.911	1581.910	-0.001
3211_A	528431.279	3902673.975	1581.479	1581.510	0.031
3212	520400.582	3897823.957	1659.153	1659.230	0.077
3213	515541.994	3869679.801	1603.673	1603.700	0.027

3214	495181.021	3892746.732	1568.407	1568.420	0.013
3215	489006.164	3901896.824	1708.643	1708.830	0.187
3216	455662.356	3886255.740	2055.881	2055.900	0.019
3216_A	455705.653	3886242.701	2055.363	2055.400	0.037
3217	442943.835	3884250.092	2254.074	2254.130	0.056
3217_A	442984.665	3884292.464	2253.970	2254.000	0.030
3218	437548.203	3897052.488	2105.570	2105.510	-0.060
3219	441612.448	3899642.154	1996.474	1996.270	-0.204
3220	431602.579	3911603.165	2164.387	2164.360	-0.027
3220_A	431611.192	3911561.116	2165.531	2165.490	-0.041
3221	471857.237	3901760.547	1816.063	1816.090	0.027
3221_A	471853.290	3901793.322	1814.508	1814.510	0.002
3222	428169.112	3937511.264	2248.295	2248.140	-0.155
3222_A	428208.744	3937538.635	2243.266	2243.370	0.104
3223	438393.951	3932646.588	2087.096	2087.130	0.034
3224	447731.772	3931570.999	2083.049	2083.140	0.091
3225	460466.520	3946599.621	2330.127	2330.170	0.043
3225_A	460559.912	3946591.891	2319.052	2319.060	0.008
3226	438481.416	3953613.334	2327.597	2327.630	0.033
3226_A	438497.857	3953575.792	2328.495	2328.650	0.155
3227	440393.235	3963322.717	2487.770	2487.840	0.070
3228	474664.914	3958929.726	2166.087	2166.030	-0.057
3228_A	474638.416	3958885.467	2161.676	2161.730	0.054
3229	540270.661	3949993.317	1900.250	1900.310	0.060
3229_A	540346.121	3949931.078	1899.198	1899.230	0.032
3230	521674.976	3945353.889	2013.789	2013.850	0.061
3231	500841.070	3939034.298	2113.128	2113.150	0.022
3232	502979.055	3944998.067	2078.384	2078.410	0.026
3233	483087.085	3913882.301	1829.714	1829.760	0.046
3234	470650.656	3916781.362	1896.085	1896.030	-0.055
3235	457235.843	3917208.471	1849.147	1849.290	0.143
3235_A	457231.387	3917180.997	1849.414	1849.510	0.096
3236	448597.930	3925317.022	2048.315	2048.350	0.035
3237	440485.307	3925683.842	2079.052	2078.630	-0.422
3238	438829.092	3928626.345	2069.649	2069.670	0.021
3239	477398.648	3930731.322	1947.911	1947.960	0.049
3239_A	477398.962	3930636.741	1948.169	1948.220	0.051
3240	525215.101	3910233.717	1511.582	1511.620	0.038
3240_A	525257.488	3910236.970	1509.051	1509.150	0.099
3241	477027.597	3944184.922	2019.615	2019.700	0.085
3242	491092.186	3950585.399	2057.059	2057.140	0.081
3242_A	491056.933	3950581.610	2057.562	2057.640	0.078
3243	497359.078	3955857.255	1996.731	1996.700	-0.031
3244	501569.856	3960934.309	1954.300	1954.310	0.010
3245	459985.126	3986116.658	2708.907	2708.930	0.023

3246	466223.814	3987195.893	2319.693	2319.590	-0.103
3247	461617.153	3990940.767	2551.886	2551.950	0.064
3248	476083.081	3987974.668	2326.071	2326.280	0.209
3249	473078.112	3994123.315	2401.493	2401.460	-0.033
3250	466659.236	3998311.769	2438.081	2438.080	-0.001
3250_A	466682.741	3998342.305	2439.831	2439.850	0.019
3251	488450.895	3990920.497	2326.940	2326.850	-0.090
3252	477902.148	4005229.669	2497.242	2497.280	0.038
3252_A	477879.853	4005220.265	2502.688	2502.740	0.052
3253	468997.399	4012319.346	3255.060	3255.050	-0.010
3254	471065.228	4014140.627	3222.600	3222.530	-0.070
3254_A	471099.748	4014097.179	3222.385	3222.340	-0.045
3255	471799.794	4016911.461	3038.660	3038.690	0.030
3256	478355.307	4012281.816	2633.254	2633.270	0.016
3257	482876.677	4014431.926	3013.948	3013.760	-0.188
3258	474301.924	4024319.545	2611.728	2611.790	0.062
3258_A	474362.838	4024329.572	2621.487	2621.470	-0.017
3259	477870.954	4027402.237	2934.734	2934.710	-0.024
3260	470370.172	4031471.813	2775.536	2775.400	-0.136
3261	498555.033	4026257.391	2225.308	2225.410	0.102
3262	499021.371	4030781.519	2236.187	2236.140	-0.047
3262_A	498968.193	4030751.238	2246.409	2246.410	0.001
3263	506700.103	4017402.175	2044.513	2044.520	0.007
3263_A	506628.305	4017445.583	2051.354	2051.400	0.046
3264	509668.057	4022023.935	1950.679	1950.760	0.081
3265	508048.481	4024110.567	1955.158	1955.180	0.022
3266	534581.790	4021374.137	1795.776	1795.890	0.114
3266_A	534581.785	4021248.342	1793.901	1793.980	0.079
3267	526919.965	4025458.436	1839.899	1839.930	0.031
3268	518843.308	4035750.094	1862.572	1862.660	0.088
3269	498657.573	4037505.413	2157.522	2157.540	0.018
3270	514618.227	4043564.621	1949.117	1949.140	0.023
3271	512690.901	4048357.441	1996.751	1996.790	0.039
3272	509433.052	4056236.101	2165.382	2165.330	-0.052
3273	497020.648	4052562.660	2164.196	2164.200	0.004
3274	483036.029	4053293.459	2961.114	2961.080	-0.034
3274_A	483009.923	4053357.736	2955.070	2955.400	0.330
3275	470290.596	4058704.917	2755.149	2755.370	0.221
3275_A	470308.034	4058679.114	2750.398	2750.370	-0.028
3276	499829.584	4064940.334	2489.443	2489.480	0.037
3277	491857.316	4070104.363	2471.156	2471.220	0.064
3278	494333.888	4073688.854	2533.420	2533.560	0.140
3279	489302.378	4075459.519	2725.714	2725.770	0.056
3280	486293.550	4068950.553	2571.444	2571.520	0.076
3280_A	486088.359	4068997.050	2573.261	2573.210	-0.051

3281	541086.020	3931831.953	1553.692	1553.760	0.068
3281_A	541097.149	3931767.636	1550.339	1550.420	0.081
3282	532893.434	3928967.661	1627.878	1627.950	0.072
3282_A	532889.313	3929031.837	1629.070	1629.110	0.040
3283	527072.154	3931385.884	1963.616	1963.670	0.054
3283_A	527079.541	3931351.775	1963.276	1963.300	0.024
3284	519258.864	3936684.992	1978.050	1978.060	0.010
3285	506568.494	3939124.046	2079.078	2079.090	0.012
3286	553149.113	3876339.478	1476.743	1476.970	0.227
3287	539897.300	3871461.445	1479.298	1479.460	0.162
3288	533454.560	3885022.406	1487.323	1487.490	0.167
3289	553880.537	3890779.205	1398.293	1398.330	0.037
3290	522306.034	3926265.692	2044.564	2044.630	0.066
3290_A	522263.390	3926171.811	2045.578	2045.630	0.052
3291	495238.549	3919548.546	1727.030	1726.990	-0.040

VERTICAL ACCURACY CONCLUSIONS

Vegetated Vertical Accuracy (VVA) Tested 0.175 Meters at the 95th percentile reported using National Digital Elevation Program (NDEP)/ASPRS Guidelines and tested against the DEM against 251 VVA points. VVA Errors larger than 95th percentile include:
Point 3038, Easting 369279.970, Northing 3897369.630, Z-Error 0.370 Meters
Point 3056, Easting 366987.370, Northing 4019749.400, Z-Error 0.260 Meters
Point 3061A, Easting 339994.910, Northing 3937567.060, Z-Error 0.250 Meters
Point 3079, Easting 353746.260, Northing 3983786.880, Z-Error 0.210 Meters
Point 3215, Easting 489006.164, Northing 3901896.824, Z-Error 0.187 Meters
Point 3219, Easting 441612.448, Northing 3899642.154, Z-Error 0.204 Meters
Point 3237, Easting 440485.307, Northing 3925683.842, Z-Error 0.422 Meters
Point 3248, Easting 476083.081, Northing 3987974.668, Z-Error 0.209 Meters
Point 3257, Easting 482876.677, Northing 4014431.926, Z-Error 0.188 Meters
Point 3274A, Easting 483009.923, Northing 4053357.736, Z-Error 0.330 Meters
Point 3275, Easting 470290.596, Northing 4058704.917, Z-Error 0.221 Meters
Point 3286, Easting 553149.113, Northing 3876339.478, Z-Error 0.227 Meters

Figure 5.1: Lidar Relative Accuracy Histogram
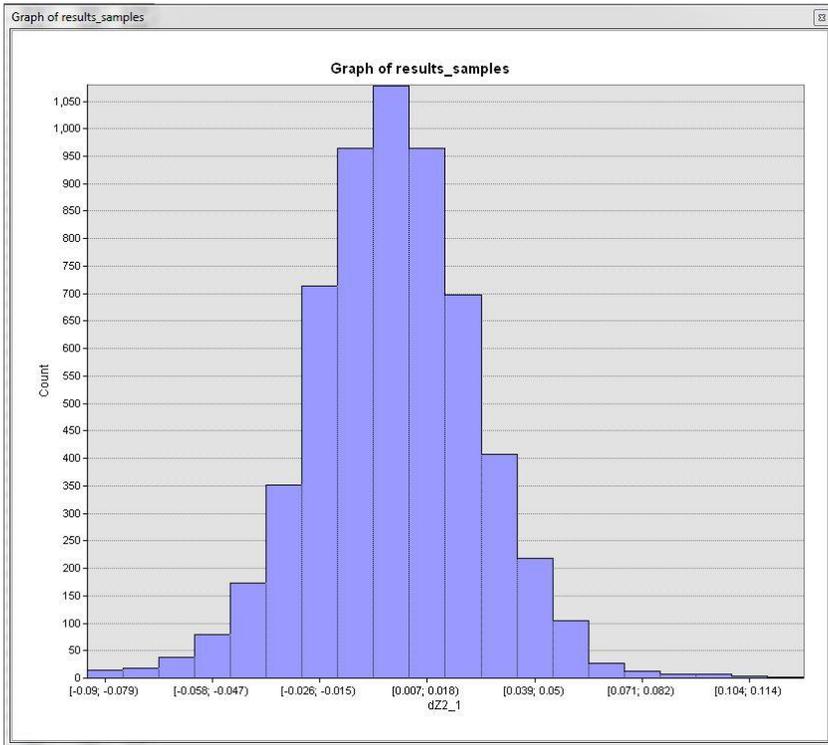
RELATIVE ACCURACY ASSESSMENT AND CONCLUSION

Relative accuracy also known as "between swath" accuracy was tested through a series of well distributed flight line overlap locations. The relative accuracy for the NM North Central FEMA R6 Lidar 2016 D17 Lidar measured at 0.024 Meters RMSDz.

Approved by:	Name	Signature	Date
Associate Member, Lidar Specialist Certified Photogrammetrist #1381	Qian Xiao		December 2017

Section 6: Flight Logs

Flight logs for the project are shown on the following pages:

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name
	5.24.2017	144	76922			NM Chama Jemez Block C

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
Denham	N404CP	6041.7	1:26:00	19:26:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	ALS-8191	6043.0	2:55:00	20:55:00	KABQ1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KABQ
220 / 4	10	30000			-2	29.96		Arriving	KABQ

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts	6500	Ft	15575	Ft	Yes	No	@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 12:59:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 1:45
136	S	19:54:00	19:55:00	0:00:00	18	1.3	146	15533	
137	N	19:59:00	20:01:00	0:00:00	18	1.2	145	15500	
138	S	20:04:00	20:06:00	0:00:00	18	1.2	151	15572	
139	N	20:11:00	20:15:00	0:00:00	18	1.2	129	15530	
140	S	20:18:00	20:21:00	0:00:00	19	1.1	149	15496	
141	N	20:25:00	20:28:00	0:00:00	19	1.1	129	15447	
142	S	20:31:00	20:32:00	0:00:00	18	1.2	155	15548	
				0:00:00					
				0:00:00					
				0:00:00					
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↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

BLOCK C

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name	
	5/25/2017	145	76922	2		NM Chama Jemez Block C, Block B	

Operator	Aircraft	HOBBS Start	Local Start Time	Zulu Start Time	Base
Denham	N404CP	6043.3	9:40:00	15:40:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	ALS-8191	6046.5	1:34:00	19:34:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
210 / 14				19	-5	29.89		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	15575	Ft	Yes	No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 8:56:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 9:55
66	SW	16:34:00	16:35:00	0:00:00	20	1	117	15420	
90	S	16:43:00	16:44:00	0:00:00	20	1.1	144	15302	
89	N	16:48:00	16:49:00	0:00:00	20	1.1	137	15228	
88	S	16:55:00	16:57:00	0:00:00	19	1.2	145	15315	
91	N	17:00:00	17:01:00	0:00:00	19	1.2	153	12478	
92	S	17:06:00	17:08:00	0:00:00	18	1.3	136	15380	
93	N	17:11:00	17:13:00	0:00:00	18	1.3	144	15433	
94	S	17:16:00	17:18:00	0:00:00	18	1.3	154	15525	
95	N	17:21:00	17:23:00	0:00:00	19	1.3	137	15458	
96	S	17:26:00	17:28:00	0:00:00	19	1.3	147	15478	
97	N	17:31:00	17:33:00	0:00:00	19	1.3	154	15419	
98	S	17:36:00	17:40:00	0:00:00	20	1.2	143	15524	
99	N	17:43:00	17:47:00	0:00:00	23	1.1	144	15524	
100	S	17:50:00	17:56:00	0:00:00	22	1.1	130	15404	
101	N	17:58:00	18:04:00	0:00:00	21	1.1	156	15569	
102	S	18:08:00	18:14:00	0:00:00	21	1.1	145	15578	
110	N	18:18:00	18:27:00	0:00:00	20	1.2	133	15440	
				0:00:00					
140	W	18:48:00	19:05:00	0:00:00	20	1.2	95	13474	BLOCK B
				0:00:00					
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Additional Comments:	Drive #
BLOCK C and BLOCK B	

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #			Project Name		
	5/26/2017	146	76922		2			NM Chama Jemez Block B		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
Denham		N404CP		6046.5		9:43:00		15:43:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
GEBHART		ALS-8191		6052.2		3:23:00		21:23:00		KSAF1

Wind Dir/Speed	Visibility		Ceiling		Cloud Cover %	Temp		Dew Point		Pressure		Haze/Fire/Cloud		Departing	KSAF
210 / 12								-8		30.09				Arriving	KSAF

Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain			Mode		Threshold Values
40		42.9		272		100		Gain - Course/Up			Single		A
								Gain - Fine/Down			Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	13575	Ft	Yes / No		@		NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 9:10:00
		⇕ Times entered are Zulu / GMT ⇕							Verify S-Turns Before Mission Yes X No
									Take Off: 10:01
139	W	16:23:00	X	0:00:00	X	X	X	X	TDC Error
X	X	X	X	0:00:00	X	X	X	X	Reflying Base Station
139	W	17:08:00	17:21:00	0:00:00	19	1.4	146	13523	
138	E	17:24:00	17:36:00	0:00:00	20	1.3	149	13505	
137	W	17:39:00	17:54:00	0:00:00	23	1	133	13350	
136	E	17:57:00	18:09:00	0:00:00	20	1.1	150	13396	
135	W	18:12:00	18:25:00	0:00:00	20	1.2	144	13472	
134	E	18:28:00	18:39:00	0:00:00	22	1.1	144	13376	
133	W	18:43:00	18:56:00	0:00:00	20	1.1	105	13353	
132	E	18:59:00	19:07:00	0:00:00	20	1.2	143	13458	
131	W	19:11:00	19:20:00	0:00:00	20	1.2	129	13509	
130	E	19:23:00	19:38:00	0:00:00	20	1.1	140	13384	
129	W	19:42:00	19:59:00	0:00:00	18	1.3	139	13440	
128	E	20:02:00	20:18:00	0:00:00	19	1.2	161	13619	
127	W	20:21:00	20:39:00	0:00:00	18	1.2	133	13488	
126	E	20:43:00	20:58:00	0:00:00	17	1.1	156	13485	
				0:00:00					
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↑ Times entered are Zulu / GMT ↑			Page		1		Verify S-Turns After Mission Yes X No

Additional Comments:	Drive #
Block B	

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name
	5/27/2017	147	76922	2		NM Chama Jemez Block B

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
Denham	N404CP	6052.2	9:20:00	15:20:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	ALS-8191	6057.0	2:28:00	20:28:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
								Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts	6500	Ft	13575	Ft	Yes / No		@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 8:49:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 9:38
125	W	16:04:00	16:19:00	0:00:00	18	1.2	138	13477	
124	E	16:22:00	16:36:00	0:00:00	22	1.1	151	13569	
123	W	16:40:00	16:55:00	0:00:00	22	1.2	139	13594	
122	E	16:58:00	17:14:00	0:00:00	20	1.4	153	13568	
121	W	17:17:00	17:33:00	0:00:00	21	1.3	150	13425	
120	E	17:37:00	17:52:00	0:00:00	23	1.1	156	13569	
119	W	17:57:00	18:16:00	0:00:00	22	1.2	152	13580	
118	E	18:19:00	18:38:00	0:00:00	22	1.2	155	13582	
117	W	18:41:00	19:00:00	0:00:00	22	1.1	144	13512	
116	E	19:03:00	19:21:00	0:00:00	22	1.2	148	13653	
115	W	19:24:00	19:42:00	0:00:00	21	1.3	135	13441	
114	E	19:46:00	20:03:00	0:00:00	19	1.4	150	13592	Being pushed by tailwind. 19:51,1:954
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Additional Comments: Drive #

BLOCK B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	5/28/2017	148	76922		2		NM Chama Jemez Block B		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
Denham		N404CP		6057.0		12:16:00		18:16:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
GEBHART		ALS-8191		6058.2		2:18:00		20:18:00		KSAF1

Wind Dir/Speed	Visibility		Ceiling		Cloud Cover %	Temp		Dew Point		Pressure		Haze/Fire/Cloud		Departing	KSAF
160 / 10						20		-1		30.33				Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain			Mode		Threshold Values
40	42.9		272		100		Gain - Course/Up			Single		A
							Gain - Fine/Down			Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	13575	Ft	Yes	No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	8:57:00
		⇕ Times entered are Zulu / GMT ⇕							Verify S-Turns Before Mission Yes X No	
									Take Off: 12:23	
113	W	18:47:00	19:06:00	0:00:00	20	1.1	147	13497		
				0:00:00					Engine Trouble Again.	
				0:00:00					RTB.	
				0:00:00						
				0:00:00						
				0:00:00						
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↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission Yes X No	

Additional Comments: **Drive #**

Aircraft engine issues. Late take off. Block B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name
	6/5/2017	156	76922	2		USGS NM Chama Jemez Block C

Operator	Aircraft	HOBBS Start	Local Start Time	Zulu Start Time	Base
Denham	N404CP	6062.0	9:19:00	15:19:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	ALS-8191	6065.6	1:10:00	19:10:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
Variable / 3	10				8	30.16		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts	6500	Ft	15575	Ft	Yes	No	@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 8:55:00
		⇕ Times entered are Zulu / GMT ⇕							Verify S-Turns Before Mission Yes X No
									Take Off: 9:31
67	S	16:03:00	16:06:00	0:00:00	23	1.1	153	15583	
68	N	16:09:00	16:12:00	0:00:00	22	1.3	140	15573	
69	S	16:15:00	16:23:00	0:00:00	22	1.3	151	15577	
70	N	16:25:00	16:33:00	0:00:00	20	1.4	142	15449	
71	S	16:36:00	16:44:00	0:00:00	20	1.4	152	15542	
72	N	16:47:00	16:55:00	0:00:00	21	1.3	145	15479	
73	S	16:58:00	17:05:00	0:00:00	23	1.1	152	15498	
74	N	17:08:00	17:15:00	0:00:00	23	1.1	148	15541	
75	S	17:18:00	17:24:00	0:00:00	21	1.2	146	15535	
76	N	17:26:00	17:31:00	0:00:00	20	1.4	148	15508	
77	S	17:34:00	17:38:00	0:00:00	21	1.3	148	15563	
78	N	17:41:00	17:46:00	0:00:00	21	1.2	157	15460	
79	S	17:48:00	17:53:00	0:00:00	23	1.1	153	15506	
80	N	17:55:00	17:59:00	0:00:00	24	1.1	151	15524	
81	S	18:02:00	18:05:00	0:00:00	23	1.1	158	15483	
82	N	18:09:00	18:12:00	0:00:00	21	1.1	158	15550	
83	S	18:14:00	18:17:00	0:00:00	21	1.1	144	15487	
84	N	18:20:00	18:24:00	0:00:00	20	1.2	146	15576	
85	S	18:26:00	18:30:00	0:00:00	21	1.2	139	15567	
86	N	18:32:00	18:35:00	0:00:00	21	1.2	130	15534	
87	S	18:40:00	18:42:00	0:00:00	21	1.2	149	15496	
				0:00:00					
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↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission Yes X No		Drive #

Additional Comments:

Block C.

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	6/6/2017	157	76922		2		NM Chama Jemez Block C		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
Denham		N404CP		6065.6		10:02:00		16:02:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
GEBHART		ALS-8191		6067.6		12:12:00		18:12:00		KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
340 / 7	10			25	6	30.26		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts	6500	Ft	15575	Ft	Yes / No		@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 9:12:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 10:10
103	S	16:36:00	16:42:00	0:00:00	21	1.3	147	15572	
104	N	16:46:00	16:53:00	0:00:00	21	1.2	134	15402	
105	S	16:56:00	17:04:00	0:00:00	23	1.1	147	15480	
106	N	17:07:00	17:15:00	0:00:00	21	1.1	133	15406	
107	S	17:18:00	17:28:00	0:00:00	22	1.4	143	15500	
108	N	17:31:00	17:41:00	0:00:00	22	1.2	134	15400	
				0:00:00					
				0:00:00					
				0:00:00					
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↑ Times entered are Zulu / GMT ↑		Page	1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

Block C

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #			Project Name	
	6/7/2017	158	76922		2			USGS NM Chama Jemes Block C, Block B	

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
Denham	N404CP	6067.6	10:00:00	16:00:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	ALS-8191	6071.8	2:35:00	20:35:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
Variable/ 3				21	10	30.29		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	15575/13575	Ft	Yes	No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	9:21:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission	Yes X No
									Take Off: 10:15	
109	S	16:40:00	16:49:00	0:00:00	20	1.3	147	15409	Block C	
111	N	16:51:00	16:59:00	0:00:00	24	1	135	15411	Block C	
112	S	17:03:00	17:14:00	0:00:00	21	1.1	151	15525	Block C	
113	N	17:16:00	17:26:00	0:00:00	19	1.3	144	15415	Block C Cloud 17:23	
135	S	17:32:00	17:33:00	0:00:00	20	1.2	146	15510	Block C	
134	N	17:35:00	17:37:00	0:00:00	20	1.2	149	15405	Block C	
133	S	17:39:00	17:41:00	0:00:00	21	1.1	155	15421	Block C	
132	N	17:44:00	17:46:00	0:00:00	22	1.1	140	15451	Block C	
131	S	17:48:00	17:52:00	0:00:00	22	1	140	15365	Block C Cloud 17:49	
				0:00:00						
185	W	17:59:00	18:12:00	0:00:00	21	1	150	13616	Block B	
184	E	18:15:00	18:29:00	0:00:00	20	1.1	146	13574	Block B	
183	W	18:31:00	18:45:00	0:00:00	20	1.3	155	13525	Block B	
182	E	18:47:00	19:01:00	0:00:00	18	1.5	143	13677	Block B	
140	W	19:11:00	19:24:00	0:00:00	17	1.3	147	13501	Block B	
141	E	19:26:00	19:39:00	0:00:00	18	1.1	145	13651	Block B	
142	W	19:42:00	19:56:00	0:00:00	19	1.1	150	13570	Block B	
143	E	19:58:00	20:11:00	0:00:00	19	1.1	147	13599	Block B	
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Additional Comments: Drive #

BLOCK C & BLOCK B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	6/8/2017	159	76922		2		USGS NM Chama Jemez Block C	

Operator	Aircraft	HOBBS Start	Local Start Time	Zulu Start Time	Base
Denham	N404CP	6071.8	8:57:00	14:57:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	ALS-8191	6073.5	10:51:00	16:51:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud		
								Departing	KSAF
								Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15575	Ft	Yes		No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 8:19:00
			‡ Times entered are Zulu / GMT ‡						Verify S-Turns Before Mission Yes X No
									Take Off: 9:03
130	S	15:25:00	15:28:00	0:00:00	20	1.2	145	15385	
129	N	15:31:00	15:35:00	0:00:00	20	1.1	141	15453	
128	S	15:38:00	15:43:00	0:00:00	22	1	143	15463	
127	N	15:46:00	15:52:00	0:00:00	21	1.1	144	15442	
126	S	15:55:00	16:02:00	0:00:00	20	1.2	148	15392	
125	N	16:04:00	16:12:00	0:00:00	20	1.2	139	15378	
124	S	16:14:00	16:21:00	0:00:00	20	1.2	145	15412	
123	N	16:23:00	16:29:00	0:00:00	20	1.3	150	15425	
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↑ Times entered are Zulu / GMT ↑		Page	1	Verify S-Turns After Mission Yes X No

Additional Comments: | Drive #

Block C

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name
	6/13/2017	164	76922	2		USGS NM Chama Jemez Block C/Block B

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
Denham	N404CP	6073.5	7:45:00	13:45:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	6077.6	12:01:00	18:01:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
150 / 3	10			16	-8	30.07		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15575	Ft	Yes	No		@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 7:23:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 7:56
131	S	14:21:00	14:25:00	0:00:00	19	1.2	140	15519	Block C
122	N	14:29:00	14:35:00	0:00:00	20	1.1	144	15567	Block C
121	S	14:39:00	14:44:00	0:00:00	19	1.2	153	15541	Block C
120	N	14:50:00	14:56:00	0:00:00	18	1.2	159	15571	Block C
119	S	14:59:00	15:05:00	0:00:00	19	1.3	152	15529	Block C
118	N	15:08:00	15:14:00	0:00:00	21	1.1	159	15565	Block C
117	S	15:18:00	15:24:00	0:00:00	21	1.1	149	15533	Block C
116	N	15:27:00	15:33:00	0:00:00	22	1.1	147	15541	Block C
115	S	15:37:00	15:44:00	0:00:00	22	1.1	140	15451	Block C
114	N	15:46:00	15:53:00	0:00:00	21	1.3	144	15327	Block C
112	S	15:58:00	16:08:00	0:00:00	21	1.4	153	15399	Block C
				0:00:00					
126	E	16:23:00	16:25:00	0:00:00	23	1.2	166	14074	Block B Tailwind. Unable to fly slower
143	W	16:34:00	16:47:00	0:00:00	24	1.1	160	13607	Block B
144	E	16:51:00	17:04:00	0:00:00	20	1.4	151	13557	Block B
145	W	17:07:00	17:20:00	0:00:00	21	1.2	154	13475	Block B Down Draft
146	E	17:23:00	17:36:00	0:00:00	23	1.1	159	13615	Block B
				0:00:00					
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Additional Comments: Drive #

Block C and BLOCK B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	6/14/2017	165	76922		2		NM Chama Jemez Block B		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
Denham		N404CP		6077.6		7:25:00		13:25:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
ALBERS		ALS-8191		6083.6		1:45:00		19:45:00		KSAF1

Wind Dir/Speed	Visibility		Ceiling		Cloud Cover %	Temp	Dew Point		Pressure		Haze/Fire/Cloud		Departing	KSAF
350 / 14						12	-10		30.15				Arriving	KSAF

Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain			Mode		Threshold Values	
40		42.9		272		100		Gain - Course/Up			Single		A	
								Gain - Fine/Down			Multi		B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode					Pre-Trigger Dist.	
150	Kts	6500	Ft	13575	Ft	Yes	No			@		NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 7:18:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 7:41
110	W	14:08:00	14:25:00	0:00:00	16	1.3	157	13532	
111	E	14:29:00	14:46:00	0:00:00	16	1.2	160	13538	
112	W	14:49:00	15:06:00	0:00:00	16	1.3	159	13464	
147	E	15:12:00	15:25:00	0:00:00	18	1.2	154	13480	
148	W	15:28:00	15:41:00	0:00:00	18	1.2	158	13536	
149	E	15:44:00	15:57:00	0:00:00	17	1.4	154	13574	
150	W	16:01:00	16:14:00	0:00:00	18	1.3	164	13497	
151	E	16:17:00	16:30:00	0:00:00	21	1.2	159	13603	
152	W	16:33:00	16:46:00	0:00:00	20	1.2	157	13522	
153	E	16:49:00	17:02:00	0:00:00	19	1.5	152	13585	
154	W	17:07:00	17:18:00	0:00:00	19	1.3	160	13492	
155	E	17:23:00	17:38:00	0:00:00	22	1.2	160	13532	
156	W	17:41:00	17:56:00	0:00:00	20	1.1	165	13579	
157	E	17:58:00	18:13:00	0:00:00	20	1.2	163	13651	
158	W	18:16:00	18:31:00	0:00:00	18	1.4	164	13560	
159	E	18:34:00	18:49:00	0:00:00	18	1.2	158	13628	
160	W	18:53:00	19:09:00	0:00:00	19	1.1	156	13641	
161	E	19:12:00	19:27:00	0:00:00	21	1	159	13672	19:34 Big Updraft
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Additional Comments: Drive #

BLOCK B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	6/15/2017	166	76299		2		NM Chama Jemez Block B		
Operator		**Aircraft**		**HOBBS Start**	**Local Start Time**		**ZULU Start Time**		**Base**
Denham		N404CP		6083.6	7:18:00		13:18:00		WOOLPERT PIN
Pilot		**Sensor Type**		**HOBBS END**	**Local End Time**		**Zulu End Time**		**PID**
ALBERS		ALS-8191		6090.4	2:16:00		20:16:00		KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
								Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts	6500	Ft	13575	Ft	Yes / No		@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 7:11:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 7:22
162	W	13:44:00	X	0:00:00	X	X	X	X	TDC Error
				0:00:00					Refly Base Station
162	W	14:15:00	X	0:00:00	X	X	X	X	TDC Error
162	W	14:23:00	14:39:00	0:00:00	19	1.3	161	13448	
163	E	14:42:00	14:58:00	0:00:00	19	1.3	159	13512	
164	W	15:02:00	15:17:00	0:00:00	22	1.1	161	13567	
165	E	15:20:00	15:35:00	0:00:00	21	1.2	164	13557	
166	W	15:38:00	15:53:00	0:00:00	20	1.4	159	13546	
167	E	15:56:00	16:11:00	0:00:00	20	1.3	163	13558	
168	W	16:14:00	16:29:00	0:00:00	22	1.1	161	13578	
169	E	16:33:00	16:46:00	0:00:00	21	1.1	151	13538	
170	W	16:49:00	17:01:00	0:00:00	19	1.3	162	13502	
171	E	17:04:00	17:18:00	0:00:00	22	1.1	163	13573	
172	W	17:21:00	17:34:00	0:00:00	23	1	156	13427	
173	E	17:37:00	17:50:00	0:00:00	21	1	153	13547	
174	W	17:53:00	18:06:00	0:00:00	20	1.2	151	13516	
175	E	18:09:00	18:22:00	0:00:00	18	1.4	156	13536	
176	W	18:24:00	18:38:00	0:00:00	17	1.5	159	13562	
177	E	18:41:00	18:54:00	0:00:00	19	1.2	165	13646	
178	W	18:58:00	19:11:00	0:00:00	18	1.2	150	13519	
179	E	19:13:00	19:26:00	0:00:00	17	1.1	155	13585	
180	W	19:29:00	19:43:00	0:00:00	17	1.1	164	13595	
181	E	19:46:00	19:59:00	0:00:00	16	1.2	155	13534	
				0:00:00					
				0:00:00					
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				0:00:00					
				0:00:00					

↑ Times entered are Zulu / GMT ↑		Page	1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

BLOCK B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #			Project Name		
	6/16/2017	167	76922		2			NM Chama Jemez Block B		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
Denham		N404CP		6090.4		9:08:00		15:08:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
ALBERS		ALS-8191		6096.7		3:16:00		21:16:00		KSKX1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	KSKX
CALM	10	12000		20	-7	30.27			Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.
150	Kts	6500	Ft	13575	Ft	Yes / No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 9:03:00
		⭥ Times entered are Zulu / GMT ⭥							Verify S-Turns Before Mission Yes X No
									Take Off: 9:15
1	S	15:43:00	X	0:00:00	X	X	X	X	Aborted Line: Wildfire
73	W	15:53:00	16:04:00	0:00:00	21	1.3	150	13574	
72	E	16:07:00	16:19:00	0:00:00	22	1.2	158	13576	
71	W	16:21:00	16:33:00	0:00:00	22	1.1	153	13543	
70	E	16:36:00	16:47:00	0:00:00	22	1.2	161	13528	
69	W	16:50:00	17:02:00	0:00:00	22	1.2	157	13498	
68	E	17:05:00	17:17:00	0:00:00	23	1.1	163	13554	
67	W	17:19:00	17::31	0:00:00	24	1	153	13509	
66	E	17:34:00	17:43:00	0:00:00	23	1.1	160	13578	
65	W	17:47:00	17:56:00	0:00:00	23	1	155	13535	
64	E	17:59:00	18:09:00	0:00:00	22	1.1	160	13564	
63	W	18:12:00	18:22:00	0:00:00	19	1.3	162	13547	
62	E	18:26:00	18:35:00	0:00:00	19	1.2	151	13547	
61	W	18:38:00	18:49:00	0:00:00	19	1.2	149	13447	
60	E	18:52:00	19:03:00	0:00:00	19	1.1	163	13542	
59	W	19:07:00	19:18:00	0:00:00	19	1	144	13524	
58	E	19:21:00	19:32:00	0:00:00	17	1.3	147	13574	
57	W	19:35:00	19:46:00	0:00:00	17	1.2	157	13495	
56	E	19:49:00	20:00:00	0:00:00	19	1.1	150	13479	
55	W	20:04:00	20:14:00	0:00:00	20	1	160	13443	
54	E	20:17:00	20:27:00	0:00:00	20	1	164	13491	
53	W	20:30:00	20:40:00	0:00:00	17	1.2	149	13457	
52	E	20:42:00	20:52:00	0:00:00	16	1.1	153	13563	
				0:00:00					
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↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

BLOCK B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	6/17/2017	168	76922		2		USGS NM Chama Jemez Block B	

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
Denham		N404CP		6096.7		9:10:00		15:10:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
Albers		ALS-8191		6102.7		3:24:00		21:24:00		KSKX1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing		KSKX
CALM	10	12000		23	-3	30.18		Arriving		KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	255	Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	215
				Gain - Fine/Down		Multi	X	B	195

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	13575	Ft	Yes / No X		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 8:54:00
		⇕ Times entered are Zulu / GMT ⇕							Verify S-Turns Before Mission Yes X No
									Take Off: 9:21
51	W	15:42:00	15:52:00	0:10:00	20	1.3	145	13536	
50	E	15:55:00	16:04:00	0:09:00	20	1.2	159	13590	
49	W	16:08:00	16:17:00	0:09:00	23	1.1	156	13522	
48	E	16:20:00	16:29:00	0:09:00	23	1	153	13487	
47	W	16:31:00	16:40:00	0:09:00	20	1.1	150	13530	
46	E	16:43:00	16:53:00	0:10:00	20	1.2	163	13570	
45	W	16:55:00	17:04:00	0:09:00	20	1.1	156	13497	
44	E	17:07:00	17:15:00	0:08:00	20	1.1	158	13600	
43	W	17:18:00	17:25:00	0:07:00	19	1.2	154	13494	
42	E	17:28:00	17:35:00	0:07:00	20	1.1	155	13624	
41	W	17:37:00	17:44:00	0:07:00	20	1.2	153	13526	
40	E	17:47:00	17:53:00	0:06:00	20	1.2	152	13534	
39	W	17:56:00	18:02:00	0:06:00	20	1.1	157	13537	
38	E	18:05:00	18:11:00	0:06:00	18	1.4	154	13570	
37	W	18:14:00	18:20:00	0:06:00	17	1.3	143	13486	
36	E	18:23:00	18:28:00	0:05:00	17	1.4	149	13562	
35	W	18:32:00	18:37:00	0:05:00	17	1.2	161	13551	
34	E	18:39:00	18:44:00	0:05:00	17	1.2	162	13638	
33	W	18:47:00	18:51:00	0:04:00	18	1.1	159	13542	
32	E	18:54:00	18:58:00	0:04:00	17	1.2	163	13554	
31	W	19:01:00	19:06:00	0:05:00	19	1.1	150	13543	
30	E	19:08:00	19:12:00	0:04:00	19	1.1	159	13570	
29	W	19:15:00	19:19:00	0:04:00	18	1.1	158	13485	
28	E	19:22:00	19:27:00	0:05:00	19	1	154	13520	
27	W	19:30:00	19:35:00	0:05:00	19	1	148	13586	
26	E	19:38:00	19:43:00	0:05:00	17	1.3	151	13539	
25	W	19:45:00	19:50:00	0:05:00	18	1.1	152	13367	
24	E	19:53:00	19:58:00	0:05:00	18	1.1	154	13537	
23	W	20:02:00	20:07:00	0:05:00	20	1	153	13441	
22	E	20:09:00	20:14:00	0:05:00	20	1	165	13451	

↑ Times entered are Zulu / GMT ↑			Page		1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

BLOCK B, CONTINUED ON NEXT PAGE (2)

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	6/17/2017	168	76922		2		BLOCK B	

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID

Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure		Haze/Fire/Cloud		Departing	
																Arriving	

Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		Mode		Threshold Values
								Gain - Course/Up		Single		A
								Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.
	Kts		Ft		Ft	Yes	No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	
		⇕ Times entered are Zulu / GMT ⇕							Verify S-Turns Before Mission Yes No	
									Take Off:	
21	W	20:18:00	20:23:00	0:00:00	18	1.1	159	13570		
20	E	20:26:00	20:31:00	0:00:00	17	1.2	160	13525		
109	W	20:49:00	21:07:00	0:00:00	16	1.4	150	13479		
				0:00:00						
				0:00:00						
				0:00:00						
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↑ Times entered are Zulu / GMT ↑			Page		2		Verify S-Turns After Mission Yes No	

Additional Comments:	Drive #
BLOCK B	

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #			Project Name	
	6/18/2017	169	76922		2			USGS NM Chama Jemez Block A/Block B	

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
Denham		N404CP		6102.7		9:24:00		15:24:00		WOOLPERT PIN
Pilot		**Sensor Type**		**HOBBS END**		**Local End Time**		**Zulu End Time**		**PID**
ALBERS		ALS-8191		6108.2		3:07:00		21:07:00		KSKX1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	KSKX
									Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	11575/13575	Ft	Yes		No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 9:10:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 9:32
22	S	16:01:00	16:07:00	0:00:00	23	1.2	163	11636	Block A
23	N	16:11:00	16:18:00	0:00:00	23	1.1	154	11512	Block A
24	S	16:21:00	16:28:00	0:00:00	21	1.1	160	11500	Block A
25	N	16:32:00	16:37:00	0:00:00	20	1.2	161	11515	Block A
26	S	16:39:00	16:44:00	0:00:00	20	1.2	159	11514	Block A
27	N	16:47:00	16:51:00	0:00:00	20	1.2	162	11572	Block A
28	S	16:54:00	16:57:00	0:00:00	22	1.2	155	11518	Block A
29	N	17:00:00	17:03:00	0:00:00	22	1.1	147	11480	Block A
30	S	17:06:00	17:09:00	0:00:00	22	1.1	147	11537	Block A
31	N	17:12:00	17:15:00	0:00:00	20	1.1	152	11549	Block A
32	S	17:18:00	17:20:00	0:00:00	21	1.1	149	11519	Block A
33	N	17:24:00	17:26:00	0:00:00	20	1.1	161	11517	Block A
34	S	17:29:00	17:32:00	0:00:00	19	1.2	156	11517	Block A
				0:00:00					
108	E	17:44:00	18:02:00	0:00:00	20	1.2	149	13511	Block B
107	W	18:05:00	18:22:00	0:00:00	18	1.3	149	13546	Block B
106	E	18:25:00	18:43:00	0:00:00	17	1.2	157	13522	Block B
105	W	18:47:00	19:05:00	0:00:00	18	1	152	13448	Block B
104	E	19:08:00	19:26:00	0:00:00	17	1.1	157	13540	Block B
103	W	19:29:00	19:47:00	0:00:00	17	1.4	159	13546	Block B
102	E	19:50:00	20:08:00	0:00:00	18	1.1	150	13537	Block B
101	W	20:12:00	20:30:00	0:00:00	16	1.1	145	13441	Block B
100	E	20:33:00	20:50:00	0:00:00	14	1.3	158	13550	Block B
				0:00:00					
				0:00:00					
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				0:00:00					
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↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

BLOCK A, BLOCK B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name
	6/19/2017	170	76922	2		NM Chama Jemez Block B

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
Denham	N404CP	6108.2	8:01:00	14:01:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	6114.9	2:58:00	20:58:00	KSKX1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSKX
CALM	10	12000		19	6	30.34		Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts	6500	Ft	13575	Ft	Yes	No	@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 7:46:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 8:09
99	W	14:30:00	14:48:00	0:00:00	20	1.2	159	13485	
98	E	14:51:00	15:08:00	0:00:00	24	1	164	13476	
97	W	15:12:00	15:29:00	0:00:00	24	1.1	156	13480	
96	E	15:32:00	15:49:00	0:00:00	22	1.4	164	13463	
95	W	15:52:00	16:10:00	0:00:00	23	1.2	150	13458	
94	E	16:13:00	16:30:00	0:00:00	25	1	154	13574	
93	W	16:33:00	16:51:00	0:00:00	23	1.2	152	13593	
92	E	16:54:00	17:11:00	0:00:00	24	1.1	157	13462	
91	W	17:14:00	17:32:00	0:00:00	23	1.2	156	13565	
90	E	17:35:00	17:52:00	0:00:00	22	1.2	162	13549	
89	W	17:55:00	18:12:00	0:00:00	19	1.4	158	13509	
88	E	18:15:00	18:33:00	0:00:00	19	1.2	163	13521	
87	W	18:40:00	18:52:00	0:00:00	18	1.2	155	13527	
86	E	18:54:00	19:06:00	0:00:00	19	1.1	154	13571	
85	W	19:09:00	19:20:00	0:00:00	18	1.1	162	13627	
84	E	19:24:00	19:35:00	0:00:00	17	1.1	158	13471	
83	W	19:38:00	19:50:00	0:00:00	19	1.1	152	13530	
82	E	19:53:00	20:04:00	0:00:00	20	1.1	150	13472	
81	W	20:07:00	20:19:00	0:00:00	18	1.2	155	13542	
80	E	20:22:00	20:34:00	0:00:00	17	1.2	164	13538	
				0:00:00					
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↑ Times entered are Zulu / GMT ↑		Page	1	Verify S-Turns After Mission Yes X No

Additional Comments: | Drive #

BLOCK B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	6/20/2017	171	76922		2		USGS NM Chama Jemez	

Operator	Aircraft	HOBBS Start	Local Start Time	Zulu Start Time	Base
Denham	N404CP	6114.9	8:24:00	14:24:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	6119.2	12:51:00	18:51:00	KSKX1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud		
340 / 5	10	12000		20	8	-		Departing	KSKX
								Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	13575	Ft	Yes	No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	7:54:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission	Yes X No
									Take Off: 8:30	
1	SE	14:54:00	14:58:00	0:00:00	21	1.1	158	13566		
2	NW	15:02:00	15:07:00	0:00:00	21	1.2	152	13522		
3	SE	15:10:00	15:15:00	0:00:00	21	1.2	160	13508		
4	NW	15:18:00	15:24:00	0:00:00	19	1.4	161	13504		
5	SE	15:27:00	15:32:00	0:00:00	20	1.4	162	13550		
6	NW	15:35:00	15:40:00	0:00:00	21	1.3	160	13619		
7	SE	15:43:00	15:48:00	0:00:00	21	1.3	150	13557		
8	NW	15:50:00	15:56:00	0:00:00	24	1.2	155	13581		
9	SE	15:58:00	16:03:00	0:00:00	24	1.1	156	13579		
10	NW	16:06:00	16:11:00	0:00:00	24	1.1	151	13542		
11	SE	16:16:00	16:19:00	0:00:00	21	1.2	155	13542		
12	NW	16:21:00	16:25:00	0:00:00	21	1.2	147	13452		
13	SE	16:27:00	16:30:00	0:00:00	21	1.2	156	13349		
14	NW	16:33:00	16:37:00	0:00:00	21	1.2	159	13535		
15	SE	16:39:00	16:43:00	0:00:00	21	1.2	156	13538		
16	NW	16:46:00	16:49:00	0:00:00	22	1.2	158	13628		
17	SE	16:51:00	16:54:00	0:00:00	22	1.1	166	13551		
18	NW	16:46:00	16:49:00	0:00:00	21	1.1	164	13546		
19	SE	17:03:00	17:04:00	0:00:00	19	1.2	165	13474		
79	W	17:08:00	17:20:00	0:00:00	20	1.1	155	13539		
78	E	17:23:00	17:35:00	0:00:00	19	1.3	160	13573		
77	W	17:37:00	17:49:00	0:00:00	20	1.2	161	13521		
76	E	17:51:00	18:03:00	0:00:00	18	1.5	151	13519		
75	W	18:06:00	18:17:00	0:00:00	18	1.4	165	13500		
74	E	18:20:00	18:32:00	0:00:00	18	1.2	158	13535		
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						

↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

BLOCK B

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	6/21/2017	172	76922		2		USGS NM Chama Jemez Block C	

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
Denham	N404CP	6119.2	8:34:00	14:34:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	6124.0	1:33:00	19:33:00	KSKX1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSKX
210 / 4	10	12000		21	7			Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15575	Ft	Yes	No		@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	7:47:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No	
									Take Off: 8:40	
41	N	15:03:00	15:17:00	0:00:00	19	1.1	156	15471		
42	S	15:20:00	15:32:00	0:00:00	17	1.4	160	15562		
43	N	15:35:00	15:46:00	0:00:00	18	1.3	156	15500		
44	S	15:49:00	15:59:00	0:00:00	20	1.2	153	15451		
45	N	16:03:00	16:15:00	0:00:00	20	1.1	149	15455	Possible Smoke	
46	S	16:18:00	16:29:00	0:00:00	20	1.2	163	15462	Possible Smoke	
47	N	16:33:00	16:44:00	0:00:00	20	1.1	159	15505	Possible Smoke	
48	S	16:47:00	16:57:00	0:00:00	22	1.1	156	15492	Wildfire Smoke	
49	N	17:01:00	17:11:00	0:00:00	21	1.1	157	15519	Wildfire Smoke	
50	S	17:14:00	17:24:00	0:00:00	18	1.3	156	15503	Wildfire Smoke	
51	N	17:27:00	17:36:00	0:00:00	19	1.2	159	15575	Wildfire Smoke	
52	S	17:39:00	17:47:00	0:00:00	20	1.2	163	15533	Wildfire Smoke	
53	N	17:50:00	15:56:00	0:00:00	18	1.4	160	15463	Wildfire Smoke	
54	S	17:59:00	18:05:00	0:00:00	18	1.4	151	15618	Wildfire Smoke	
55	N	18:08:00	18:14:00	0:00:00	18	1.2	150	15455	Wildfire Smoke	
56	S	18:17:00	18:23:00	0:00:00	18	1.2	165	15588	Wildfire Smoke	
57	N	18:25:00	18:30:00	0:00:00	18	1.2	164	15507	Wildfire Smoke	
58	S	18:33:00	18:38:00	0:00:00	19	1.1	154	15503	Wildfire Smoke	
59	N	18:41:00	18:45:00	0:00:00	19	1.1	146	15532	Wildfire Smoke	
60	S	18:47:00	18:50:00	0:00:00	19	1.1	151	15485	Wildfire Smoke	
61	N	18:53:00	18:56:00	0:00:00	20	1.1	150	15383	Wildfire Smoke	
62	S	18:59:00	19:02:00	0:00:00	19	1.2	161	15478	Wildfire Smoke	
63	N	19:05:00	19:07:00	0:00:00	19	1.2	156	15381	Wildfire Smoke	
64	S	19:10:00	19:11:00	0:00:00	19	1.2	158	15508	Wildfire Smoke	
65	N	19:14:00	19:14:00	0:00:00	19	1.2	149	15445	Wildfire Smoke	
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
↑ Times entered are Zulu / GMT ↑			Page		1		Verify S-Turns After Mission Yes X No			

Additional Comments: Drive #

Block C. The further we went toward Line 65 the thicker the smoke.

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	7/17/2017	198	76922	2	chama jemez

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
SMITH	N404CP	6127.1	8:29:00	14:29:00	

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	OTHER	6130.0	11:17:00	17:17:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	skx
								Arriving	skx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	43	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15574	Ft	Yes	No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission	Yes X No
1	s	14:59:00	15:01:00		21	0.6	1.1		
2	n	15:04:00	15:06:00		22	0.6	1.1		
3	s	15:09:00	15:10:00		22	0.6	1.1		
4	n	15:14:00	15:16:00		21	0.6	1.1		
5	s	15:19:00	15:20:00		22	0.6	1		
6	n	15:23:00	15:24:00		21	0.6	1.1		
7	s	15:27:00	15:28:00		19	0.6	1.1		
8	n	15:32:00	15:33:00		20	0.6	1		
9	s	15:36:00	15:37:00		19	0.6	1.2		
10	n	15:41:00	15:42:00		20	0.6	1.2		
11	s	15:45:00	15:46:00		20	0.6	1.2		
12	n	15:49:00	15:50:00		20	0.6	1.2		
13	s	15:54:00	15:55:00		19	0.6	1.3		
14	n	15:58:00	16:02:00		18	0.6	1.4		
15	s	16:05:00	16:09:00		18	0.6	1.4		
16	n	16:11:00	16:16:00		18	0.6	1.4		
17	s	16:18:00	16:24:00		17	0.6	1.5	clds wp 16-18	
18	n	16:26:00	16:32:00		18	0.6	1.2		
19	s	16:34:00	16:42:00		17	0.6	1.2		
20	n	16:44:00	16:53:00		18	0.6	1.1	clds wp 17,11,10	
17	s	16:56:00	16:58:00		18	0.6	1.1	reflt wp 16-18	
↑ Times entered are Zulu / GMT ↑			Page		1			Verify S-Turns After Mission	Yes X No

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	7/18/2017	199	76922		2		chama jemez		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
SMITH		N404CP		6130.0		8:10:00		14:10:00		

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
GEBHART		OTHER		6132.4		10:39:00		16:39:00		

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	skx
								Arriving	skx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	43	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi	X	B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15574	Ft	Yes	No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No	
20	n	14:34:00	14:43:00		19	0.6	1.2		
21	s	14:46:00	14:54:00		19	0.6	1.2		
22	n	14:57:00	15:06:00		22	0.6	1.1		
23	s	15:09:00	15:17:00		22	0.6	1.1		
24	n	15:19:00	15:27:00		21	0.6	1.1		
25	s	15:30:00	15:38:00		21	0.6	1.2		
26	n	15:41:00	15:49:00		21	0.6	1.2	cld wp 5	
27	s	15:52:00	16:00:00		19	0.6	1.4		
28	n	16:05:00	16:16:00		19	0.6	1.3	clds wp 28-1	

↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission	Yes	X	No	

Additional Comments:

Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	7/19/2017	200	76922	2	chama jemez

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
SMITH	N404CP	6132.4	7:58:00	13:58:00	

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	OTHER	6135.4	10:53:00	16:53:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	skx
								Arriving	skx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	43	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15574	Ft	Yes		No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No
29	n	14:18:00	14:29:00		23	0.6	1.2	
30	s	14:31:00	14:43:00		22	0.6	1.2	
31	n	14:45:00	14:57:00		22	0.6	1.1	
32	s	14:59:00	15:10:00		23	0.6	1.1	
33	n	15:12:00	15:23:00		21	0.6	1.2	
34	s	15:26:00	15:40:00		21	0.6	1.2	
35	n	15:42:00	15:56:00		22	0.6	1.2	clds wp 32,18,7
36	s	15:59:00	16:14:00		19	0.6	1.4	clds wp 7,32-34,40,49,50,64,67
28	n	16:23:00	16:29:00		17	0.6	1.2	reflt 28-1, clds wp 19,13
26	s	16:31:00	16:32:00		17	0.6	1.2	reflt wp 5
↑ Times entered are Zulu / GMT ↑			Page		1			Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	7/20/2017	201	76922	2	chama jemez

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
SMITH	N404CP	6135.4	7:55:00	13:55:00	

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	OTHER	6138.0	10:31:00	16:31:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	skx
								Arriving	skx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	43	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	15574	Ft	Yes		No	@	NS			Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission	Yes X No
37	n	14:13:00			22	0.6	1.1	tdc error,reboot	
37	n	14:26:00	14:40:00		20	0.6	1.2		
38	s	14:43:00	14:58:00		20	0.6	1.1		
39	n	15:00:00	15:14:00		21	0.6	1.1		
40	s	15:17:00	15:31:00		19	0.6	1.2		
36	n	15:34:00	15:48:00		19	0.6	1.2	reflt whole line cld wp 48	
35	s	15:51:00	15:58:00		19's	0.6	1.4	reflt 1-35	
28	n	16:03:00	16:08:00		16	0.6	1.4	reflt 21-1	

↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission	Yes X No

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	7/22/2017	203	76922	2	chama jemez

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
SMITH	N404CP	6139.4	7:59:00	13:59:00	

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	OTHER	6140.3	8:55:00	14:55:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	skx
								Arriving	skx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	43	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15574	Ft	Yes / No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No
36	n	14:17:00	14:18:00		21	0.6	1.2	reflt 50-46
24	n	14:25:00	14:27:00		21	0.6	1.2	reflt 8-4
28	s	14:35:00	14:37:00		22	0.6	1.2	reflt 33-37

↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
		10/2/2016	276	76922				Pecos Santa Fe_ F Block		

Operator		Aircraft		HOBBS Start		Local Start Time IMU		ZULU Start Time IMU		Base
Linville		N111SD		136.9		8:23:15		14:23:15		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time IMU				PID
LaROCQUE		OTHER		139.1		10:59:47		16:59:47		

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	kskx
calm	10	clr	0	9	-1	30.29		Arriving	kskx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	X	Mode	Threshold Values
40	50	272	100	Gain - Course/Up		Single	A	PreSet
				Gain - Fine/Down		Multi	B	PreSet

Air Speed	AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.
150	6500	varies	varies	Ft	Yes		No X	@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	Base GPS Began Logging At:
			↕ Times entered are Zulu / GMT ↕					Figure 8-Turns Before Mission Yes X No
44	186.1	15:06:34	15:08:14		18	0.7	1.3	
43	006.1	15:12:31	15:13:35	0:00:00	18	0.7	1.2	
42	186.1	15:17:54	15:19:09	0:00:00	18	0.7	1.3	
45	155.5	15:22:34	15:27:48	0:00:00	17	0.7	1.5	
46	335.7	15:31:42	15:36:52	0:00:00	18	0.7	1.4	
47	155.6	15:40:12	15:45:07	0:00:00	19	0.6	1.1	potential cloud in line
48	335.7	15:48:29	15:53:15	0:00:00	18	0.6	1.3	
49	155.5	15:56:49	16:01:42	0:00:00	18	0.7	1.3	
50	335.6	16:05:04	16:09:40	0:00:00	18	0.7	1.3	
51	108.9	16:18:24	16:19:37	0:00:00	20	0.7	1.4	
52	289.0	16:22:56	16:24:04	0:00:00	21	0.6	1.2	
53	116.8	16:28:46	16:30:27	0:00:00	21	0.6	1.1	**potential cloud at very end**
54	296.9	16:34:11	16:35:11	0:00:00	21	0.6	1.1	
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
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↑ Times entered are Zulu / GMT ↑		Page	1	Figure 8-Turns After Mission Yes X No

Additional Comments:

Drive #

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Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
		10/2/2016	27616	75926/76922		2		San Luis/Pecos Santa Fe, New Mexico		

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
GALAMBOS	N404CP	5585.9	9:08:00	15:08:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
RADER	OTHER	5585.9	10:27:00	16:27:03	KSKX

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSKX
330 4	10+	Clear		8	-1	30.29		Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	255	Mode	Threshold Values
40	51	272	100	Gain - Course/Up		Single	A
				Gain - Fine/Down		Multi X	B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	Varies	Ft	Yes		No X	@ NS			Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	14:33;20
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No	
2	SW	15:08:08	15:09:24	6:25:33	18	0.6	1,1	Sensor 8194/ takeoff: 1432z	
1	NE	15:12:23	15:13:10	0:00:00	18	0.7	1.2	Santa Fe Pecos "G" 19298 MSL	
				0:00:00				40/42.9/272 - SETTINGS	
3	S	15:19:03	15:21:14	0:00:00	17	0.7	1.4	San Luis, NM "G"	
4	N	15:24:07	15:25:33	0:00:00	17	0.7	1.4	GPS Altitude 18143	
5	S	15:28:18	15:29:00	0:00:00	17	0.7	1.4		
6	N	15:32:32	15:34:14	0:00:00	17	0.7	1.4		
7	S	15:37:38	15:39:27	0:00:00	17	0.7	1.4		
8	N	15:42:16	15:44:41	0:00:00	17	0.7	1.4		
9	S	15:47:53	15:50:50	0:00:00	17	0.7	1.4		
10	N	15:53:20	15:56:25	0:00:00	19	0.6	1.1		
11	S	15:59:31	16:02:28	0:00:00	19	0.6	1.1		
12	N	16:05:15	16:08:04	0:00:00	19	0.6	1.1		
13	S	16:11;16	16:13;34	0:00:00	19	0.6	1.1		
12	N	16:16:02	16:08:04	0:00:00	19	0.6	1.1		
13	S	16:11:16	16:13:34	0:00:00	19	0.6	1.1		
14	N	16:16:02	16:17:00	0:00:00	20	0.6	1.1		
2	NE	16:21:13	16:23:00	0:00:00	21	0.6	1.1		
1	SW	16:25:26	16:27:03	0:00:00	21	0.6	1.1		
				0:00:00				Landing 1646z	
				0:00:00				Static: 16:50:50	
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					

↑ Times entered are Zulu / GMT ↑		Page	1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name		
	10/4/2016	278	76922		Pecos Santa Fe_ A Flights		
Operator	**Aircraft**		**HOBBS Start**	**Local Start Time IMU**	**ZULU Start Time IMU**	**Base**	
Linville	N111SD		139.5	9:15:00	15:15:00	WOOLPERT PIN	
Pilot	**Sensor Type**		**HOBBS END**	**Local End Time IMU**		**PID**	
LaROCQUE	OTHER		144.7	2:42:00	20:42:00		

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	klvs
360@11	10	clr	0	13	-12	29.9		Arriving	klvs

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	X	Mode	Threshold Values
40	50	272	100	Gain - Course/Up		Single	A	PreSet
				Gain - Fine/Down		Multi	B	PreSet

Air Speed	AGL		MSL		Waveform Used		Waveform Mode	Pre-Trigger Dist.
150	6500	varies	11939	Ft	Yes	No X	@ NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	Base GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Figure 8-Turns Before Mission Yes X No
1	082.3	15:44:50	15:45:48		16	0.7	1.3	
2	262.3	15:49:58	15:51:22	0:00:00	16	0.7	1.3	
3	082.2	16:01:40	16:03:18	0:00:00	17	0.6	1.3	
4	262.4	16:07:32	16:10:40	0:00:00	17	0.7	1.4	
5	082.2	16:14:14	16:17:14	0:00:00	18	0.6	1.1	
6	262.4	16:22:37	16:28:27	0:00:00	17	0.6	1.2	
7	082.2	16:31:55	16:35:55	0:00:00	17	0.6	1.2	
8	262.5	16:41:34	16:48:11	0:00:00	17	0.6	1.2	
9	082.2	16:55:26	17:00:02	0:00:00	19	0.6	1	
10	262.4	17:04:56	17:12:05	0:00:00	17	0.6	1.2	
11	082.2	17:16:09	17:20:38	0:00:00	17	0.6	1.2	
12	262.4	17:25:12	17:31:34	0:00:00	17	0.6	1.2	
13	082.2	17:34:48	17:39:18	0:00:00	17	0.6	1.4	
14	262.4	17:43:57	17:50:18	0:00:00	17	0.6	1.3	
15	082.2	17:53:39	17:58:10	0:00:00	16	0.7	1.3	
16	262.5	18:01:36	18:08:24	0:00:00	17	0.7	1.3	
17	082.2	18:02:08	18:17:05	0:00:00	17	0.6	1.1	
18	262.5	18:21:30	18:28:04	0:00:00	18	0.6	1.2	
19	082.2	18:31:52	18:36:56	0:00:00	17	0.6	1.2	
20	262.5	18:41:48	18:48:26	0:00:00	16	0.7	1.3	
21	082.2	18:52:17	18:57:48	0:00:00	18	0.6	1.1	
22	262.5	19:01:28	19:08:11	0:00:00	19	0.6	1.1	
23	082.2	19:12:41	19:19:26	0:00:00	19	0.6	1.1	
24	262.5	19:24:11	19:32:24	0:00:00	17	0.6	1.2	
25	082.2	19:37:10	19:44:15	0:00:00	18	0.6	1.1	
26	262.6	19:49:18	19:57:46	0:00:00	16	0.7	1.3	
27	082.2	20:01:36	21:44:56	0:00:00	16	0.7	1.2	
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
↑ Times entered are Zulu / GMT ↑			Page		1			Figure 8-Turns After Mission Yes X No

Additional Comments: | **Drive #**

Base station was dead upon arrival back to the airport. Aircraft tail # is N6255Q

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Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	10/4/2016	278	76922	2	Chama Chevez /Pecos Santa Fe, New Mexico

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
GALAMBOS	N404CP	5588.0	9:04:00	15:04:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
RADER	OTHER	5593.3	1:31:00	19:31:00	KSKX

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSKX
170 6	10=	Clear		6	-10	29.97		Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	255	Mode	Threshold Values
40	42.9	272	100	Gain - Course/Up		Single	A
				Gain - Fine/Down		Multi X	B

Air Speed	AGL	MSL	Waveform Used	Waveform Mode	Pre-Trigger Dist.
150 Kts	6500 Ft	17,300 Ft	Yes / No	@ NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At: 14:26:36
		⇕ Times entered are Zulu / GMT ⇕						Verify S-Turns Before Mission Yes X No
1	NW	15:04:40	15:06:27	6:24:28	17	0.7	1.3	Sensor 8194/Taleoff: 1437z "D"
2	NW	15:11:20	15:13:08	0:00:00	15	0.7	1.4	Chama Chevez/17575 GPS MSL
3	SE	15:30:21	15:32:15	0:00:00	17	0.6	1.2	Winds 287 at 55 knots
4	NW	15:35:19	15:37:10	0:00:00	16	0.7	1.2	Snow on Mountain Tops NW of us
5	SE	15:43:36	15:44:34	0:00:00	16	0.7	1.2	Hobbs: 5589.1
				0:00:00				
1	SE	15:58:26	16:00:36	0:00:00	17	0.7	1.4	Pecos Santa Fe/Hobbs 5589.2
2	N	16:05:06	16:07:35	0:00:00	17	0.7	1.4	GPS 17,300 MSL
3	S	16:11:10	16:14:40	0:00:00	17	0.7	1.4	
4	N	16:18:07	16:22:02	0:00:00	17	0.7	1.4	
37	S	16:29:15	16:31:20\	0:00:00	17	0.7	1.4	exceesing 5 degrees pitch
36	N	16:34:43	16:37:34	0:00:00	17	0.7	1.4	Mountain Wave/wind 286 55kt
35	S	16:40:14	16:43:40	0:00:00	17	0.7	1.4	
34	N	16:46:38	16:50:30	0:00:00	17	0.7	1.4	
33	S	16:53:16	16:57:00	0:00:00	17	0.7	1.2	
32	N	17:00:26	17:04:23	0:00:00	17	0.7	1.2	
31	S	17:07:54	17:13:04	0:00:00	17	0.7	1.2	
30	N	17:16:17	17:23:00	0:00:00	17	0.7	1.2	
29	S	17:25;14	17:31:18	0:00:00	17	0.7	1.2	
28	N	17:33:49	17:40:17	0:00:00	17	0.7	1.2	
27	S	17:42:43	17:49:03	0:00:00	17	0.7	1.2	
41	N	17:51:25	17:52:36	0:00:00	17	0.7	1.2	
40	S	17:54:50	17:55;45	0:00:00	17	0.7	1.2	
39	N	17:58:04	17:59:06	0:00:00	17	0.7	1.2	
38	S	18:01:34	18:02:09	0:00:00	16	0.7	1.2	
26	N	18:04:46	18:11:30	0:00:00	17	0.7	1.3	
25	S	18:13:28	18:14;52	0:00:00	17	0.7	1.3	
24	N	18:16:35	18:18:02	0:00:00	17	0.7	1.3	
23	S	18:20:08	18:21;13	0:00:00	17	0.7	1.3	
22	N	18:23:07	18:24:08	0:00:00	17	0.7	1.3	
21	S	18:26:23	18:27:32	0:00:00	17	0.7	1.3	Go to page 2
↑ Times entered are Zulu / GMT ↑			Page		1			Verify S-Turns After Mission Yes X No

Additional Comments:

Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	10/4/2016	278	76922	2	Chama Chevez /Pecos Santa Fe, New Mexico

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
GALAMBOS	N404CP	5588.0	9:04:00	14:04:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
RADER	OTHER	5593.3	1:31:00	19:31:00	KSKX

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSKX
170 4	10+	CLR		6	-10	29.97		Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	255	Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi	X	B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	17,300	Ft	Yes	No X	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	14:26:36
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No	
				#VALUE!				8194	
20	N	18:30:24	18:32;45	0:00:00	19	0.6	1.1		
19	S	18:35;31	18:38:00	0:00:00	19	0.6	1.1		
18	N	18:39:51	18:42:34	0:00:00	19	0.6	1.1		
17	S	18:44;31	18:47:00	0:00:00	19	0.6	1.1		
16	N	18:48:43	18:51:21	0:00:00	19	0.6	1.1		
15	S	18:54:21	18:54;32`	0:00:00	19	0.6	1.1		
14	N	18:57:27	18:58:38	0:00:00	19	0.6	1.1		
131	S	19:00:41	19:01:34	0:00:00	19	0.6	1.1		
12	N	19:03:49	19:05:00	0:00:00	19	0.6	1.1		
11	S	19:07:02	19"07:50	0:00:00	19	0.6	1.1		
10	N	19:09:41	19:10:34	0:00:00	19	0.6	1.1		
9	S	19:12;22	19:12:53	0:00:00	18	0.7	1.1		
8	N	19:15:07	19:15:41	0:00:00	18	0.7	1.1		
7	S	19:17:44	19:18:25	0:00:00	18	0.7	1.1		
6	N	19:22:42	19:25:28	0:00:00	18	0.7	1.1		
5	S	19:27:41	19:30:58	0:00:00	18	0.7	1.1		
				0:00:00				static: 19:57:15	
				0:00:00					
				0:00:00					
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↑ Times entered are Zulu / GMT ↑			Page		2		Verify S-Turns After Mission Yes X No	

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	10/5/2016	279	76922		2		Pecos Santa Fe_ A Flights		

Operator		Aircraft		HOBBS Start		Local Start Time IMU		ZULU Start Time IMU		Base
Linville		N111SD		144.7		10:42:00		16:42:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time IMU				PID
LaROCQUE		OTHER		149.5		3:41:00		21:41:00		

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	klvs
210@20 g24	10	clr	0	17	-8	30.05		Arriving	klvs

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	X	Mode		Threshold Values
40	36	346	100	Gain - Course/Up		Single		A	PreSet
				Gain - Fine/Down		Multi		B	PreSet

Air Speed	AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	6500	varies	11939	Ft	Yes / No	X	@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	Base GPS Began Logging At:	
		↕ Times entered are Zulu / GMT ↕						Figure 8-Turns Before Mission	Yes X No
28	082.2	17:30:39	17:38:15		19	0.6	1.2		
29	262.8	17:48:15	18:02:03	0:00:00	19	0.6	1.2		
30	082.2	18:05:43	18:19:14	0:00:00	18	0.6	1.1		
31	263.0	18:24:43	18:40:44	0:00:00	19	0.6	1.1		
32	082.2	18:44:37	18:59:45	0:00:00	20	0.6	1.1		
33	263.0	19:03:49	19:20:45	0:00:00	20	0.6	1.1		
34	082.2	19:24:47	19:39:49	0:00:00	19	0.6	1.1		
35	263.0	19:44:13	19:59:45	0:00:00	16	0.7	1.3		
36	082.2	20:03:22	20:17:57	0:00:00	17	0.7	1.1		
37	263.0	20:22:01	20:37:15	0:00:00	18	0.6	1.1		
38	082.2	20:40:59	20:55:10	0:00:00	16	0.7	1.2		
39	263	20:58:43	21:12:15	0:00:00	16	0.8	1.3		
				0:00:00					
				0:00:00					
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				0:00:00					
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↑ Times entered are Zulu / GMT ↑			Page		1			Figure 8-Turns After Mission	Yes X No

Additional Comments:
Base station was dead upon arrival back to the airport. Aircraft tail # is N6255Q

Drive #

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Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	10/5/2016	279	76922		2		Pecos Santa Fe, New Mexico	

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
GALAMBOS		N404CP		5593.3		10:34:00		16:34:00		NGS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
RADER		OTHER		5591.0		3:15:00		21:15:00		Rosair 1987

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSXU
200 3	10+	Clear		20	-5	30.01	255	Arriving	KSXU

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up	Single		A	
				Gain - Fine/Down	Multi	X	B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	11,939	Ft	Yes	No X	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At: 16:12:46
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No
72	E	16:34:57	16:36:13	9:20:39	20	0.6	1.2	Sensor 8194/Takeoff: 16:18
71	W	16:38:54	16:41:45	0:00:00	20	0.6	1.2	"A" Block
70	E	16:44:29	16:46:40	0:00:00	20	0.6	1.2	Takeoff: KSXU 10:20 AM
69	W	16:49:21	16:53:04	0:00:00	20	0.6	1.2	
68	E	16:56:24	17:00:02	0:00:00	20	0.6	1.2	
67	W	17:02:44	17:07:18	0:00:00	20	0.6	1.2	
65	W	17:11:56	17:15:26	0:00:00	17	0.7	1.3	
66	E	17:18:28	17:21:45	0:00:00	19	0.6	1.2	
64	E	17:29:13	17:40:12	0:00:00	17	0.7	1.4	
63	W	17:42;52	17:55:17	0:00:00	17	0.7	1.4	
62	E	17:57:35	18:08:34	0:00:00	17	0.7	1.4	
61	W	18:10:52	18:23:20	0:00:00	17	0.7	1.4	
60	E	18:25:39	18:36:50	0:00:00	17	0.7	1.4	
59	W	13:38:58	18:51:32	0:00:00	17	0.7	1.4	
58	E	18:53:49	19:05:25	0:00:00	17	0.7	1.2	
57	W	19:07:52	19:20:11	0:00:00	17	0.7	1.2	
56	E	19:22:29	19:49:23	0:00:00	19	0.6	1.1	
54	W	19:51:28	20:02:44	0:00:00	19	0.6	1.1	
53	E	20:04:58	20:16:59	0:00:00	19	0.6	1.1	
52	W	20:19:03	20:30:37	0:00:00	17	0.7	1.2	
51	E	20:32:52	20:44:25	0:00:00	17	0.7	1.2	
50	W	20:46:44	20:44:25\	0:00:00	17	0.7	1.2	
49	E	21_01:32	20:59:39	0:00:00	17	0.7	1.3	
				0:00:00				110 GB
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
			Page		1		Verify S-Turns After Mission Yes X No	

Additional Comments:

Drive # 162

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
		10/6/2016	280	76922		2		Pecos Santa Fe_ C Flights		

Operator		Aircraft		HOBBS Start		Local Start Time IMU		ZULU Start Time IMU		Base
Linville		N111SD		149.5		10:25:00		16:25:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time IMU				PID
LaROCQUE		OTHER		153.9		3:04:00		21:04:00		

Wind Dir/Speed	Visibility		Ceiling	Cloud Cover %	Temp		Dew Point	Pressure		Haze/Fire/Cloud	Departing	klvs
260@19 g30	10		clr	0	16		-6	30.07			Arriving	klvs

Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	X	Mode		Threshold Values
40	42.9		272		100		Gain - Course/Up		Single		A PreSet
							Gain - Fine/Down		Multi		B PreSet

Air Speed	AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.
150	6500	varies	11300	Ft	Yes	No X	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	Base GPS Began Logging At:
			↕ Times entered are Zulu / GMT ↕					Figure 8-Turns Before Mission Yes X No
128	262.1	17:13:09	17:15:23		17	0.6	1.3	
127	081.8	17:19:25	17:22:59	0:00:00	17	0.6	1.3	
126	262.0	17:26:51	17:31:18	0:00:00	17	0.6	1.2	
125	081.8	17:34:35	17:40:40	0:00:00	17	0.6	1.2	
124	262.1	17:44:43	17:51:23	0:00:00	17	0.6	1.2	
123	081.8	17:54:45	18:01:23	0:00:00	18	0.6	1.1	
122	262.1	18:04:53	18:12:11	0:00:00	18	0.6	1.1	
121	081.8	18:15:40	18:22:11	0:00:00	18	0.6	1.1	
120	262.2	18:26:55	18:35:40	0:00:00	19	0.6	1.1	
119	081.8	18:38:59	18:46:47	0:00:00	19	0.6	1.1	
118	262.2	18:51:31	19:00:14	0:00:00	20	0.6	1.1	
117	081.9	19:03:35	19:11:54	0:00:00	20	0.6	1.1	
116	262.2	19:15:54	19:24:28	0:00:00	19	0.6	1.1	
115	081.8	19:28:43	19:37:16	0:00:00	19	0.6	1.1	
114	262.2	19:41:22	19:49:58	0:00:00	18	0.6	1.2	
113	081.8	19:53:55	20:02:25	0:00:00	17	0.7	1.2	
112	262.2	20:06:59	20:18:38	0:00:00	19	0.6	1	
111	081.6	20:22:28	20:33:45	0:00:00	18	0.7	1.1	
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
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				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				

↑ Times entered are Zulu / GMT ↑			Page		1	Figure 8-Turns After Mission Yes X No

Additional Comments: Drive #

Aircraft tail # is N6255Q

156

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	10/6/2016	280	76922		2		Pecos Santa Fe, New Mexico		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
GALAMBOS		N404CP		5600.5		9:56:00		15:56:00		NGS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
RADER		OTHER		5605.1		1:58:00		19:58:00		Rosair 1987

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSXU
240 8	10+	Clear		18	0	30.02	255	Arriving	KSXU

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	11,939	Ft	Yes	No X	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	15:31:02
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No	
48	E	15:56:38	16:09:38	8:39:17	18	0.6	1.3	Sensor 8191/Taleoff: 15:36	
47	W	16:12:23	16:26:54	0:00:00	18	0.6	1.1	"A" Block	
46	E	16:29:15	16:41:45	0:00:00	18	0.6	1.3		
45	W	16:44:32	16:58:58	0:00:00	15	0.7	1.2		
44	E	17:01:40	17:13:04	0:00:00	15	0.7	1.2		
43	W	17:15:21	17:28:57	0:00:00	17	0.7	1.2		
42	E	17:30:41	17:41:18	0:00:00	17	0.7	1.3		
41	W	17:33:44	17:57:10	0:00:00	19	0.6	1.2		
40	E	17:59:23	18:11:12	0:00:00	17	0.7	1.4		
				0:00:00				Hobbs: 5603.1	
13	W	18:18:18	18:19:34	0:00:00	18	0.6	1.1	"B " Block GPS Altitude 13,140	
12	E	18:22:00	18:22:50	0:00:00	18	0.6	1.1		
11	W	18:25;21	18:26:30	0:00:00	18	0.6	1.1		
10	E	18:30:01	18:30:01	0:00:00	18	0.6	1.1		
9	W	18:35:58	18:39:04	0:00:00	20	0.6	1.1		
8	E	18:42;06	18:45:02	0:00:00	20	0.6	1.1		
7	W	18:47:57	18:52;33	0:00:00	20	0.6	1.1		
6	E	18:54;28	18:52:09	0:00:00	20	0.6	1.1		
5	W	19:01:16	19:05:08	0:00:00	20	0.6	1.1		
14	SW	19:21:45	19:22:42	0:00:00	17	0.7	1.2		
15	NE	19:26:55	19:28:15	0:00:00	17	0.7	1.2		
4	E	19:41:16	19:42:30	0:00:00	17	0.7	1.2		
3	W	19:45:38	19:47:15	0:00:00	17	0.7	1.3		
2	W	19:51:00	19:52:38	0:00:00	17	0.7	1.3		
1	W	19:56:30	19:58:11	0:00:00	17	0.7	1.3		
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
			Page			1		Verify S-Turns After Mission Yes X No	

Additional Comments:

Drive #

162

Woolpert

Leica LIDAR										
	MM/DD/YEAR	**Day of Year**	**Project #**		**Phase #**		**Project Name**			
	10/7/2016	281	76922		2		Pecos Santa Fe_ C Flights			
Operator		**Aircraft**	**HOBBS Start**		**Local Start Time IMU**		**ZULU Start Time IMU**		**Base**	
Linville		N111SD	153.9		7:06:00		13:06:00		WOOLPERT PIN	
Pilot		**Sensor Type**	**HOBBS END**		**Local End Time IMU**				**PID**	
LaROCQUE		OTHER	156.1		9:53:00		15:23:00			

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	klvs
170@8kt	10	clr	0	-1	-4	30.41		Arriving	klvs

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	X	Mode	Threshold Values
40	42.9	272	100	Gain - Course/Up		Single	A	PreSet
				Gain - Fine/Down		Multi	B	PreSet

Air Speed	AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	6500	varies	11300	Ft	Yes	No X		@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	Base GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Figure 8-Turns Before Mission Yes X No
110	081.6	13:42:00	13:53:17		18	0.6	1.1	
109	262.2	13:56:52	14:08:11	0:00:00	16	0.7	1.1	
108	081.5	15:00:09	15:11:35	0:00:00	16	0.7	1.4	ldh failed to communicate with laser
				0:00:00				at end of line 108.
107	262.2	16:39:41	16:50:18	0:00:00	19	0.6	1	start of 2nd flight
106	081.4	16:53:11	17:05:22	0:00:00	19	0.6	1.1	
105	262.2	17:08:51	17:20:08	0:00:00	19	0.6	1.1	
104	081.4	17:24:34	17:17:11	0:00:00	19	0.6	1.1	
103	262.2	17:40:12	17:52:46	0:00:00	18	0.6	1.1	
102	081.4	17:57:05	18:10:15	0:00:00	19	0.6	1.1	
101	262.2	18:14:36	18:27:10	0:00:00	19	0.6	1.1	
100	081.4	18:31:59	18:44:30	0:00:00	19	0.6	1.1	
99	262.2	18:48:00	19:00:54	0:00:00	21	0.6	1.1	
98	081.4	19:05:47	19:20:12	0:00:00	19	0.6	1.1	
97	262.2	19:23:56	19:38:09	0:00:00	19	0.6	1.1	
96	081.4	19:42:11	19:56:57	0:00:00	16	0.7	1.2	
95	262.2	20:00:23	20:15:37	0:00:00	17	0.7	1.1	
94	081.4	20:19:05	20:34:15	0:00:00	17	0.7	1.1	
				0:00:00				
73		20:47:34	20:56:12	0:00:00	17	0.8	1.3	A flight line 73
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				

↑ Times entered are Zulu / GMT ↑		Page	1	Figure 8-Turns After Mission Yes X No

Additional Comments: — **Drive #**

Aircraft tail # is N6255Q
2nd flight hobbs start:156.1 Hobbs end:161.2
IMU start: 16:05:00 imu local start 10:05:00 imu stop: 21:29:00 imu stop local:3:29:00

158

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	10/7/2016	281	76922		2		Pecos Santa Fe, New Mexico		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
GALAMBOS		N404CP		5605.9		9:51:00		15:51:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
RADER		OTHER		4612.4		3:21:00		21:21:00		KSKX

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSKX
180 3	10+	Clear		3	-12	30.43	255	Arriving	KSSX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi	X	B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	Vary per blk	Ft	Yes / No X		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At: 15:19:45
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No
				0:00:00				Sensor 8194/Takeoff: 9:30 local
				0:00:00				"F" Block/17,300 GPS Altitude
				0:00:00				
F53	NW	15:51:50	15:53:46	0:00:00	20	0.6	1.2	Reflight
F46	NW	16:14:31	16:19:31	0:00:00	20	0.6	1.2	Reflight
F47	SE	16:22;17	16:27:08	0:00:00	20	0.6	1.2	Reflight/ Hobbs: 5606.9
D229	SE	16:43:58	16:44:46	0:00:00	20	0.6	1.2	GPS ALTITUDE 13,300
D228	NW	16:47:11	16:48:08	0:00:00	20	0.6	1.2	
D227	SE	16:50:06	16:51:15	0:00:00	17	0.7	1.4	
D226	NW	16:53:09	16:54:07	0:00:00	17	0.7	1.4	
D225	SE	16:56:22	16:57:12	0:00:00	17	0.7	1.4	
D224	NW	16:59:32	17:01:50	0:00:00	17	0.7	1.4	
D223	SE	17:04:04	17:06:17	0:00:00	17	0.7	1.4	
D222	NW	17:08:32	17:10:57	0:00:00	17	0.7	1.4	
D221	SE	17:13;10	17:15:24	0:00:00	17	0.7	1.2	
D220	NW	17:17:38	17:20:04	0:00:00	17	0.7	1.2	
D219	SE	17:22:20	17:24:50	0:00:00	19	0.6	1.1	
D218	NW	17:26:45	17:29:26	0:00:00	19	0.6	1.1	
D107	SE	17:32:25	17:34;31	0:00:00	19	0.6	1.1	
D106	NW	17:36:31	17:38:56	0:00:00	17	0.7	1.2	
D105	SE	17:41:04	17:43;40	0:00:00	17	0.7	1.2	
104	NW	17:48:31	17:54:36	0:00:00	17	0.7	1.2	
103	SE	17:56:36	18:02:44	0:00:00	17	0.7	1.3	
102	NW	18:04:43	18:11:03	0:00:00	17	0.7	1.3	
101	SE	18:13:13	18:19:15	0:00:00	17	0.7	1.3	
100	NW	18:21:10	18:27:50	0:00:00	17	0.7	1.3	
99	SE	18:29:54	18:35:30	0:00:00	17	0.7	1.3	
98	NW	18:37:29	18:43:29	0:00:00	17	0.7	1.3	
97	SE	18:45:38	18:51:54	0:00:00	17	0.7	1.3	
96	NW	18:53:53	19:00:27	0:00:00	17	0.7	1.3	
D95	SE	19:02:36	19:08:55	0:00:00	17	0.7	1.3	Go to Page #2
				Page		**1**		Verify S-Turns After Mission Yes X No

Additional Comments:	Drive #
	133

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
		10/7/2016	281	76922		2		Pecos Santa Fe, New Mexico		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
GALAMBOS		N404CP		5605.9		9:51:00		15:51:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
RADER		OTHER		5612.4		3:21:00		21:21:00		KSKX

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSKX
180 3	10+	CLR		3	-12	30.43		Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	255	Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi	X	B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts	6500	Ft	17,300	Ft	Yes	No X	@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	15:19:45
KSFU+A24:L32		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No	
D94	NW	19:11:31	19:16:57	14:43:24	17	0.6	1.2	8194	
D93	SE	19:19:07	19:24:17	0:00:00	17	0.6	1.2	5610.0 hobbs	
C204	E	19:32:21	19:33:16	0:00:00	17	0.6	1.2	GPS Altitude 11,300	
C203	W	19:35:10	19:36:16	0:00:00	17	0.6	1.2		
C202	E	19:38:44	19:39:42	0:00:00	17	0.6	1.2		
C202	W	19:41:48	19:42:50	0:00:00	19	0.6	1.1		
74	W	19:52:02	20:07:09	0:00:00	19	0.6	1.1		
75	E	20:10:23	20:26:12	0:00:00	19	0.6	1.1		
76	W	20:28:20	20:44:42	0:00:00	19	0.6	1.1		
77	E	20:46;52	21:03:11	0:00:00	19	0.6	1.1		
78	W	21:05:05	21:21:28	0:00:00	19	0.6	1.1	STATIC: 21:56:00	
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↑ Times entered are Zulu / GMT ↑			Page		2		Verify S-Turns After Mission Yes X No		

Additional Comments:	Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	10/11/2016	285	76922	2	Pecos Santa Fe_ C Flights

Operator	Aircraft	HOBBS Start	Local Start Time IMU	ZULU Start Time IMU	Base
Linville	N111SD	166.6	9:16:00	15:16:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time IMU		PID
LaROCQUE	OTHER	171.3	2:13:00	20:13:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	klvs
310@5kt	10	clr	0	18	2	30.27		Arriving	klvs

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	X	Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single	A	PreSet
				Gain - Fine/Down		Multi	B	PreSet

Air Speed	AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	6500	varies	11300	Ft	Yes / No X		@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	Base GPS Began Logging At: 9:00:00
		⇕ Times entered are Zulu / GMT ⇕						Figure 8-Turns Before Mission Yes X No
89	262.2	15:46:52	16:04:50		21	0.6	1.1	
90	081.3	16:08:31	16:25:04	0:00:00	20	0.6	1.1	
91	262.2	16:28:55	16:46:47	0:00:00	20	0.6	1.1	
92	081.3	16:50:08	17:05:56	0:00:00	17	0.6	1.3	
93	262.2	17:10:03	17:27:04	0:00:00	17	0.6	1.2	
73	081.4	17:32:32	17:45:22	0:00:00	16	0.7	1.3	
72	262.2	17:49:49	18:04:09	0:00:00	17	0.6	1.1	
71	081.5	18:07:36	18:20:49	0:00:00	18	0.6	1.1	
70	262.2	18:25:02	18:39:21	0:00:00	17	0.7	1.2	
69	081.4	18:42:41	18:56:25	0:00:00	19	0.6	1.1	
68	262.2	19:00:53	19:16:09	0:00:00	17	0.6	1.2	
67	081.4	19:20:10	19:34:02	0:00:00	16	0.7	1.3	
66	262.2	19:38:03	19:53:15	0:00:00	17	0.7	1.1	
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↑ Times entered are Zulu / GMT ↑		Page		1	Figure 8-Turns After Mission Yes X No

Additional Comments: Drive #

Aircraft tail # is N6255Q

132

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	10/11/2016	285	76922		2		Pecos Santa Fe, New Mexico	

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
GALAMBOS		N404CP		5613.6		9:40:00		15:40:00		NGS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
RADER		OTHER		5618.8		2:17:00		20:17:00		Vegasport 1987

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KLVS
Calm	10+	Clear		20	0	30.27	255	Arriving	KLVS

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode	Pre-Trigger Dist.
150	Kts	6500	Ft	11,300	Ft	Yes / No X		@ NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At: 15:19:48
			↕ Times entered are Zulu / GMT ↕					Verify S-Turns Before Mission Yes X No
171	E	15:40:30	15:41:19	7:30:17	21	0.6	1.1	Sensor 8194/Taleoff: 1527z
172	W	15:44:07	15:46:10	0:00:00	21	0.6	1.1	
173	E	15:48:59	15:50:46	0:00:00	21	0.6	1.1	
174	W	15:56:03	16:09:35	0:00:00	21	0.6	1.1	
175	E	16:11:49	16:22:55	0:00:00	20	0.6	1.1	Turbulence, wind west at 40 knots
176	W	16:25:28	16:39:04	0:00:00	19	0.6	1.2	
177	E	16:41:02	16:52:52	0:00:00	18	0.7	1.3	
178	W	16:55;20	17:09:20	0:00:00	17	0.6	1.2	
179	E	17:11:44	17:24:25	0:00:00	17	0.7	1.4	
180	W	17:26:29	17:39:26	0:00:00	17	0.7	1.4	
181	E	17:41:43	17:54:13	0:00:00	17	0.6	1.1	
182	W	17:56:34	18:10:10	0:00:00	17	0.6	1.1	
183	W	18:12:43	18:25:00	0:00:00	17	0.7	1.4	
184	E	18:27:22	18:40:14	0:00:00	17	0.7	1.4	
185	W	18:42:30	18:54:55	0:00:00	17	0.7	1.2	
186	E	18:57:27	19:10:38	0:00:00	17	0.7	1.2	
187	W	19:14:11	19:27:46	0:00:00	19	0.6	1.1	
188	E	19:29:41	19:44:07	0:00:00	19	0.6	1.1	
189	W	19:46:31	20:00:36	0:00:00	19	0.6	1.1	
190	E	20:02:33	20:17:02	0:00:00	17	0.7	1.2	
				0:00:00				96 GB
				0:00:00				Touchdown 20:26
				0:00:00				Static: 20:29:28
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
			Page		1		Verify S-Turns After Mission Yes X No	

Additional Comments:

Drive # **162**

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
		12/12/2016	286	76922		2		Pecos Santa Fe_ C Flights		

Operator		Aircraft		HOBBS Start		Local Start Time IMU		ZULU Start Time IMU		Base
Linville		N111SD		171.3		7:51:00		13:51:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time IMU				PID
LaROCQUE		OTHER		175.8		12:33:00		18:33:00		

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	klvs
040@06kt	10	clr	0	8	-2	30.27		Arriving	klvs

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	X	Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A PreSet
				Gain - Fine/Down		Multi		B PreSet

Air Speed	AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	6500	varies	11300	Ft	Yes		No X	@ NS			Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	Base GPS Began Logging At: 7:40:00
			↕ Times entered are Zulu / GMT ↕					Figure 8-Turns Before Mission Yes X No
65	262.2	14:18:10	14:33:19		17	0.7	1.3	
64	081.4	14:36:20	14:50:58	0:00:00	17	0.7	1.4	
63	262.2	14:54:26	15:09:38	0:00:00	19	0.6	1.4	
62	081.4	15:13:53	15:28:23	0:00:00	18	0.7	1.3	
61	262.2	15:31:34	15:46:46	0:00:00	19	0.6	1.3	
60	081.4	15:50:01	16:04:09	0:00:00	20	0.6	1.2	
59	262.2	16:07:42	16:21:47	0:00:00	20	0.6	1.2	
58	081.4	16:24:58	16:38:19	0:00:00	17	0.6	1.4	
57	262.2	16:41:48	16:55:59	0:00:00	18	0.6	1.3	
56	081.4	16:59:27	17:12:50	0:00:00	19	0.6	1.2	
55	262.2	17:16:17	17:31:23	0:00:00	19	0.6	1.2	
54	081.4	17:35:12	17:48:25	0:00:00	18	0.6	1.1	
53	262.1	17:51:50	17:06:30	0:00:00	19	0.6	1.1	lhd failed to communicate with laser
52	081.3	18:09:58	18:16:40	0:00:00	18	0.7	1.2	with 6-7mi left on line 53 and half
				0:00:00				way through line 52
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				

↑ Times entered are Zulu / GMT ↑		Page	1	Figure 8-Turns After Mission Yes X No

Additional Comments: Drive #

Aircraft tail # is N6255Q

156

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	10/13/2016	287	76922	2	Pecos Santa Fe_ C Flights

Operator	Aircraft	HOBBS Start	Local Start Time IMU	ZULU Start Time IMU	Base
Linville	N111SD	175.8	10:13:00	16:13:00	WOOLPERT PIN

Pilot	Sensor Type		Local End Time IMU		PID
LaROCQUE	OTHER	180.8	3:28:00	21:28:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	klvs
190@8kt	10	clr	0	11	4	30.29		Arriving	klvs

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	X	Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A	PreSet
				Gain - Fine/Down		Multi		B	PreSet

Air Speed	AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	6500	varies	11300	Ft	Yes		No	X	@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	Base GPS Began Logging At:	10:00:00
		↕ Times entered are Zulu / GMT ↕						Figure 8-Turns Before Mission Yes X No	
30	261.9	16:32:33	16:39:51		18	0.6	1.2		
29	081.5	16:43:45	15:50:47	0:00:00	17	0.6	1.3		
28	262	16:54:33	17:01:57	0:00:00	17	0.6	1.2		
27	081.5	17:05:23	17:12:19	0:00:00	17	0.6	1.3		
26	261.9	17:15:20	17:22:12	0:00:00	16	0.7	1.3		
25	081.5	17:25:39	17:32:21	0:00:00	17	0.6	1.2		
24	261.9	17:35:17	17:42:06	0:00:00	18	0.6	1.1		
23	081.6	17:47:27	17:52:21	0:00:00	18	0.6	1.1		
22	261.9	17:55:28	18:00:25	0:00:00	19	0.6	1.1		
21	081.6	18:03:32	18:08:14	0:00:00	19	0.6	1.1		
20	261.9	18:11:25	18:15:43	0:00:00	17	0.6	1.2		
19	081.6	18:18:51	18:23:58	0:00:00	20	0.6	1.1		
18	261.9	18:26:49	18:31:15	0:00:00	20	0.6	1.1		
17	081.7	18:35:10	18:40:12	0:00:00	20	0.6	1.1		
16	261.9	18:43:48	18:46:44	0:00:00	20	0.6	1.1		
31	081.6	18:52:07	18:58:42	0:00:00	19	0.6	1.1		
32	261.9	19:01:35	19:08:16	0:00:00	19	0.6	1.1		
33	081.6	19:11:01	19:17:40	0:00:00	17	0.7	1.3		
34	262.0	19:21:03	19:28:13	0:00:00	17	0.7	1.2		
35	081.6	19:31:38	19:39:06	0:00:00	18	0.7	1.1		
36	262.0	19:42:23	19:50:13	0:00:00	18	0.7	1.1		
37	081.5	19:53:33	20:01:29	0:00:00	18	0.7	1.1		
43	262.0	20:05:36	20:19:13	0:00:00	17	0.7	1.2		
44	081.2	20:22:43	20:36:26	0:00:00	18	0.7	1.1		
45	262.1	20:40:05	20:54:41	0:00:00	18	0.7	1.1		
46	081.3	20:57:56	21:12:30	0:00:00	18	0.7	1.1		
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
↑ Times entered are Zulu / GMT ↑			Page		1			Figure 8-Turns After Mission Yes X No	

Additional Comments:	Drive #
Aircraft tail # is N6255Q	158

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
		10/13/2016	267	76922		2		Pecos Santa Fe, New Mexico "C"		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
GALAMBOS		N404CP		5619.1		11:50:00		17:50:00		NGS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
RADER		OTHER		5623.9		3:54:00		21:54:00		Vegasport 1987

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSKX
210 9	10+	Clear		15	2	30.28		Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	255	Mode	Threshold Values
40	42.9	272	100	Gain - Course/Up		Single	A
				Gain - Fine/Down		Multi X	B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	11,300	Ft	Yes	No X	@	NS			Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	17:22:26
		⬍ Times entered are Zulu / GMT ⬍						Verify S-Turns Before Mission Yes X No	
191	E	17:50:48	18:04:32	12:27:41	17	0.7	1.1	Sensor 8191/Takeoff: 1729z	
192	W	18:06:34	18:21:07	0:00:00	17	0.7	1.1		
193	E	18:23:23	18:36:42	0:00:00	17	0.7	1.1		
194	W	18:38:49	18:52:52	0:00:00	21	0.6	1.1		
195	E	18:55:03	19:08:48	0:00:00	20	0.6	1.1		
198	W	19:22:45	19:37:55	0:00:00	19	0.6	1.2	Manual Start/Stop UL001	
197	E	19:40:22	19:54:48	0:00:00	18	0.7	1.3	FCMS Glitch	
196	W	19:57:14	20:11:16	0:00:00	17	0.6	1.2		
199	E	20:13:41	20:28:33	0:00:00	17	0.7	1.4		
200	W	20:30:39	20:45:00	0:00:00	17	0.7	1.4		
1	E	20:49:00	21:03:55	0:00:00	17	0.6	1.1		
2	W	21:05:48	21:21:00	0:00:00	17	0.6	1.1		
3	W	21:23:16	21:37:18	0:00:00	17	0.7	1.4		
4	E	21:39:13	21:54:20	0:00:00	17	0.7	1.4	5623.5 Hoobs	
				0:00:00				87GB	
				0:00:00					
				0:00:00				Over base 22:17:44	
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
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				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
			Page			1		Verify S-Turns After Mission Yes X No	

Additional Comments:

Drive #

162

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
		10/14/2016	288	76922		2		Pecos Santa Fe_ C Flights		

Operator		Aircraft		HOBBS Start		Local Start Time IMU		ZULU Start Time IMU		Base
Linville		N111SD		180.8		7:47:00		13:47:00		WOOLPERT PIN

Pilot		Sensor Type								PID
LaROCQUE		OTHER		183.7		10:52:00		16:52:00		

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	klvs
240@12	10	clr	0	11	-1	30.23		Arriving	klvs

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	X	Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A PreSet
				Gain - Fine/Down		Multi		B PreSet

Air Speed	AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	6500	varies	11300	Ft	Yes	No X	@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	Base GPS Began Logging At: 7:40:00

‡ Times entered are Zulu / GMT ‡ — Figure 8-Turns Before Mission Yes X No

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
38	145.0	14:15:01	14:15:46		17	0.7	1.3	
39	325.0	14:19:04	14:20:30	0:00:00	16	0.7	1.3	
40	145.0	14:24:23	14:26:07	0:00:00	17	0.7	1.3	
41	325.0	14:29:37	14:31:50	0:00:00	16	0.7	1.4	
42	162.8	14:35:57	14:37:14	0:00:00	17	0.7	1.3	
47	081.3	14:43:16	14:57:39	0:00:00	17	0.7	1.4	
48	262.1	15:01:14	15:16:30	0:00:00	17	0.6	1.3	
49	081.3	15:19:47	15:33:33	0:00:00	18	0.6	1.3	
50	262.1	15:36:29	15:51:27	0:00:00	18	0.6	1.2	
51	081.3	15:54:33	16:08:35	0:00:00	19	0.6	1.1	
52	262.1	16:12:19	16:27:14	0:00:00	20	0.6	1.1	
53	081.3	16:30:30	16:35:38	0:00:00	19	0.6	1.2	caught the west end of line to fill in from ldh error
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
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				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				

↑ Times entered are Zulu / GMT ↑		Page		1		Figure 8-Turns After Mission Yes X No

Additional Comments: — Drive #

Aircraft tail # is N6255Q

158

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	10/14/2016	288	76922		2		Pecos Santa Fe, New Mexico "C"	

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
GALAMBOS	N404CP	5623.9	8:53:00	14:53:00	NGS

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
RADER	OTHER	5629.4	1:21:00	19:21:00	Vegasport 1987

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSKX
calm	10+	Clear		2	-8	30.32		Arriving	KSKX

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	255	Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used				Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	11,300	Ft	Yes		No	X	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	14:20:43
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission	Yes X No
5	E	14:53:14	15:07:48	6:37:14	18	0.6	1.1	Sensor 8191/Takeoff 1430z / 8:30	
6	W	15:10:25	15:26:49	0:00:00	18	0.6	1.1		
7	E	15:28:51	15:43:12	0:00:00	17	0.7	1.1		
8	W	15:45:48	16:01:45	0:00:00	21	0.6	1.1		
9	E	16:03:46	16:17:33	0:00:00	20	0.6	1.1		
10	W	16:20:31	16:34:41	0:00:00	19	0.6	1.2		
11	E	16:37:11	16:50:26	0:00:00	18	0.7	1.3		
12	W	16:54:03	17:07:24	0:00:00	17	0.6	1.2		
13	E	17:09:59	17:23:19	0:00:00	17	0.7	1.4		
14	W	17:25:18	17:38:22	0:00:00	17	0.7	1.4		
15	E	17:41:00	17:54:00	0:00:00	17	0.6	1.1		
79	W	18:05;04	18:23:42	0:00:00	17	0.6	1.1	Reflight	
80	E	18:25:53	18:42:43	0:00:00	17	0.7	1.4	Reflight	
81	W	18:44:45	19:03:00	0:00:00	17	0.7	1.4	Reflight	
82	E	19:05:04	19:21;52	0:00:00	17	0.7	1.2	Reflight	
				0:00:00				86GB	
				0:00:00				Over LVS base : 19:37:05	
				0:00:00				Over 5 Varos base : 19:57:10	
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					

| | | | | Page | | 1 | | Verify S-Turns After Mission | Yes X No |

Additional Comments:

Drive #

162

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	10/15/2016	289	76922		2		Pecos Santa Fe, New Mexico "C"	

Operator	Aircraft	HOBBS Start	Local Start Time	Base
GALAMBOS	N404CP	5630.2	10:18:00	NGS

Pilot	Sensor Type	HOBBS END	Local End Time	PID
RADER	OTHER	5634.8	2:06:00	Vegasport 1987

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Departing	KLVS
190 8	10+	Clear		18	7	30.14	Arriving	KLVS

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	Mode	Threshold Values
40	42.9	272	100	Gain - Course/Up		A
				Gain - Fine/Down	X	B

Air Speed	AGL	MSL	Waveform Used	Waveform Mode	Pre-Trigger Dist.
150 Kts	6500 Ft	11,300 Ft	Yes / No X	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	15:46:00
			↕ Times entered are Zulu / GMT ↕					Yes X No
				0:00:00				Sensor 8191/9:52 - Ta
A73	N	16:18:15	16:26:43	0:00:00	21	0.6	1.3	Cross-Flight A Block -
				0:00:00				11,939 GPS ALTITUDE
C108	W	16:41:08	16:54:22	0:00:00	21	0.6	1.1	11,300GZPS Altitude
C107	E	16:58:04	17:09:13	0:00:00	20	0.6	1.1	Reflight
C103	W	17:11:50	17:26:20	0:00:00	19	0.6	1.2	Reflight
C102	E	17:29:29	17:42;11	0:00:00	18	0.7	1.3	Reflight
C94	W	17:45:03	18:02:48	0:00:00	17	0.6	1.2	Reflight
C88	E	18:06:23	18:21:52	0:00:00	17	0.7	1.4	Reflight
C87	W	18:24:41	18:43:00	0:00:00	17	0.7	1.4	Reflight
B86	E	18:45:18	19:01:09	0:00:00	17	0.6	1.1	Reflight
C85	W	19:04:03	19:22:24	0:00:00	17	0.6	1.1	Reflight
C84	E	19:26:36	19:43:27	0:00:00	17	0.7	1.4	Reflight
C83	W	19::45:50	20:05:33	0:00:00	17	0.7	1.1	Reflight
				0:00:00				70 GB
				0:00:00				
				0:00:00				overbase
				0:00:00				20:21;53
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
				0:00:00				
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				0:00:00				
				0:00:00				
				Page		1		Yes X No

Additional Comments:	Drive #
	162

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
		10/25/2017	298	76922		2		Chama-Jemez, NM	

Operator		Aircraft		HOBBS Start		Local Start Time		Zulu Start Time		Base
GALAMBOS		N475RC		1063.1		12:35:00		17:35:00		CORS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
GEBHART		OTHER		1065.0		12:41:00		17:41:00		P123

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KAMA
280 11	5+	50+		16	1	30.28	255	Arriving	KSDM

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode	Threshold Values
40	42.9	272	100	Gain - Course/Up		Single	A
				Gain - Fine/Down		Multi X	B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	11,575	Ft	Yes / No X		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	15:48:56
		⇕ Times entered are Zulu / GMT ⇕						Verify S-Turns Before Mission Yes X No	
				0:00:00				Sensor 8194/633/113GB	
				0:00:00				Takeoff:15:59z	
E1	W	17:35:57	17:36:34	0:00:00	16	0.7	1.2	Over CORS: 17:23:25 (approx)	
E1	E	17:40:11	17:40:45	0:00:00	17	0.7	1.2		
				0:00:00				Over CORS: 17:49:40	
				0:00:00				N 36:38:00 W 105:54:36	
				0:00:00				used 1GB	
				0:00:00					
				0:00:00				Hobbs: 1065.0	
				0:00:00					
				0:00:00				Arrived KSDM Hobs1068.9	
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
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↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	10/28/2016	302	76922	2	pecos blk e

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
SMITH	N404CP	5644.4	11:28:00	17:28:00	

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	OTHER	5649.0	4:00:00	22:00:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	skx
250/5	10			16	0	3034		Arriving	skx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	43	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15299	Ft	Yes	No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:	
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission	Yes X No
108	n	17:47:00	17:48:00		19	0.6	1.1		
107	s	17:52:00	17:53:00		19	0.6	1.1		
106	n	17:59:00	18:03:00		19	0.6	1.1		
105	s	18:07:00	18:13:00		16	0.6	1.3		
104	n	18:16:00	18:22:00		16	0.6	1.2		
103	s	18:25:00	18:32:00		17	0.6	1.1		
102	n	18:34:00	18:41:00		18	0.6	1		
101	s	18:44:00	18:50:00		18	0.6	1		
100	n	18:52:00	18:58:00		18	0.6	1		
99	s	19:01:00	19:07:00		16	0.6	1.2		
98	n	19:11:00	19:17:00		17	0.6	1.1		
97	s	19:20:00	19:25:00		16	0.6	1.3		
96	n	19:27:00	19:41:00		16	0.6	1.3		
95	s	19:43:00	19:56:00		17	0.6	1.1		
94	n	20:00:00	20:13:00		17	0.6	1.1		
93	s	20:16:00	20:29:00		17	0.6	1.1		
92	n	20:32:00	20:45:00		18	0.6	1		
91	s	20:48:00	21:01:00		18	0.6	1.1		
90	n	21:04:00	21:15:00		18	0.6	1		
89	s	21:18:00	21:29:00		19	0.6	1.1		
88	n	21:31:00	21:42:00		20	0.6	1.1		

↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission	Yes X No

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	10/29/2016	303	76922	2	pecos blk e

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
SMITH	N404CP	5649.0	9:30:00	15:30:00	

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	OTHER	5651.3	11:47:00	17:47:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	skx
calm	10			12	0	3033		Arriving	skx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	43	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15299	Ft	Yes		No	@ NS			Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No
87	n	15:50:00	16:05:00		20	0.6	1.2	clouds wp 45, n. end
56	e	16:10:00	16:11:00		18	0.6	1.3	
57	w	16:14:00	16:16:00		18	0.6	1.3	
58	e	16:18:00	16:21:00		18	0.6	1.3	
59	w	16:25:00	16:28:00		20	0.6	1.2	
60	e	16:35:00	16:38:00		20	0.6	1.1	
61	w	16:49:00	16:50:00		21	0.6	1.1	
62	n	16:57:00	17:04:00		20	0.6	1.1	clouds wp 11
63	s	17:07:00	17:11:00		20	0.6	1.1	clouds wp 6
64	n	17:14:00	17:20:00		22	0.6	1.1	clouds wp 12-9,3-1

↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name
	11/2/2016	314	76922		2		Pecos Santa Fe Blk E Flt #1

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time	Base
SWAIN, J.		N6255Q		232.6		9:47:00		15:47:00	WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time	PID
SWAIN, D.		ALS-8170		236.0		13:23:00		19:23:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point		Pressure	Haze/Fire/Cloud	Departing	KLVS
340/08	10	Clr	30	13	-1		30.25		Arriving	KLVS

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain	255	Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A 215
				Gain - Fine/Down		Multi	X	B 195

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6,500	Ft	15,300	Ft	Yes	No X	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 9:18:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
1	171	16:23:19	16:25:51	0:02:32	16	1.2	153	15259	Take Off @ 15:55
2	351	16:28:50	16:31:24	0:02:34	16	1.2	153	15252	
3	171	16:34:53	16:37:38	0:02:45	17	1.2	154	15212	
4	351	16:40:32	16:43:10	0:02:38	16	1.2	153	15234	
5	171	16:47:30	16:52:32	0:05:02	16	1.3	159	15186	
6	351	16:55:41	17:00:35	0:04:54	19	1.1	159	15210	
7	171	17:03:21	17:07:44	0:04:23	19	1.1	157	15187	
8	351	17:10:30	17:16:15	0:05:45	19	1.2	154	15221	
9	171	17:19:14	17:22:34	0:03:20	20	1.2	155	15183	
10	351	17:25:08	17:30:33	0:05:25	19	1.1	157	15255	
11	171	17:32:49	17:37:43	0:04:54	18	1.2	158	15215	
12	351	17:46:10	17:52:50	0:06:40	18	1.2	152	15214	
13	171	17:47:35	17:52:50	0:05:15	17	1.3	165	15214	
14	351	17:54:54	18:00:03	0:05:09	17	1.2	150	15226	
15	171	18:02:30	18:07:25	0:04:55	18	1.1	160	15265	
16	351	18:09:57	18:14:50	0:04:53	18	1.1	157	15207	
17	171	18:17:10	18:23:14	0:06:04	17	1.1	163	15242	
18	351	18:25:08	18:31:15	0:06:07	19	1	150	15260	
19	171	18:33:54	18:40:05	0:06:11	18	1.1	148	15231	
20	351	18:43:16	18:50:12	0:06:56	17	1.1	152	15195	
21	171	18:53:16	18:59:16	0:06:00	17	1.1	150	15230	cloud @ 17.66 nmi
				0:00:00					
				0:00:00					
				0:00:00					
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				0:00:00					

↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission Yes X No

Additional Comments:

Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	11/2/2016	307	76922	2	pecos blk e

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
SMITH	N404CP	5652.6	9:20:00	15:20:00	

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	OTHER	5656.5	12:56:00	18:56:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	skx
350/8	10			7	-3	3029		Arriving	skx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	43	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15299	Ft	Yes		No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes X No
87	n	15:40:00	15:53:00		15	0.7	1.3	
86	s	15:57:00	16:10:00		15	0.7	1.4	
85	n	16:46:00	17:00:00		16	0.7	1.5	clouds wp 53-38
65	s	17:08:00	17:14:00		19	0.7	1.2	
66	n	17:16:00	17:24:00		20	0.7	1.2	
67	s	17:27:00	17:34:00		18	0.7	1.2	
68	n	17:37:00	17:50:00		18	0.7	1.2	clouds wp 41
69	s	17:52:00	18:05:00		17	0.7	1.2	clouds wp 41, 6
109	s	18:20:00	18:23:00		19	0.7	1	clouds wp 10-end
↑ Times entered are Zulu / GMT ↑			Page		1			Verify S-Turns After Mission Yes X No

Additional Comments:

Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	11/3/2016	308	76922	2	pecos blk e

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
SMITH	N404CP	5656.5	9:21:00	15:21:00	

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
GEBHART	OTHER	5658.4	11:16:00	17:16:00	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	skx
350/9	10			7	-4	3054		Arriving	skx

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	43	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi	X	B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	15299	Ft	Yes		No	@	NS			Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		⇕ Times entered are Zulu / GMT ⇕						Verify S-Turns Before Mission Yes X No
70	n	15:43:00	15:56:00		15	0.7	1.4	
71	s	15:59:00	16:11:00		16	0.7	1.2	
72	n	16:14:00	16:26:00		17	0.7	1.1	
73	s	16:29:00	16:42:00		17	0.7	1.1	clds wp 39,56,57

↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name	
	11/10/2016	315	76922			USGS_NM_Pecos_SantaFe_Lidar_2016	

Operator		Aircraft		HOBBS Start		Local Start Time		Zulu Start Time		Base	
DENHAM		N404CP		5677.2		9:29:00		16:29:00		WOOLPERT PIN	

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID	
GEBHART		ALS-8191		5683.3		3:56:00		22:56:00		KSKX	

Wind Dir/Speed	Visibility		Ceiling		Cloud Cover %	Temp		Dew Point		Pressure		Haze/Fire/Cloud		Departing	KSKX
CALM	10		12000		CLEAR			-8		30.4				Arriving	KSKX

Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain			Mode		Threshold Values
40		42.9		272		100		Gain - Course/Up			Single		A
								Gain - Fine/Down			Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	15300	Ft	Yes / No		@	NS			Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: **8:50:00**
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes **X** No
									Take Off: 9:47
63	N	18:12:00	18:16:00	0:00:00		1.1			**All lines BLOCK E**
64	S	18:20:00	18:25:00	0:00:00		1.1			
68	N	18:28:00	18:40:00	0:00:00		1.3			
87	S	18:53:00	19:07:00	0:00:00		1.1			
85	N	19:09:00	19:24:00	0:00:00		1.1			
84	S	19:26:00	19:39:00	0:00:00		1.1			
83	N	19:43:00	19:57:00	0:00:00		1.1			
82	S	20:00:00	20:14:00	0:00:00		1			
81	N	20:17:00	20:28:00	0:00:00		1.1			
80	S	20:31:00	20:41:00	0:00:00		1.1			
79	N	20:43:00	21:00:00	0:00:00		1.1			
78	S	20:56:00	21:05:00	0:00:00		1.2			
77	N	21:08:00	21:17:00	0:00:00		1.2			
76	S	21:22:00	21:33:00	0:00:00		1.4			
75	N	21:36:00	21:48:00	0:00:00		1.4			
74	S	21:50:00	22:03:00	0:00:00		1.1			
69	N	22:05:00	22:17:00	0:00:00		1.1			
109	S	22:32:00	22:35:00	0:00:00		1.1			
				0:00:00					
				0:00:00					
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				0:00:00					

↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission Yes **X** No

Additional Comments: Drive #

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/11/2016	Day of Year 316	Mission Name / Job # 76922 New Mexico

Operator Annen	Aircraft	Sensor	Hobbs Start 237.6	Local Start Time 13:00	Zulu Start Time 20:00

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [X], SH_6157, SH-7108

Pilot Larocque			Hobbs End 241	Local End Time 16:45	Zulu End Time 23:45

Passengers	Using or Relying on CORS	GPS Base #1 Operator Annen PID KSAF1
	Yes [ ] No [X]	GPS Base #2 Operator ___ PID ___

Wind Dir/Speed 350/8	Visibility 10	Ceiling 15,800	Cloud Cover % 40	Temp 14	Dew Point 12	Pressure 30.35	Haze/Fire/Cloud	Departing ICAO KSAF
								Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain Course/Up ___ Fine/Down ___	Mode Single [ ] Multi [ ] 2 + 2 [ ] 4 + 3 [ ]

Air Speed 150 Kts	AGL 6,500 Ft	MSL 11,572 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
⇕ Times entered are Zulu / GMT ⇕							Verify S-Turns Before Mission	Yes [X] No [ ]
A229	N	20:35:00	20:45:00		18	0.7	1.2	
A228	S	20:47:00	21:04:00					
A227	N	21:07:00	21:24:00					Working 500' high due to restricted
A226	S	21:27:00	21:43:00					airspace, Los Alamos.
A225	N	21:46:00	22:03:00					North end of the lines.
A224	S	22:06:00	22:23:00					
A223	N	22:26:00	22:40:00					
A222	S	22:43:00	22:58:00					
A221	N	23:00:00	23:14:00					
A220	S	23:17:00	23:31:00					

↑ Times entered are Zulu / GMT ↑	0:00:00	Total Time On Line	Verify S-Turns After Mission	Yes [X] No [ ]

Additional Comments: Drive #

The system worked well, no issues.

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/12/2016	Day of Year 317	Mission Name / Job # 76922 ChamaJemez

Operator Annen	Aircraft	Sensor	Hobbs Start 241	Local Start Time 8:25	Zulu Start Time 15:25

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [^], SH_6157, SH-7108

Pilot Larocque			Hobbs End 246.5	Local End Time 14:10	Zulu End Time 21:10

Passengers	Using or Relying on CORS	GPS Base #1	Operator Annen	PID KSAF1
	Yes [ ] No [X]	GPS Base #2	Operator	PID

Wind Dir/Speed 360/4	Visibility 10	Ceiling 0	Cloud Cover % 0	Temp 3	Dew Point 0	Pressure 30.43	Haze/Fire/Cloud	Departing ICAO KSAF
								Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain Course/Up ___ Fine/Down ___	Mode Single [ ] Multi [ ] 2 + 2 [ ] 4 + 3 [ ]

Air Speed 150 Kts	AGL 6,500 Ft	MSL 11,572 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:

↕ Times entered are Zulu / GMT ↕ Verify S-Turns Before Mission Yes [X] No [ ]

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
A219	N	16:10:00	16:07:00		20	0.7	1.1	TDC Buffer error
A218	S	16:10:00	16:23:00					
A217	N	16:26:00	16:38:00					
A216	S	16:41:00	16:53:00					
A215	N	16:56:00	17:08:00					
A214	S	17:11:00	17:23:00					
A213	N	17:26:00	17:38:00					
A212	S	17:41:00	17:51:00					
A211	N	17:53:00	18:04:00					
A210	S	18:07:00	18:17:00					
A209	N	18:20:00	18:30:00					
A208	S	18:33:00	18:43:00					
A207	N	18:46:00	18:56:00					
A206	S	18:59:00	19:11:00					
A205	N	19:14:00	19:23:00					
A204	S	19:26:00	19:36:00					
A203	N	19:39:00	19:50:00					
A202	S	19:53:00	20:03:00					
A201	N	20:05:00	20:15:00					
A200	S	20:18:00	20:28:00					
A199	N	20:31:00	20:41:00					
A198	S	20:44:00	20:53:00					

↑ Times entered are Zulu / GMT ↑ | 0:00:00 | Total Time On Line | Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

TDC Buffer Error on the first line, we will refly that line.

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/13/2016	Day of Year 318	Mission Name / Job # 76922 ChamaJemez Flt A

Operator	Annen	Aircraft	Sensor	Hobbs Start 246.5	Local Start Time 7:00	Zulu Start Time 14:00

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [X], SH_6157, SH-7108

Pilot	Larocque			Hobbs End 250.5	Local End Time 11:15	Zulu End Time 18:15

Passengers		Using or Relying on CORS	GPS Base #1	Operator Annen	PID KSF1

Using or Relying on CORS: Yes [ ] No [X]

GPS Base #2 | Operator | PID

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing ICAO KSAF
0100/7	10	CLR	0	-2	-3	30.26		Arriving ICAO KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Gain	Mode
40	43	272	100	Course/Up ___ Fine/Down ___	Single [ ] 2 + 2 [ ] Multi [ ] 4 + 3 [ ]

Air Speed	AGL	MSL	Threshold	Waveform Mode	Pre-Trigger Dist.
150 Kts	6,500 Ft	11,572 Ft	/	@ NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:

↕ Times entered are Zulu / GMT ↕   Verify S-Turns Before Mission Yes [X] No [ ]

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
A219R	S	14:30:00	14:41:00		18	0.6	1.2	Re-flight, yesterday had TDC Buffer fail
A197	N	14:47:00	14:57:00					
A196	S	15:00:00	15:09:00					
A195	N	15:13:00	15:22:00					
A194	S	15:25:00	15:33:00					
A193	N	15:36:00	15:45:00					
A193	S	15:49:00	15:57:00					
A191	N	16:01:00	16:10:00					
A190	S	16:13:00	16:21:00					
A189	N	16:24:00	16:33:00					
A188	S	16:36:00	16:45:00					
A187	N	16:48:00	16:57:00					
A186	S	17:01:00	17:09:00					
A185	N	17:13:00	17:21:00					
A184	S	17:25:00	17:34:00					
A183	N	17:37:00	17:46:00					
A182	S	17:50:00	17:57:00					

↑ Times entered are Zulu / GMT ↑   0:00:00   Total Time On Line   Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/13/2016	Day of Year 318	Mission Name / Job # 76922 ChamaJemez Flt B

Operator	Aircraft	Sensor	Hobbs Start	Local Start Time	Zulu Start Time
Annen	N6255Q [X] N404CP N7079F N475CP N1107Q	SH-8170 [^] SH_6157 SH-7108	250.5	12:18	19:18

Pilot			Hobbs End	Local End Time	Zulu End Time
Larocque			254.3	16:15	23:15

Passengers	Using or Relying on CORS		GPS Base #1	Operator Annen	PID KSAF1
	Yes [ ] No [X]		GPS Base #2	Operator	PID

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing ICAO KSAF
330/9	10	CLR	0	14	-2	30.24		Arriving ICAO KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Gain		Mode	
40	43	272	100	Course/Up ___ Fine/Down ___		Single [ ] 2 + 2 [ ] Multi [ ] 4 + 3 [ ]	

Air Speed	AGL	MSL	Threshold	Waveform Mode		Pre-Trigger Dist.
150 Kts	6,500 Ft	11,572 Ft	/	@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission	Yes [X] No [ ]
A181R	N	19:56:00	20:03:00		15	0.8	1.4	First run had TDC Buffer Error, Re-flew it.
A180	S	20:06:00	20:13:00					
A179	N	20:16:00	20:24:00					
A178	S	20:28:00	20:35:00					
A177	N	20:38:00	20:46:00					
A176	S	20:50:00	20:57:00					
A175	N	21:00:00	21:09:00					
A174	S	21:12:00	21:20:00					
A173	N	21:23:00	21:31:00					
A172	S	21:34:00	21:41:00					
A171	N	21:43:00	21:53:00					
A170	S	21:56:00	22:03:00					
A169	N	22:07:00	22:16:00					
A168	S	22:19:00	22:28:00					
A167	N	22:32:00	22:42:00					
A166	S	22:45:00	22:54:00					
↑ Times entered are Zulu / GMT ↑				0:00:00	Total Time On Line		Verify S-Turns After Mission	Yes [X] No [ ]

Additional Comments: Drive #

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/14/2016	Day of Year 319	Mission Name / Job # 76922 ChamaJemez Flt A

Operator	Annen	Aircraft		Sensor		Hobbs Start 254.3	Local Start Time 7:25	Zulu Start Time 14:25

		N6255Q	X	SH-8170	X			

Pilot	Larocque	N404CP		SH_6157		Hobbs End 258.6	Local End Time 11:48	Zulu End Time 18:48

N7079F / N475CP / N1107Q / SH-7108

Passengers	Using or Relying on CORS	GPS Base #1	Operator Annen	PID KSAF1
	Yes ☐ No ☒	GPS Base #2	Operator	PID

Wind Dir/Speed 350/7	Visibility 10	Ceiling CLR	Cloud Cover % 0	Temp -1	Dew Point -5	Pressure 30.33	Haze/Fire/Cloud	Departing ICAO KSAF
								Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain Course/Up ___ Fine/Down ___	Mode Single ☐ Multi ☐	2 + 2 ☐ 4 + 3 ☐

Air Speed 150 Kts	AGL 6,500 Ft	MSL 11,572 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
↕ Times entered are Zulu / GMT ↕								Verify S-Turns Before Mission Yes ☒ No ☐
A165	N	14:55:00	15:04:00		18	0.7	1.3	
A164	S	15:07:00	15:16:00					
A163	N	15:19:00	15:30:00					
A162	S	15:33:00	15:43:00					
A161	N	15:47:00	15:57:00					
A160	S	16:00:00	16:10:00					
A159	N	16:13:00	16:20:00					
A158	S	16:24:00	16:31:00					
A157	N	16:34:00	16:41:00					
A156	S	16:43:00	16:50:00					
A155	N	16:54:00	17:00:00					
A154	S	17:03:00	17:09:00					
A153	N	17:13:00	17:20:00					
A152	S	17:23:00	17:31:00					
A151	N	17:34:00	17:42:00					
A150	S	17:45:00	17:54:00					
A149	N	17:58:00	18:07:00					
A148	S	18:14:00	18:27:00					
↑ Times entered are Zulu / GMT ↑			0:00:00	Total Time On Line				Verify S-Turns After Mission Yes ☒ No ☐

Additional Comments:	Drive #
System worked well, no issues.	

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/14/2016	Day of Year 319	Mission Name / Job # 76922 ChamaJemez Flt B

Operator	Annen	Aircraft		Sensor		Hobbs Start 258.6	Local Start Time 13:25	Zulu Start Time 20:25

		N6255Q	X	SH-8170	X			
Pilot	Larocque	N404CP		SH_6157		Hobbs End 2:24	Local End Time 17:15	Zulu End Time 0:15
		N7079F		SH-7108				
		N475CP						
		N1107Q						

Passengers	Using or Relying on CORS		GPS Base #1	Operator Annen	PID KSAF
	Yes ☐ No ☒		GPS Base #2	Operator	PID

Wind Dir/Speed 210/9	Visibility 10	Ceiling CLR	Cloud Cover % 0	Temp 17	Dew Point -4	Pressure 30.3	Haze/Fire/Cloud	Departing ICAO KSAF
								Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain Course/Up ___ Fine/Down ___	Mode Single ☐ Multi ☐	2 + 2 ☐ 4 + 3 ☐

Air Speed 150 Kts	AGL 6,500 Ft	MSL 11,572 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
↕ Times entered are Zulu / GMT ↕								Verify S-Turns Before Mission Yes ☒ No ☐
A147	N	20:58:00	21:12:00		21	0.6	1.1	
A146	S	21:16:00	21:29:00					
A145	N	21:33:00	21:47:00					
A144	S	21:50:00	22:03:00					
A143	N	22:06:00	22:16:00					
A142	S	22:19:00	22:29:00					
A141	N	22:32:00	22:42:00					
A140	S	22:45:00	22:55:00					
A139	N	22:58:00	23:08:00					
A138	S	23:12:00	23:21:00					
A137	N	23:24:00	23:34:00					
A136	S	23:37:00	23:46:00					

↑ Times entered are Zulu / GMT ↑	0:00:00	Total Time On Line	Verify S-Turns After Mission Yes ☒ No ☐

Additional Comments:	Drive #
System worked well, no issues.	

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	**MM/DD/YYYY** 11/15/2016	**Day of Year** 320	**Mission Name / Job #** 76922 ChamaJemez

Operator Annen	**Aircraft**	**Sensor**	**Hobbs Start** 262.1	**Local Start Time** 8:30	**Zulu Start Time** 15:30

Aircraft	Sensor
N6255Q [X]	SH-8170 [^]
N404CP	SH_6157
N7079F	SH-7108
N475CP	
N1107Q	

Pilot Larocque			**Hobbs End** 265.4	**Local End Time** 12:10	**Zulu End Time** 19:10

Passengers	**Using or Relying on CORS** Yes [ ] No [X]	**GPS Base #1**	**Operator** Annen	**PID** KSAF
		GPS Base #2	**Operator**	**PID**

Wind Dir/Speed 350/15	**Visibility** 10	**Ceiling** CLR	**Cloud Cover %** 0	**Temp** 4	**Dew Point** -6	**Pressure** 30.33	**Haze/Fire/Cloud**	**Departing ICAO** KSAF
								Arriving ICAO KSAF

Scan Angle (FOV) 40	**Scan Frequency (Hz)** 43	**Pulse Rate (kHz)** 272	**Laser Power %** 100	**Gain** Course/Up ___ Fine/Down ___	**Mode** Single [ ] Multi [ ]	2 + 2 [ ] 4 + 3 [ ]

Air Speed 150 Kts	**AGL** 6,500 Ft	**MSL** 11,572 Ft	**Threshold** /	**Waveform Mode** @ NS	**Pre-Trigger Dist.** Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
— ↕ Times entered are Zulu / GMT ↕								Verify S-Turns Before Mission Yes [X] No [ ]
A135	N	16:09:00	16:18:00		19	0.7	1.1	
A134	S	16:22:00	16:28:00					
A133	N	16:32:00	16:37:00					
A132	S	16:40:00	16:45:00					
A131	N	16:48:00	16:53:00					
A130	S	16:56:00	17:01:00					
A129	N	17:05:00	17:09:00					
A128	S	17:13:00	17:18:00					
A127	E	17:32:00	17:35:00					
A126	W	17:38:00	17:40:00					
A125	E	17:43:00	17:46:00					
A124	W	17:49:00	17:52:00					
A123	E	17:55:00	17:58:00					
A122	W	18:01:00	18:03:00					
A121	E	18:07:00	18:08:00					
A120	W	18:11:00	18:12:00					
A119	E	18:15:00	18:16:00					
A118	W	18:19:00	18:21:00					
A117	E	18:23:00	18:24:00					
A116	W	18:27:00	18:28:00					
A115	E	18:31:00	18:32:00					
A114	W	18:35:00	18:36:00					
↑ Times entered are Zulu / GMT ↑				0:00:00	Total Time On Line		Verify S-Turns After Mission Yes [X] No [ ]	

Additional Comments:

Drive #

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/16/2016	Day of Year 321	Mission Name / Job # 76922 ChamaJemez Flt A

Operator Annen	Aircraft	Sensor	Hobbs Start 265.4	Local Start Time 7:20	Zulu Start Time 14:20

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [X], SH_6157, SH-7108

Pilot Larocque			Hobbs End 270.8	Local End Time 13:00	Zulu End Time 20:00

Passengers	Using or Relying on CORS Yes [ ] No [X]	GPS Base #1 Operator Annen PID KSAF1

GPS Base #2 Operator PID

Wind Dir/Speed 360/6	Visibility 10	Ceiling 25K	Cloud Cover % 70	Temp 2	Dew Point -4	Pressure 30.12	Haze/Fire/Cloud	Departing ICAO KSAF Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain Course/Up Fine/Down	Mode Single [ ] Multi [ ] 2 + 2 [ ] 4 + 3 [ ]

Air Speed 150 Kts	AGL 6,500 Ft	MSL 11,572 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes [X] No [ ]
A113	W	14:48:00	14:53:00		16	0.7	1.3	
A112	E	14:55:00	14:59:00					
A111	W	15:03:00	15:06:00					
A110	E	15:09:00	15:12:00					
A109	W	15:16:00	15:19:00					
A108	E	15:23:00	15:27:00					
A107	W	15:31:00	15:35:00					
A106	E	15:38:00	15:42:00					
A105	W	15:46:00	15:50:00					
A104	E	15:53:00	15:57:00					
A103	W	16:00:00	16:05:00					
A102	E	16:08:00	16:11:00					
A101	W	16:15:00	16:19:00					
A100	E	16:22:00	16:26:00					
A99	W	16:30:00	16:34:00					
A98	E	16:37:00	16:41:00					
A97	W	16:44:00	16:49:00					
A96	E	16:52:00	16:57:00					
A95	W	17:00:00	17:05:00					
A94	E	17:16:00	17:27:00					
A93	W	17:31:00	17:44:00					
A92	E	17:48:00	17:58:00					
A91	W	18:01:00	18:14:00					
A90	E	18:17:00	18:30:00					
A89	W	18:33:00	18:47:00					
A88	E	18:50:00	19:03:00					
		PG 2						see page 2

↑ Times entered are Zulu / GMT ↑	0:00:00	Total Time On Line	Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

System worked well, no issues.

WOOLPERT FLIGHT LOG SHEET #2

| **Leica ALS-70** | | **DD/MM/YYYY**
11/16/2016 | | **Day of Year**
321 | **Mission Name / Job #**
76922 ChamaJemez | | |

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
A87	W	19:08:00	19:21:00					
A86	E	19:25:00	19:38:00					

| ↑ Times entered are Zulu / GMT ↑ | 0:00:00 | Total Time On Line | Verify S-Turns After Mission | Yes ☐ No ☐ |

Additional Comments: **Drive #**

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/18/2016	Day of Year 323	Mission Name / Job # 76922 ChamaJemez Flt A

Operator Annen	Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q	Sensor: SH-8170 [X], SH_6157, SH-7108	Hobbs Start 270.8	Local Start Time 7:40	Zulu Start Time 14:40
Pilot Larocque			Hobbs End 275.3	Local End Time 12:20	Zulu End Time 19:20

Passengers	Using or Relying on CORS: Yes [ ] No [X]	GPS Base #1 Operator Annen PID KSAF1
		GPS Base #2 Operator PID

Wind Dir/Speed 340/8	Visibility 10	Ceiling 0	Cloud Cover % 0	Temp -4	Dew Point -12	Pressure 30.26	Haze/Fire/Cloud	Departing ICAO KSAF
								Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain: Course/Up __ Fine/Down __	Mode: Single [ ] Multi [ ] 2 + 2 [ ] 4 + 3 [ ]

Air Speed 150 Kts	AGL 6,500 Ft	MSL 11,572 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
↕ Times entered are Zulu / GMT ↕								Verify S-Turns Before Mission Yes [X] No [ ]
A85	W	15:12:00	12:25:00		19	0.6	1.1	
A84	E	15:28:00	15:42:00					
A83	W	15:04:00	15:59:00					
A82	E	15:02:00	16:16:00					
A81	W	16:19:00	16:33:00					
A80	E	16:36:00	16:51:00					
A79	W	16:53:00	17:07:00					
A78	E	17:10:00	17:24:00					
A77	W	17:27:00	17:40:00					
A76	E	17:43:00	17:55:00					
A75	W	17:58:00	18:10:00					
A74	E	18:13:00	18:24:00					
A73	W	18:28:00	18:40:00					
A72	E	18:43:00	18:56:00					
↑ Times entered are Zulu / GMT ↑				0:00:00		Total Time On Line		Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

SYSTEM WORKED WELL, NO ISSUES.

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/18/2016	Day of Year 323	Mission Name / Job # 76922 ChamaJemez Flt B

Operator Annen	Aircraft	Sensor	Hobbs Start 275.3	Local Start Time 13:30	Zulu Start Time 20:30

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [X], SH_6157, SH-7108

Pilot Larocque			Hobbs End 278.6	Local End Time 17:05	Zulu End Time 0:05

Passengers	Using or Relying on CORS	GPS Base #1	Operator Annen	PID KSAF1
	Yes [ ] No [X]	GPS Base #2	Operator	PID

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing ICAO KSAF
200/10	10	0	0	7	-14	30.35		Arriving ICAO KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Gain	Mode
40	43	272	100	Course/Up ___ / Fine/Down ___	Single [ ] 2 + 2 [ ] / Multi [ ] 4 + 3 [ ]

Air Speed	AGL	MSL	Threshold	Waveform Mode	Pre-Trigger Dist.
150 Kts	6,500 Ft	11,572 Ft	/	@ NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
↕ Times entered are Zulu / GMT ↕								Verify S-Turns Before Mission Yes [X] No [ ]
A71	W	21:04:00	21:16:00		19	0.6	1.1	
A70	E	21:19:00	21:31:00					
A69	W	21:35:00	21:47:00					
A68	E	21:50:00	22:02:00					
A67	W	22:04:00	22:08:00					
A66	E	22:11:00	22:14:00					
A65	W	22:17:00	22:21:00					
A64	E	22:24:00	22:27:00					
A63	W	22:30:00	22:33:00					
A62	E	22:36:00	22:40:00					
A61	W	22:43:00	22:46:00					
A60	W	22:49:00	22:55:00					
A59	E	22:59:00	23:04:00					
A58	W	23:07:00	23:15:00					
A57	E	23:18:00	23:24:00					
A56	W	23:27:00	23:34:00					
↑ Times entered are Zulu / GMT ↑			0:00:00	Total Time On Line				Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	11/18/2016	323	76922		2		USGS Pecos Santa Fe	

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
DENHAM	N404CP	5683.6	2:10:00	21:10:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	5686.6	5:20:00	0:20:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
CALM	10	12000	CLEAR	12	-13	30.35		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	49.2	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	15300	Ft	Yes	No		@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission	Yes X No
									Take Off: 2:18	
111	N	21:43:00	21:46:00	0:00:00		1.1				
110	S	21:49:00	21:51:00	0:00:00		1.1				
55	S	21:55:00	21:55:00	0:00:00		1.1				
54	N	21:58:00	21:59:00	0:00:00		1.1				
53	S	22:02:00	22:03:00	0:00:00		1.1				
52	N	22:05:00	22:07:00	0:00:00		1.1				
51	S	22:09:00	22:10:00	0:00:00		1.1				
50	N	22:15:00	22:20:00	0:00:00		1				
49	S	22:27:00	22:37:00	0:00:00		1.1				
48	N	22:39:00	22:49:00	0:00:00		1.2				
47	S	22:52:00	23:01:00	0:00:00		1.2				
46	N	23:04:00	23:12:00	0:00:00		1.1				
45	S	23:15:00	23:24:00	0:00:00		1.1				
44	N	23:26:00	23:35:00	0:00:00		1				
43	S	23:38:00	23:49:00	0:00:00		1				
42	N	23:51:00	0:03:00	0:00:00		1.1				
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
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				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
↑ Times entered are Zulu / GMT ↑			Page		1		Verify S-Turns After Mission		Yes X No	

Additional Comments:	Drive #

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/19/2016	Day of Year 324	Mission Name / Job # 76922 ChamaJemez Flt A

Operator Annen	Aircraft	Sensor	Hobbs Start 278.6	Local Start Time 7:45	Zulu Start Time 14:45

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [X], SH_6157, SH-7108

Pilot Larocque			Hobbs End 283.2	Local End Time 12:40	Zulu End Time 19:40

Passengers	Using or Relying on CORS	GPS Base #1	Operator Annen	PID KSAF1
	Yes [ ] No [X]	GPS Base #2	Operator	PID

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing ICAO KSAF
340/4	10	0	0	-2	-10	30.51		Arriving ICAO KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Gain	Mode
40	43	272	100	Course/Up ___ Fine/Down ___	Single [ ] 2 + 2 [ ] Multi [ ] 4 + 3 [ ]

Air Speed	AGL	MSL	Threshold	Waveform Mode	Pre-Trigger Dist.
150 Kts	6,500 Ft	11,572 Ft	/	@ NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes [X] No [ ]
A264	S	15:13:00	15:23:00		18	0.6	1.6	
A263	N	15:25:00	15:34:00					
A262	S	15:37:00	15:46:00					
A261	N	15:48:00	15:57:00					
A260	S	16:00:00	16:08:00					
A259	N	16:11:00	16:19:00					
A258	S	16:22:00	16:29:00					
A257	N	16:32:00	16:40:00					
A256	S	16:42:00	16:49:00					
A255	N	16:52:00	16:58:00					
A254	S	17:01:00	17:08:00					
A253	N	17:11:00	17:18:00					
A252	S	17:21:00	17:28:00					
A251	N	17:31:00	17:39:00					
A250	S	17:42:00	17:50:00					
A249	N	17:54:00	18:04:00					
A248	S	18:07:00	18:17:00					
A247	N	18:20:00	18:30:00					
A246	S	18:33:00	18:43:00					
		Break in	sequence					
A274	N	18:47:00	18:50:00					
A273	S	18:53:00	18:56:00					
A272	N	19:00:00	19:04:00					
A271	S	19:07:00	19:11:00					
A270	N	19:13:00	19:17:00					
		↑ Times entered are Zulu / GMT ↑		0:00:00	Total Time On Line			Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

SYSTEM WORKED WELL

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	**MM/DD/YYYY** 11/19/2016	**Day of Year** 324	**Mission Name / Job #** 76922 ChamaJemez Flt B

Operator	Aircraft	Sensor	Hobbs Start	Local Start Time	Zulu Start Time
Annen	N6255Q [X] / N404CP / N7079F / N475CP / N1107Q	SH-8170 [X] / SH_6157 / SH-7108	283.2	13:50	20:50

Pilot			Hobbs End	Local End Time	Zulu End Time
Larocque			286.3	17:05	0:05

Passengers	Using or Relying on CORS	GPS Base #1	Operator	Annen	PID	KSAF1
	Yes [ ] No [X]	GPS Base #2	Operator		PID	

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing ICAO	KSAF
230/8	10	0	0	11	-10	30.41		Arriving ICAO	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Gain	Mode	
40	43	272	100	Course/Up ___ Fine/Down ___	Single [ ] Multi [ ]	2 + 2 [ ] 4 + 3 [ ]

Air Speed	AGL	MSL	Threshold	Waveform Mode	Pre-Trigger Dist.
150 Kts	6,500 Ft	11,572 Ft	/	@ NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
			‡ Times entered are Zulu / GMT ‡					Verify S-Turns Before Mission Yes [X] No [ ]
A245	S	21:13:00	21:16:00		20	0.6	1.1	
A244	N	21:19:00	21:21:00					
A243	S	21:25:00	21:27:00					
A242	N	21:30:00	21:32:00					
A241	S	21:35:00	21:37:00					
A240	N	21:40:00	21:42:00					
A239	S	21:45:00	21:48:00					
A238	N	21:50:00	21:53:00					
A237	S	21:56:00	21:58:00					
A236	N	22:01:00	22:03:00					
A235	S	22:06:00	22:16:00					
A234	N	22:19:00	22:29:00					
A233	S	22:32:00	22:42:00					
A265	N	22:45:00	22:51:00					Break in sequence
A266	S	22:54:00	23:00:00					Working around the mountain
A267	N	23:04:00	23:09:00					
A269	S	22:13:00	22:17:00					
A268	N	23:20:00	23:26:00					
A232	N	23:30:00	23:33:00					
A231	S	23:36:00	9:21:36					
A230	N	23:42:00	23:46:00					
			↑ Times entered are Zulu / GMT ↑	0:00:00 Total Time On Line				Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

System worked well, no issues

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #			Project Name	
	11/19/2016	324	76922		2			USGS Pecos Santa Fe	

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
DENHAM		N404CP		5686.6		10:04:00		17:04:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
ALBERS		ALS-8191		5693.5		5:05:00		0:05:00		KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
340/6	10		CLEAR	6	-10	30.5		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed	AGL		MSL		Waveform Used			Waveform Mode			Pre-Trigger Dist.	
150	6500	Ft	15300	Ft	Yes		No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	7:30:00
		⇕ Times entered are Zulu / GMT ⇕							Verify S-Turns Before Mission Yes X No	
									Take Off:	
41	S	17:37:00	17:48:00	0:00:00						
40	N	17:51:00	18:01:00	0:00:00						
39	S	18:04:00	18:14:00	0:00:00						
38	N	18:17:00	18:29:00	0:00:00						
37	S	18:33:00	18:42:00	0:00:00						
36	N	18:44:00	18:52:00	0:00:00						
35	S	18:55:00	19:03:00	0:00:00						
34	N	19:05:00	19:14:00	0:00:00						
33	S	19:16:00	19:24:00	0:00:00						
32	N	19:26:00	19:34:00	0:00:00						
31	S	19:36:00	19:44:00	0:00:00						
30	N	19:47:00	19:54:00	0:00:00						
29	S	19:57:00	20:05:00	0:00:00						
28	N	20:07:00	20:15:00	0:00:00						
27	S	20:17:00	20:24:00	0:00:00						
26	N	20:26:00	20:33:00	0:00:00						
25	S	20:35:00	20:43:00	0:00:00						
24	N	20:45:00	20:52:00	0:00:00						
23	S	20:55:00	21:01:00	0:00:00						
22	N	21:04:00	21:10:00	0:00:00						
6	S	21:15:00	21:20:00	0:00:00					REFLIGHT	
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						

↑ Times entered are Zulu / GMT ↑		Page		2	Verify S-Turns After Mission Yes X No	

Additional Comments: Drive #

BLOCK E

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name
	11/19/2016	324	76922		2		USGS Pecos Santa Fe

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
DENHAM	N404CP	5686.6	10:04:00	17:04:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	5693.5	5:05:00	0:05:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
340/6	10		CLEAR	6	-10	30.5		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed	AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	6500	Ft	15300	Ft	Yes	No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	7:30:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No	
									Take Off:	
41	S	17:37:00	17:48:00	0:00:00						
40	N	17:51:00	18:01:00	0:00:00						
39	S	18:04:00	18:14:00	0:00:00						
38	N	18:17:00	18:29:00	0:00:00						
37	S	18:33:00	18:42:00	0:00:00						
36	N	18:44:00	18:52:00	0:00:00						
35	S	18:55:00	19:03:00	0:00:00						
34	N	19:05:00	19:14:00	0:00:00						
33	S	19:16:00	19:24:00	0:00:00						
32	N	19:26:00	19:34:00	0:00:00						
31	S	19:36:00	19:44:00	0:00:00						
30	N	19:47:00	19:54:00	0:00:00						
29	S	19:57:00	20:05:00	0:00:00						
28	N	20:07:00	20:15:00	0:00:00						
27	S	20:17:00	20:24:00	0:00:00						
26	N	20:26:00	20:33:00	0:00:00						
25	S	20:35:00	20:43:00	0:00:00						
24	N	20:45:00	20:52:00	0:00:00						
23	S	20:55:00	21:01:00	0:00:00						
22	N	21:04:00	21:10:00	0:00:00						
6	S	21:15:00	21:20:00	0:00:00					REFLIGHT	
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						

↑ Times entered are Zulu / GMT ↑		Page		2	Verify S-Turns After Mission Yes X No	Drive #

Additional Comments:

BLOCK E

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	**MM/DD/YYYY** 11/20/2016	**Day of Year** 325	**Mission Name / Job #** 76922 ChamaJemez

Operator	Annen	Aircraft		Sensor	**Hobbs Start** 286.3	**Local Start Time** 7:55	**Zulu Start Time** 14:55

Pilot	Larocque

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [∧], SH_6157, SH-7108

Hobbs End 291.6	**Local End Time** 13:35	**Zulu End Time** 20:35

Passengers		**Using or Relying on CORS** Yes [ ] No [X]	**GPS Base #1** Operator Annen PID KSAF1
			GPS Base #2 Operator PID

Wind Dir/Speed 360/11	Visibility 10	Ceiling 0	Cloud Cover % 0	Temp 3	Dew Point -9	Pressure 30.35	Haze/Fire/Cloud	Departing ICAO KSAF
								Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain Course/Up ___ Fine/Down ___	Mode Single [ ] 2+2 [ ] Multi [ ] 4+3 [ ]

Air Speed 150 Kts	AGL 6,500 Ft	MSL 11,572 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes [X] No [ ]
B288	S	15:27:00	15:29:00		21	0.6	1.1	
B287	N	15:31:00	15:33:00					
B286	S	15:36:00	15:37:00					
B285	N	15:50:00	15:41:00					
B284	S	15:43:00	15:45:00					
B283	N	15:47:00	15:48:00					
B282	S	15:51:00	15:57:00					
B281	N	15:59:00	16:04:00					
B280	S	16:07:00	16:12:00					
B279	N	16:15:00	16:19:00					
B278	S	16:22:00	16:25:00					
B277	N	16:28:00	16:32:00					
B276	S	16:35:00	16:40:00					ATC line interruption
B276	S	16:44:00	16:46:00					Airline traffic conflict.
B275	N	16:49:00	16:56:00					
B274	S	16:59:00	17:05:00					
B273	N	17:07:00	17:14:00					
B272	S	17:17:00	17:25:00					
B271	N	17:29:00	17:51:00					
B270	S	17:40:00	17:48:00					
B269	N	17:51:00	17:59:00					
B268	S	18:02:00	18:11:00					
B267	N	18:14:00	18:22:00					
B266	S	18:25:00	18:33:00					
B265	N	18:36:00	18:44:00					
B264	S	18:48:00	18:55:00					
	SEE	PAGE 2						
		↑ Times entered are Zulu / GMT ↑		0:00:00	Total Time On Line			Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: System worked well, no issues.

Drive #

WOOLPERT FLIGHT LOG SHEET #2

Leica ALS-70		DD/MM/YYYY 11/20/2016		Day of Year 325		Mission Name / Job # ChamaJemez		

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
B263	N	15:58:00	19:07:00					
B262	S	19:09:00	19:17:00					
B261	N	19:20:00	19:28:00					
B260	S	19:31:00	19:39:00					
B259	N	19:42:00	19:50:00					
B258	S	19:53:00	20:01:00					
B257	N	20:04:00	20:09:00					

↑ Times entered are Zulu / GMT ↑	0:00:00	Total Time On Line	Verify S-Turns After Mission	Yes	No

Additional Comments:

Drive #

System worked well, no issues

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	11/20/2016	325	7622		2		USGS PECOS SANTA FE		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
DENHAM		N404CP		5693.5		7:55:00		14:55:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
ALBERS		ALS-8191		5701.1		3:44:00		22:44:00		KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
360/11	10		CLEAR	2	-10	30.35		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	13300	Ft	Yes	No		@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 7:45:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 8:05
31	N	15:28:00	15:41:00	0:00:00					
30	S	15:43:00	15:57:00	0:00:00					
29	N	16:00:00	16:13:00	0:00:00					
28	S	16:16:00	16:29:00	0:00:00					
27	N	16:31:00	16:44:00	0:00:00					
26	S	16:50:00	17:06:00	0:00:00					
25	N	17:08:00	17:26:00	0:00:00					
24	S	17:29:00	17:46:00	0:00:00					
23	N	17:48:00	18:06:00	0:00:00					
22	S	18:08:00	18:25:00	0:00:00					
21	N	18:28:00	18:46:00	0:00:00					
20	S	18:48:00	19:06:00	0:00:00					
19	N	19:08:00	19:26:00	0:00:00					
18	S	19:28:00	19:45:00	0:00:00					
17	N	19:48:00	20:05:00	0:00:00					
16	S	20:07:00	20:22:00	0:00:00					
92	N	20:25:00	20:30:00	0:00:00					
15	N	20:32:00	20:40:00	0:00:00					
14	S	20:42:00	20:50:00	0:00:00					
91	S	20:53:00	20:57:00	0:00:00					
90	N	20:59:00	21:03:00	0:00:00					
89	S	21:06:00	21:09:00	0:00:00					
88	N	21:11:00	21:15:00	0:00:00					
87	S	21:17:00	21:20:00	0:00:00					
86	N	21:22:00	21:24:00	0:00:00					
85	S	21:27:00	21:29:00	0:00:00					
84	N	21:31:00	21:34:00	0:00:00					
83	S	21:37:00	21:38:00	0:00:00					
82	N	21:41:00	21:42:00	0:00:00					
81	S	21:46:00	21:46:00	0:00:00					

↑ Times entered are Zulu / GMT ↑			Page		1		Verify S-Turns After Mission Yes X No	

Additional Comments: Drive #

BLOCK D

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	11/20/2016	325	76922		2		USGS PECOS SANTA FE	

Operator		Aircraft		HOBBS Start		Local Start Time	Zulu Start Time	Base
DENHAM		N404CP		5693.5		7:55:00	14:55:00	WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time	Zulu End Time	PID
ALBERS		ALS-8191		5701.1		3:44:00	22:44:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
360/11	10		CLEAR	2	-10	30.35		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	13300	Ft	Yes	No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 7:45:00
		⇕ Times entered are Zulu / GMT ⇕							Verify S-Turns Before Mission Yes X No
									Take Off: 8:05
13	N	21:52:00	22:00:00	0:00:00					
12	S	22:02:00	22:07:00	0:00:00					
11	N	22:10:00	22:15:00	0:00:00					
10	S	22:18:00	22:23:00	0:00:00					
9	N	22:25:00	22:30:00	0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
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				0:00:00					

↑ Times entered are Zulu / GMT ↑			Page		2		Verify S-Turns After Mission Yes X No	

Additional Comments: Drive #

BLOCK D

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/23/2016	Day of Year 328	Mission Name / Job # 76922 ChamaJemez

Operator Annen	Aircraft	Sensor	Hobbs Start 291.6	Local Start Time 8:00	Zulu Start Time 15:00

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [X], SH_6157, SH-7108

Pilot Larocque			Hobbs End 294.2	Local End Time 10:55	Zulu End Time 17:55

Passengers

Using or Relying on CORS: Yes [ ] No [X]

GPS Base #1 Operator Annen PID KSAF1
GPS Base #2 Operator PID

Wind Dir/Speed 360/4	Visibility 10	Ceiling 0	Cloud Cover % 0	Temp -1	Dew Point -2	Pressure 30.26	Haze/Fire/Cloud	Departing ICAO KSAF / Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain Course/Up ___ Fine/Down ___	Mode Single [ ] Multi [ ] 2+2 [ ] 4+3 [ ]

Air Speed 150 Kts	AGL 6,500 Ft	MSL 13,575 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes [X] No [ ]
B227	W	15:30:00	15:36:00		19	0.6	1.1	
B226	E	15:35:00	15:36:00					
B225	W	15:40:00	15:41:00					
B224	E	15:46:00	15:47:00					
B223	W	15:50:00	15:52:00					
B222	E	15:55:00	15:58:00					
B221	W	16:01:00	16:03:00					
B220	E	16:07:00	16:09:00					
B219	W	16:12:00	16:14:00					
B218	E	16:18:00	16:21:00					
B217	W	16:24:00	16:27:00					
B216	E	16:30:00	16:33:00					
B215	W	16:36:00	16:40:00					
B214	E	16:43:00	16:45:00					
B213	W	16:48:00	16:51:00					
								Moved due to snow
B256	S	17:01:00	17:02:00					
B255	N	17:05:00	17:07:00					
B254	S	17:09:00	17:11:00					
B253	N	17:14:00	17:16:00					
B252	S	17:19:00	17:20:00					
B251	N	17:23:00	17:24:00					

↑ Times entered are Zulu / GMT ↑ | 0:00:00 | Total Time On Line | Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: SYSTEM WORKED WELL, NO ISSUES Drive #

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY	Day of Year	Mission Name / Job #
	11/23/2016	328	76922 Pecos Santa Fe

Operator	Aircraft		Sensor	Hobbs Start	Local Start Time	Zulu Start Time
Annen	N6255Q [X]		SH-8170 [^]	294.2	12:10	19:10
	N404CP [ ]		SH_6157 [ ]	**Hobbs End**	**Local End Time**	**Zulu End Time**
Pilot	N7079F [ ]		SH-7108 [ ]			
Larocque	N475CP [ ]			298.9	17:05	0:05
	N1107Q [ ]					

Passengers	Using or Relying on CORS	GPS Base #1	Operator	Annen	PID	KSAF1
	Yes [ ] No [X]	GPS Base #2	Operator	Denham	PID	Las Vegas NM

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing ICAO	KSAF
210/7	10	0	0	9	-1	30.23		Arriving ICAO	KSAF

Scan Angle (FOV)		Pulse Rate (kHz)	Laser Power %	Gain		Mode		
40	43	272	100	Course/Up ___		Single [ ]	2 + 2 [ ]	
				Fine/Down ___		Multi [ ]	4 + 3 [ ]	

Air Speed		AGL	MSL	Threshold	Waveform Mode			Pre-Trigger Dist.
150 Kts		6,500 Ft	13,300 Ft	/		@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕					Verify S-Turns Before Mission	Yes [X] No [ ]
D178	N	19:51:00	20:02:00		19	0.6	1.1	
D179	S	20:05:00	20:06:00					
D180	S	20:08:00	20:16:00					
D181	N	20:19:00	20:28:00					
D182	S	20:31:00	20:40:00					
D183	N	20:42:00	20:49:00					
D184	S	20:51:00	21:00:00					
D185	N	21:06:00	21:13:00					
D186	S	21:16:00	21:24:00					
D187	N	21:28:00	21:35:00					
D188	S	21:38:00	21:45:00					
D189	N	21:48:00	21:54:00					
D190	S	21:57:00	22:03:00					
D191	N	22:11:00	22:17:00					
D192	S	22:20:00	22:27:00					
D193	N	22:31:00	22:37:00					
D194	S	22:40:00	22:46:00					
D195	N	22:49:00	22:54:00					
D196	S	22:57:00	23:01:00					
D197	N	23:04:00	23:07:00					
D198	S	23:10:00	23:14:00					
D199	N	23:17:00	23:20:00					
D200	S	23:23:00	23:27:00					
		↑ Times entered are Zulu / GMT ↑		0:00:00	Total Time On Line		Verify S-Turns After Mission	Yes [X] No [ ]

Additional Comments: Drive #

System worked well, no issues

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name
	11/23/2016	328	76922	2		USGS PECOS SANTA FE

Operator	Aircraft	HOBBS Start	Local Start Time	Zulu Start Time	Base
DENHAM	N404CP	5701.1	7:53:00	14:53:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	5705.4	12:25:00	19:25:00	KSAF1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
150	10	12000	CLEAR	1	-2	30.26		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	13300	Ft	Yes	No		@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 7:45:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 8:04
8	S	15:25:00	15:30:00	0:00:00					
7	N	15:33:00	15:38:00	0:00:00					
6	S	15:40:00	15:44:00	0:00:00					
5	N	15:47:00	15:51:00	0:00:00					
4	S	15:54:00	15:56:00	0:00:00					
3	N	15:58:00	16:03:00	0:00:00					
2	S	16:05:00	16:08:00	0:00:00					
1	N	16:10:00	16:13:00	0:00:00					
64	N	16:25:00	16:43:00	0:00:00					
63	S	16:45:00	17:03:00	0:00:00					
62	N	17:05:00	17:23:00	0:00:00					
61	S	17:25:00	17:42:00	0:00:00					
59	N	17:46:00	17:46:00	0:00:00					
60	N	17:50:00	18:07:00	0:00:00					
58	S	18:09:00	18:27:00	0:00:00					
57	N	18:31:00	18:51:00	0:00:00					
56	S	18:55:00	18:13:00	0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
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				0:00:00					

↑ Times entered are Zulu / GMT ↑		Page	2	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

BLOCK D FLIGHT 4

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	11/23/2016	328	76922		2		USGS PECOS SANTA FE	

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
DENHAM	N404CP	5705.4	12:43:00	19:43:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	5709.2	4:39:00	23:39:00	KLVS1

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
220/5	10	12000	CLEAR	1	-2	30.17		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	13300	Ft	Yes		No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	12:39:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes **X** No	
									Take Off: 12:46	
55	N	20:02:00	20:21:00	0:00:00						
54	S	20:23:00	20:43:00	0:00:00						
53	N	20:46:00	21:05:00	0:00:00						
52	S	21:07:00	21:27:00	0:00:00						
51	N	21:29:00	21:48:00	0:00:00						
217	S	21:58:00	21:59:00	0:00:00						
216	N	22:01:00	22:02:00	0:00:00						
215	S	22:05:00	22:07:00	0:00:00						
214	N	22:09:00	22:11:00	0:00:00						
213	S	22:14:00	22:17:00	0:00:00						
212	N	22:19:00	22:22:00	0:00:00						
211	S	22:25:00	22:28:00	0:00:00						
210	N	22:30:00	22:33:00	0:00:00						
209	S	22:35:00	22:38:00	0:00:00						
208	N	22:41:00	22:44:00	0:00:00						
207	S	22:46:00	22:49:00	0:00:00						
206	N	22:51:00	22:55:00	0:00:00						
205	S	22:57:00	23:01:00	0:00:00						
204	N	23:03:00	23:06:00	0:00:00						
203	S	23:09:00	23:12:00	0:00:00						
202	N	23:13:00	21:17:00	0:00:00						
201	S	23:19:00	23:23:00	0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						

↑ Times entered are Zulu / GMT ↑		Page		2	Verify S-Turns After Mission Yes **X** No	

Additional Comments: Drive #

BLOCK D FLIGHT 5

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/24/2016	Day of Year 329	Mission Name / Job # 76922 ChamaJemez

Operator Annen	Aircraft	Sensor	Hobbs Start 298.9	Local Start Time 7:50	Zulu Start Time 14:50

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [X], SH_6157, SH-7108

Pilot Larocque			Hobbs End 304.1	Local End Time 13:25	Zulu End Time 20:25

Passengers	Using or Relying on CORS: Yes [ ] No [X]	GPS Base #1 Operator Annen	PID KSAF1

		GPS Base #2 Operator	PID

Wind Dir/Speed 340/10	Visibility 10	Ceiling 0	Cloud Cover % 0	Temp 2	Dew Point -3	Pressure 30.26	Haze/Fire/Cloud	Departing ICAO KSAF
								Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain: Course/Up ___ Fine/Down ___	Mode: Single [ ] Multi [ ] 2+2 [ ] 4+3 [ ]

Air Speed 150 Kts	AGL 6,500 Ft	MSL 13,575 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
		↕ Times entered are Zulu / GMT ↕						Verify S-Turns Before Mission Yes [X] No [ ]
B212	W	15:19:00	15:21:00		22	0.6	1.1	
B211	E	15:24:00	15:27:00					
B210	W	15:30:00	15:43:00					
B209	E	15:37:00	15:41:00					
B208	W	15:44:00	15:49:00					
B207	E	15:29:00	15:56:00					
B206	W	15:59:00	16:03:00					
B205	E	16:07:00	16:12:00					
B204	W	16:14:00	16:18:00					
B203	E	16:22:00	16:26:00					
B202	W	16:29:00	16:33:00					
B201	E	16:37:00	16:41:00					
B200	W	16:44:00	16:48:00					
B199	E	16:51:00	16:56:00					
B198	W	16:59:00	17:03:00					
B197	E	17:06:00	17:11:00					
B196	W	17:14:00	17:17:00					
B195	E	17:21:00	17:25:00					
B194	W	17:28:00	17:32:00					
B250	S	17:38:00	17:39:00					Moved to different area
B249	N	17:42:00	17:43:00					
B248	S	17:47:00	17:48:00					
B247	N	17:51:00	17:56:00					
B246	S	17:59:00	18:03:00					
B245	N	18:07:00	18:11:00					
B244	S	18:14:00	18:18:00					
		See Page 2						
		↑ Times entered are Zulu / GMT ↑		0:00:00	Total Time On Line			Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments:

System worked well, no issues

Drive #

WOOLPERT FLIGHT LOG SHEET #2

Leica ALS-70	DD/MM/YYYY 11/24/2016	Day of Year 329	Mission Name / Job # 76922 ChamaJemez

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
B243	N	18:21:00	18:26:00					
B242	S	18:30:00	18:35:00					
B241	N	18:38:00	18:43:00					
B240	S	18:46:00	18:54:00					
B239	N	18:56:00	19:02:00					
B238	S	19:06:00	19:11:00					
B237	N	19:14:00	19:20:00					
B236	S	19:23:00	19:27:00					
B235	N	19:30:00	19:34:00					
B234	S	19:37:00	19:40:00					
B233	N	19:44:00	19:47:00					
B232	S	19:50:00	19:52:00					
B231	N	19:56:00	19:57:00					

↑ Times entered are Zulu / GMT ↑	0:00:00	Total Time On Line	Verify S-Turns After Mission	Yes	No

Additional Comments: **Drive #**

System worked well, no issues

WOOLPERT FLIGHT LOG SHEET #2

Leica ALS-70	DD/MM/YYYY 11/25/2016	Day of Year 330	Mission Name / Job # 76922 Pecos Santa Fe

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
H27	E	19:05:00	19:17:00					
H28	W	19:20:00	19:31:00					

↑ Times entered are Zulu / GMT ↑   0:00:00   Total Time On Line   Verify S-Turns After Mission   Yes ☐ No ☐

Additional Comments: Drive #

System worked well, no issues

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/25/2016	Day of Year 330	Mission Name / Job # 76922 ChamaJemez

Operator	Annen	Aircraft		Sensor		Hobbs Start 308.9	Local Start Time 13:45	Zulu Start Time 20:45

Aircraft:
- N6255Q [X]
- N404CP
- N7079F
- N475CP
- N1107Q

Sensor:
- SH-8170 [X]
- SH_6157
- SH-7108

Pilot	Larocque		Hobbs End 311.6	Local End Time 16:48	Zulu End Time 23:48

Passengers	Using or Relying on CORS	GPS Base #1	Operator Annen	PID KSAF1

Using or Relying on CORS: Yes [ ] No [X]

GPS Base #2	Operator	PID

Wind Dir/Speed 125/7	Visibility 10	Ceiling 0	Cloud Cover % 0	Temp 9	Dew Point -14	Pressure 30.39	Haze/Fire/Cloud	Departing ICAO KSAF

Arriving ICAO KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain Course/Up ___ Fine/Down ___	Mode Single [ ] Multi [ ] 2 + 2 [ ] 4 + 3 [ ]

Air Speed 150 Kts	AGL 6,500 Ft	MSL 13,575 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:

⇕ Times entered are Zulu / GMT ⇕   Verify S-Turns Before Mission Yes [X] No [ ]

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
B193	W	21:12:00						Buffer failure, restart line
B193	W	21:20:00	21:27:00		22	0.6	1.1	
B192	E	21:30:00	21:37:00					
B191	W	21:04:00	21:53:00					
B230	S	21:56:00	21:57:00					Break in sequence
B229	N	22:00:00	22:01:00					
B228	S	22:04:00	22:05:00					
B190	E	22:08:00	22:22:00					Break in sequence
B189	W	22:24:00	22:37:00					
B188	E	22:40:00	22:53:00					
B187	W	22:56:00	2:10:00					
B186	E	23:13:00	23:25:00					

↑ Times entered are Zulu / GMT ↑   0:00:00   Total Time On Line   Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #			Project Name		
	11/25/2016	330	76922		2			USGS PECOS SANTA FE		

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
DENHAM		N404CP		5711.7		7:45:00		14:45:00		WOOLPERT PIN

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
ALBERS		ALS-8191		5720.1		4:50:00		4:50:00		KLVS

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	KSAF
010/6	10	4800	BKN	-6	-9	30:49:00			Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	13300	Ft	Yes	No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	8:25:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No	
									Take Off: 7:51	
80	S	15:51:00	16:02:00	0:00:00						
79	N	16:05:00	16:17:00	0:00:00						
78	S	16:20:00	16:31:00	0:00:00						
77	N	16:33:00	16:45:00	0:00:00						
76	S	16:48:00	17:00:00	0:00:00						
75	N	17:02:00	17:14:00	0:00:00						
74	S	17:17:00	17:29:00	0:00:00						
73	N	17:32:00	17:44:00	0:00:00						
72	S	17:47:00	18:00:00	0:00:00						
71	N	18:06:00	18:22:00	0:00:00						
70	S	18:25:00	18:41:00	0:00:00						
69	N	18:43:00	19:00:00	0:00:00						
68	S	19:02:00	19:17:00	0:00:00						
67	N	19:19:00	19:34:00	0:00:00						
66	S	19:36:00	19:50:00	0:00:00						
65	N	19:54:00	20:08:00	0:00:00						
50	S	20:12:00	20:31:00	0:00:00						
49	N	20:35:00	20:50:00	0:00:00						
48	S	20:52:00	21:07:00	0:00:00						
47	N	21:10:00	21:25:00	0:00:00						
46	S	21:27:00	21:41:00	0:00:00						
45	N	21:43:00	21:56:00	0:00:00						
44	S	21:59:00	22:12:00	0:00:00						
43	N	22:14:00	22:25:00	0:00:00						
42	S	22:27:00	22:42:00	0:00:00						
41	N	22:45:00	23:00:00	0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						

↑ Times entered are Zulu / GMT ↑			Page		2		Verify S-Turns After Mission Yes X No	

Additional Comments: Drive #

BLOCK D

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 11/26/2016	Day of Year 331	Mission Name / Job # 76922 ChamaJemez

Operator	Annen	Aircraft	Sensor	Hobbs Start 311.8	Local Start Time 9:00	Zulu Start Time 16:00

Aircraft: N6255Q [X], N404CP, N7079F, N475CP, N1107Q
Sensor: SH-8170 [^], SH_6157, SH-7108

Pilot	Larocque			Hobbs End 317.2	Local End Time 14:40	Zulu End Time 21:40

Passengers		Using or Relying on CORS: Yes [ ] No [X]	GPS Base #1 Operator Annen PID KLAM	GPS Base #2 Operator PID

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing ICAO KLAM
calm	10	25,000	70	0	-9	30.37		Arriving ICAO KLAM

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Gain	Mode
40	43	272	100	Course/Up ___ Fine/Down ___	Single [ ] 2 + 2 [ ] Multi [ ] 4 + 3 [ ]

Air Speed	AGL	MSL	Threshold	Waveform Mode	Pre-Trigger Dist.
150 Kts	6,500 Ft	11,572 Ft	/	@ NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
			↕ Times entered are Zulu / GMT ↕					Verify S-Turns Before Mission Yes [X] No [ ]
A55	N	16:24:00	16:26:00		17	0.7	1.1	
A54	S	16:29:00	16:30:00					Buffer error, refly
A54R	S	16:35:00	16:37:00					
A53	N	16:40:00	16:42:00					
A52	S	16:45:00	16:48:00					
A51	W	16:51:00	16:53:00					
A50	E	16:56:00	17:00:00					
A49	W	17:03:00	17:06:00					
A48	E	17:09:00	17:13:00					
A47	W	17:16:00	17:19:00					
A46	E	17:22:00	17:25:00					
A45	N	17:31:00	17:34:00					
A44	S	17:37:00	17:40:00					
A43	N	17:43:00	17:47:00					
A42	S	17:50:00	17:53:00					
A41	N	17:57:00	17:59:00					
A40	S	18:03:00	18:06:00					
A39	N	18:09:00	18:12:00					
A38	S	18:15:00	18:18:00					
A37	N	18:21:00	18:23:00					
A36	S	18:26:00	18:29:00					
A35	N	18:32:00	18:34:00					
A01	N	18:37:00	18:38:00					
A02	S	18:41:00	18:43:00					
A03	N	18:46:00	18:48:00					
A04	S	18:52:00	18:54:00					
		See Page 2						

↑ Times entered are Zulu / GMT ↑	0:00:00	Total Time On Line	Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

WOOLPERT FLIGHT LOG SHEET #2

Leica ALS-70	**DD/MM/YYYY** 11/26/2016	**Day of Year** 331	**Mission Name / Job #** 76922 Chama Jemez

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
A05	N	18:57:00	18:59:00					
A06	S	19:02:00	19:03:00					
A07	N	19:07:00	19:08:00					
A08	N	19:14:00	19:20:00					
A09	S	19:24:00	19:28:00					
A10	N	19:35:00	19:40:00					
A11	S	19:43:00	19:47:00					
A12	N	19:51:00	19:55:00					
A13	S	19:58:00	20:03:00					
A14	N	20:07:00	20:11:00					
A15	S	20:14:00	20:18:00					
A16	N	20:21:00	20:26:00					
A17	S	20:29:00	20:34:00					
A18	N	20:38:00	20:43:00					
A19	S	20:46:00	20:53:00					
A20	N	20:56:00	21:02:00					
A21	S	21:05:00	21:12:00					

↑ Times entered are Zulu / GMT ↑	0:00:00	Total Time On Line	Verify S-Turns After Mission	Yes	No

Additional Comments:

Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	11/26/2016	331	76922		2		USGS PECOS SANTA FE	

Operator	Aircraft	HOBBS Start	Local Start Time	Zulu Start Time	Base
DENHAM	N404CP	5720.1	7:30:00	14:30:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	5727.1	3:30:00	22:28:00	KSKX

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
330/15	10		CLEAR	-4	-9	30.35		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed		AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	13300	Ft	Yes		No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	8:25:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission	Yes X No
									Take Off: 7:49	
121	N	15:50:00	15:52:00	0:00:00						
120	S	15:53:00	15:55:00	0:00:00						
119	N	15:59:00	16:03:00	0:00:00						
118	S	16:07:00	16:16:00	0:00:00						
117	N	16:20:00	16:32:00	0:00:00						
116	S	16:34:00	16:45:00	0:00:00						
115	N	16:47:00	16:59:00	0:00:00						
114	S	17:01:00	17:12:00	0:00:00						
113	N	17:14:00	17:25:00	0:00:00						
112	S	17:28:00	17:38:00	0:00:00						
111	N	17:40:00	17:50:00	0:00:00						
110	S	17:53:00	18:00:00	0:00:00						
109	N	18:03:00	18:08:00	0:00:00						
108	S	18:11:00	18:13:00	0:00:00						
122	E	18:19:00	18:21:00	0:00:00						
123	W	18:23:00	18:25:00	0:00:00						
124	E	18:28:00	18:29:00	0:00:00						
125	W	18:32:00	18:34:00	0:00:00						
126	E	18:27:00	18:39:00	0:00:00						
127	W	18:41:00	18:43:00	0:00:00						
128	E	18:46:00	18:47:00	0:00:00						
129	W	18:50:00	18:50:00	0:00:00						
140	N	18:58:00	19:11:00	0:00:00						
139	S	19:14:00	19:26:00	0:00:00						
138	N	19:28:00	19:40:00	0:00:00						
137	S	19:43:00	19:55:00	0:00:00						
136	N	19:58:00	20:09:00	0:00:00						
135	S	20:11:00	20:22:00	0:00:00						
134	N	20:24:00	20:34:00	0:00:00						
133	S	20:36:00	20:46:00	0:00:00						

↑ Times entered are Zulu / GMT ↑			Page		1		Verify S-Turns After Mission	Yes X No	

Additional Comments: | **Drive #**

BLOCK D

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	11/26/2016	331	76922		2		USGS PECOS SANTA FE	

Operator	Aircraft	HOBBS Start	Local Start Time	Zulu Start Time	Base
DENHAM	N404CP	5702.1	7:30:00	14:30:00	WOOLPERT PIN

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	5727.1	3:30:00	22:28:00	KSKX

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
330/15	10		CLEAR	-4	-9	30.35		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	13300	Ft	Yes	No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	8:25:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No	
									Take Off: 7:49	
132	N	20:48:00	20:57:00	0:00:00						
131	S	21:00:00	21:09:00	0:00:00						
130	N	21:11:00	21:19:00	0:00:00						
				0:00:00						
73	N	21:33:00	21:35:00	0:00:00					BLOCK E REFLIGHT	
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
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				0:00:00						

↑ Times entered are Zulu / GMT ↑			Page		2		Verify S-Turns After Mission Yes X No	

Additional Comments: | Drive #

BLOCK D/ BLOCK E   BLOCK E SPECS: 150Kts 15300Ft

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	**MM/DD/YYYY** 11/30/2016	**Day of Year** 335	**Mission Name / Job #** 76922 Pecos Santa Fe

Operator	Annen	Aircraft	Sensor	Hobbs Start 317.8	Local Start Time 8:50	Zulu Start Time 15:50

		N6255Q [X]	SH-8170 [X]			
Pilot	Larocque	N404CP	SH_6157	Hobbs End 323.6	Local End Time 14:55	Zulu End Time 21:55
		N7079F	SH-7108			
		N475CP				
		N1107Q				

Passengers	Using or Relying on CORS	GPS Base #1	Operator Annen	PID EP0642/KSXU
	Yes [ ] No [X]	GPS Base #2	Operator	PID

Wind Dir/Speed 240/15	Visibility 10	Ceiling 0	Cloud Cover % 0	Temp -2	Dew Point -9	Pressure 30.02	Haze/Fire/Cloud	Departing ICAO KSAF/KSXU
								Arriving ICAO KSXU/KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain: Course/Up ___ Fine/Down ___	Mode: Single [ ] Multi [ ]	2 + 2 [ ] 4 + 3 [ ]

Air Speed 150 Kts	AGL 6,500 Ft	MSL 10,663 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:

⇕ Times entered are Zulu / GMT ⇕   Verify S-Turns Before Mission Yes [X] No [ ]

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
H29	E	16:23:00	16:35:00		17	0.7	1.2	Set a base station at Santa Rosa
H30	W	16:38:00	16:51:00					
H31	E	16:54:00	17:07:00					
H32	W	17:10:00	17:24:00					
H33	E	17:27:00	17:40:00					
H34	W	17:43:00	17:58:00					
H35	E	18:01:00	18:15:00					
H36	W	18:18:00	18:31:00					
H37	E	18:34:00	18:46:00					
H38	W	18:49:00	19:03:00					
H39	E	19:07:00	19:19:00					
H40	W	19:22:00	19:35:00					
H41	E	19:38:00	19:49:00					
H42	W	19:52:00	20:05:00					
H43	E	20:08:00	20:20:00					
H44	W	20:22:00	20:34:00					
H45	E	20:38:00	20:49:00					
H46	W	20:52:00	21:03:00					
H47	E	21:06:00	21:17:00					
H48	W	21:20:00	21:31:00					

↑ Times entered are Zulu / GMT ↑ | 0:00:00 | Total Time On Line | Verify S-Turns After Mission Yes [X] No [ ]

Additional Comments: Drive #

System worked well, no issues.

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	11/30.16	335	76922		2		USGS PECOS SANTA FE	

Operator	Aircraft	HOBBS Start	Local Start Time	Zulu Start Time	Base
DENHAM	N404CP	5727.1	7:45:00	14:45:00	NGS

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	5734.7	3:33:00	22:33:00	EP0642-KXSU

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
240/12	10	12000	CLEAR	1	-9	30.02		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
40	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	12663	Ft	Yes / No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	8:55:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No	
									Take Off:7:57	
23	E	16:14:00	16:17:00	0:00:00		1.1				
22	W	16:19:00	16:24:00	0:00:00		1				
21	E	16:27:00	16:32:00	0:00:00		1				
20	W	16:35:00	16:40:00	0:00:00		1.1				
19	E	16:43:00	16:51:00	0:00:00		1.1				
18	W	16:54:00	17:01:00	0:00:00		1.1				
17	E	17:04:00	17:12:00	0:00:00		1.1				
16	W	17:15:00	17:23:00	0:00:00		1.6				
15	E	17:26:00	17:34:00	0:00:00		1.1				
14	W	17:38:00	17:45:00	0:00:00		1.2				
13	E	17:48:00	17:56:00	0:00:00		1.1				
12	W	17:58:00	18:06:00	0:00:00		1.1				
11	E	18:09:00	18:17:00	0:00:00		1.1				
10	W	18:20:00	18:28:00	0:00:00		1.1				
9	E	18:30:00	18:38:00	0:00:00		1.1				
8	W	18:43:00	18:48:00	0:00:00		1.1				
7	E	18:51:00	18:55:00	0:00:00		1				
6	W	18:58:00	19:02:00	0:00:00		1.1				
5	E	19:05:00	19:09:00	0:00:00		1.1				
4	W	19:12:00	19:15:00	0:00:00		1.1				
3	E	19:17:00	19:21:00	0:00:00		1.2				
2	W	19:24:00	19:27:00	0:00:00		1.2				
1	E	19:29:00	19:33:00	0:00:00		1.3				
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						

↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission Yes X No	

Additional Comments: — Drive #

BLOCK J. Started in flight. Overflew base station.

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name		
	11/30/2016	335	76922		2		USGS PECOS SANTA FE		

Operator		Aircraft		HOBBS Start		Local Start Time		Zulu Start Time		Base
DENHAM		N404CP		5727.1		7:45:00		14:45:00		NGS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
ALBERS		ALS-8191		5734.7		3:33:00		22:33:00		EP0642-KXSU

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing
240/12	10	12000	CLEAR	1	-9	30.02		Arriving

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.	
150	Kts	6500	Ft	10663	Ft	Yes	No		@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 8:55:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 7:57
94	E	19:47:00	19:48:00	0:00:00		1.2			
93	W	19:52:00	19:54:00	0:00:00		1.3			
92	E	19:56:00	19:58:00	0:00:00		1.4			
91	W	20:00:00	20:02:00	0:00:00		1.4			
90	E	20:05:00	20:07:00	0:00:00		1.3			
89	W	20:09:00	20:12:00	0:00:00		1.3			
88	E	20:14:00	20:17:00	0:00:00		1.2			
87	W	20:20:00	20:23:00	0:00:00		1.1			
86	E	20:26:00	20:30:00	0:00:00		1.1			
85	W	20:32:00	20:36:00	0:00:00		1.1			
84	E	20:39:00	20:43:00	0:00:00		1.2			
83	W	20:45:00	20:49:00	0:00:00		1.1			
82	E	20:52:00	20:56:00	0:00:00		1.1			
81	W	20:59:00	21:04:00	0:00:00		1.1			
80	E	21:06:00	21:11:00	0:00:00		1.2			
79	W	21:14:00	21:19:00	0:00:00		1.1			
78	E	21:21:00	21:26:00	0:00:00		1			
77	W	21:29:00	21:34:00	0:00:00		1.1			
76	E	21:37:00	21:43:00	0:00:00		1.1			
75	W	21:45:00	21:52:00	0:00:00		1.1			
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
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				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					

↑ Times entered are Zulu / GMT ↑		Page		1	Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

BLOCK H. In flight start. Flew over base station.

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80		**MM/DD/YYYY** 12/1/2016	**Day of Year** 336	**Mission Name / Job #** 76922 Pecos Santa Fe Flt A

Operator Annen	**Aircraft** N6255Q [X] N404CP N7079F N475CP N1107Q	**Sensor** SH-8170 [X] SH_6157 SH-7108	**Hobbs Start** 324.7	**Local Start Time** 8:40	**Zulu Start Time** 15:40
Pilot Larocque			**Hobbs End** 329.2	**Local End Time** 13:20	**Zulu End Time** 20:20

Passengers	**Using or Relying on CORS** Yes [ ] No [X]	**GPS Base #1**	**Operator** Annen	**PID** EP0642
		GPS Base #2	**Operator**	**PID**

Wind Dir/Speed 030/5	**Visibility** 10	**Ceiling** 0	**Cloud Cover %** 0	**Temp** -6	**Dew Point** -12	**Pressure** 29.94	**Haze/Fire/Cloud**	**Departing ICAO** KSAF/KSXU
								Arriving ICAO KSXU

Scan Angle (FOV) 40	**Scan Frequency (Hz)** 43	**Pulse Rate (kHz)** 272	**Laser Power %** 100	**Gain** Course/Up ___ Fine/Down ___	**Mode** Single [ ] 2 + 2 [ ] Multi [ ] 4 + 3 [ ]
Air Speed 150 Kts	**AGL** 6,500 Ft	**MSL** 10,659 Ft	**Threshold** /	**Waveform Mode** @ NS	**Pre-Trigger Dist.** Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
— ⇕ Times entered are Zulu / GMT ⇕						Verify S-Turns Before Mission	Yes [X] No [ ]	
H49	E	16:04:00	Buffer	Error				Will re-fly line
H50	E	16:14:00	16:24:00					
H51	W	16:27:00	16:37:00					
H52	E	16:41:00	16:50:00					
H49	W	16:53:00	17:03:00					Line re-fly completed
H53	E	17:05:00	17:16:00					
H54	W	17:18:00	17:29:00					
H55	E	17:32:00	17:42:00					
H56	W	17:45:00	17:56:00					
H57	E	17:59:00	18:10:00					
H58	W	18:12:00	18:23:00					
H59	E	18:26:00	18:35:00					
H60	W	18:38:00	18:45:00					
H61	E	18:48:00	18:56:00					
H62	W	18:59:00	19:06:00					
H63	E	19:10:00	19:17:00					
H64	W	19:19:00	19:26:00					
H65	E	19:29:00	19:36:00					
H66	W	19:39:00	19:46:00					
H67	E	19:49:00	19:56:00					
↑ Times entered are Zulu / GMT ↑			0:00:00	Total Time On Line		Verify S-Turns After Mission	Yes [X] No [ ]	

Additional Comments:
We had a Buffer error on the first line and then a software crash. Restarted and then everything operated normally

Drive #

WOOLPERT FLIGHT LOG SHEET #1

Leica ALS-80	MM/DD/YYYY 12/1/2016	Day of Year 336	Mission Name / Job # 76922 Pecos Santa Fe Flt B

Operator Annen	Aircraft	Sensor	Hobbs Start 329.2	Local Start Time 13:35	Zulu Start Time 20:35

	Aircraft		
	N6255Q	X	SH-8170
Pilot Larocque	N404CP		SH_6157
	N7079F		SH-7108
	N475CP		
	N1107Q		

Hobbs End 330.8	Local End Time 15:25	Zulu End Time 22:25

Passengers	Using or Relying on CORS	GPS Base #1	Operator Annen	PID EP0642
	Yes ☐ No ☒	GPS Base #2	Operator	PID

Wind Dir/Speed 030/4	Visibility 10	Ceiling 0	Cloud Cover % 0	Temp 10	Dew Point -1	Pressure 29.88	Haze/Fire/Cloud	Departing ICAO KSXU
								Arriving ICAO KSXU/KSAF

Scan Angle (FOV) 40	Scan Frequency (Hz) 43	Pulse Rate (kHz) 272	Laser Power % 100	Gain	Mode	
				Course/Up ___	Single ☐ 2 + 2 ☐	
				Fine/Down ___	Multi ☐ 4 + 3 ☐	

Air Speed 150 Kts	AGL 6,500 Ft	MSL 10,659 Ft	Threshold /	Waveform Mode @ NS	Pre-Trigger Dist. Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	HDOP	PDOP	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:
↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes ☒ No ☐	
H68	E	20:54:00	21:01:00		21	0.6	1.1	Set base station at Santa Rosa NM
H69	W	21:04:00	21:11:00					
H70	E	21:14:00	21:20:00					
H71	W	21:23:00	21:30:00					
H72	E	21:33:00	21:40:00					
H73	W	21:43:00	21:50:00					
H74	E	21:53:00	21:59:00					
↑ Times entered are Zulu / GMT ↑			0:00:00	Total Time On Line			Verify S-Turns After Mission Yes ☒ No ☐	

Additional Comments:

System worked well, no issues.

Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name	
	12/1/2016	336	76922	2		USGS PECOS SANTA FE	

Operator		Aircraft		HOBBS Start		Local Start Time		Zulu Start Time		Base
DENHAM		N404CP		5734.7		7:40:00		14:40:00		NGS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
ALBERS		ALS-8191		5742.4		4:34:00		23:34:00		KRTN-AC7060

Wind Dir/Speed	Visibility		Ceiling		Cloud Cover %	Temp	Dew Point		Pressure		Haze/Fire/Cloud	Departing	KSAF
040/3	10				CLEAR	-4	-11		29.96			Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		Mode		Threshold Values
40	42.9		272		100		Gain - Course/Up		Single		A
							Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts		Ft	13300	Ft	Yes / No		@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 8:45:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 7:45
170	S	16:15:00	16:17:00	0:00:00		1.1			
169	N	16:20:00	16:21:00	0:00:00		1.1			
168	S	16:24:00	16:25:00	0:00:00		1			
167	N	16:28:00	16:30:00	0:00:00		1			
166	S	16:32:00	16:35:00	0:00:00		1.1			
165	N	16:38:00	16:41:00	0:00:00		1.1			
164	S	16:44:00	16:48:00	0:00:00		1.1			
163	N	16:51:00	16:55:00	0:00:00		1.1			
162	S	16:58:00	17:03:00	0:00:00		1.1			
161	N	17:05:00	17:10:00	0:00:00		1.1			
160	S	17:13:00	17:18:00	0:00:00		1.4			
159	N	17:21:00	17:26:00	0:00:00		1.1			
158	S	17:29:00	17:34:00	0:00:00		1.1			
157	N	17:37:00	17:43:00	0:00:00		1.1			
156	S	17:45:00	17:52:00	0:00:00		1.1			
155	N	17:54:00	18:01:00	0:00:00		1.1			
154	S	18:03:00	18:10:00	0:00:00		1.1			
153	N	18:15:00	18:24:00	0:00:00		1.2			
152	S	18:27:00	18:36:00	0:00:00		1.1			
151	N	18:39:00	18:49:00	0:00:00		1.1			
150	S	18:51:00	19:03:00	0:00:00		1.2			
149	N	19:06:00	19:19:00	0:00:00		1.2			
148	S	19:22:00	19:34:00	0:00:00		1.4			
147	N	19:37:00	19:50:00	0:00:00		1.4			
146	S	19:53:00	20:06:00	0:00:00		1.8			
145	N	20:09:00	20:22:00	0:00:00		1.7			
144	S	20:25:00	20:37:00	0:00:00		1.2			
143	N	20:40:00	20:53:00	0:00:00		1.2			
142	S	20:55:00	21:08:00	0:00:00		1.1			
177	N	21:09:00	21:13:00			1			

↑ Times entered are Zulu / GMT ↑			Page		1		Verify S-Turns After Mission Yes X No

Additional Comments: Drive #

BLOCK D

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name
	12/1/2016	336	76922	2	USGS PECOS SANTA FE

Operator	Aircraft	HOBBS Start	Local Start Time	ZULU Start Time	Base
DENHAM	N404CP	5734.7	7:40:00	14:40:00	NGS

Pilot	Sensor Type	HOBBS END	Local End Time	Zulu End Time	PID
ALBERS	ALS-8191	5742.4	4:34:00	23:34:00	KRTN-AC7060

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
040/3	10		CLEAR	-4	-11	29.96		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used			Waveform Mode		Pre-Trigger Dist.	
150	Kts		Ft	13300	Ft	Yes		No	@	NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At: 8:45:00
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No
									Take Off: 7:45
176	W	21:16:00	21:20:00	0:00:00		1			
175	E	21:22:00	21:26:00	0:00:00		1			
174	W	21:29:00	21:32:00	0:00:00		1.1			
173	E	21:35:00	21:38:00	0:00:00		1.2			
172	W	21:42:00	21:44:00	0:00:00		1.2			
171	E	21:47:00	21:49:00	0:00:00		1.2			
141	N	21:55:00	22:07:00	0:00:00		1.2			
				0:00:00					
				0:00:00					
				0:00:00					
				0:00:00					
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				0:00:00					
				0:00:00					

↑ Times entered are Zulu / GMT ↑			Page		2	Verify S-Turns After Mission Yes X No

Additional Comments: | Drive #

BLOCK D

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	12/4/2016	339	76922		2		USGS PECOS SANTA FE	

Operator		Aircraft		HOBBS Start		Local Start Time		Zulu Start Time		Base
DENHAM		N404CP		5742.4		8:38:00		15:38:00		NGS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
RADER		ALS-8191		5751.3		7:51:00		2:52:00		KTRN-A7060

Wind Dir/Speed	Visibility		Ceiling		Cloud Cover %	Temp	Dew Point		Pressure		Haze/Fire/Cloud	Departing	KSAF
350/17	10				CLEAR	-4	-11		30.12			Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
40	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts	6500	Ft	11300	Ft	Yes / No		@ NS		Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	
		⇕ Times entered are Zulu / GMT ⇕							Verify S-Turns Before Mission Yes X No	
									Take Off: 8:53	
129	SE	17:24:00	17:26:00	0:00:00		1.2				
130	NW	17:29:00	17:31:00	0:00:00		1.1				
131	SE	17:34:00	17:39:00	0:00:00		1.1				
132	NW	17:42:00	17:47:00	0:00:00		1.1				
133	SE	17:54:00	18:04:00	0:00:00		1.1				
134	NW	18:06:00	18:16:00	0:00:00		1.1				
135	SE	18:18:00	18:28:00	0:00:00		1.1				
136	NW	18:30:00	18:40:00	0:00:00		1				
137	SE	18:42:00	18:52:00	0:00:00		1.1				
138	NW	18:54:00	19:03:00	0:00:00		1.1				
139	SE	19:05:00	19:14:00	0:00:00		1.1				
140	NW	19:16:00	19:25:00	0:00:00		1.2				
141	SE	19:29:00	19:40:00	0:00:00		1.2				
142	NW	19:42:00	19:53:00	0:00:00		1.3				
143	SE	19:56:00	20:07:00	0:00:00		1.3				
144	NW	20:09:00	20:19:00	0:00:00		1.1				
145	SE	20:21:00	20:30:00	0:00:00		1				
146	NW	20:33:00	20:43:00	0:00:00		1.1				
147	SE	20:45:00	20:54:00	0:00:00		1.1				
148	NW	20:56:00	21:05:00	0:00:00		1				
149	SE	21:08:00	21:16:00	0:00:00		0.9				
150	NW	21:18:00	21:28:00	0:00:00		1.1				
151	SE	21:30:00	21:39:00	0:00:00		1.1				
152	NW	21:41:00	21:51:00	0:00:00		1.2				
153	SE	21:53:00	22:01:00	0:00:00		1.1				
154	NW	22:03:00	22:10:00	0:00:00		1.1				
155	SE	22:12:00	22:19:00	0:00:00		1				
156	NW	22:22:00	22:27:00	0:00:00		1				
157	SE	22:29:00	22:34:00	0:00:00		1				
158	NW	22:37:00	22:41:00	0:00:00		1.1				

↑ Times entered are Zulu / GMT ↑			Page		1		Verify S-Turns After Mission Yes X No	

Additional Comments: | Drive #

BLOCK C

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	12/4/2016	339	76922		2		USGS PECOS SANTA FE	

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
DENHAM		N404CP		5742.4		8:38:00		15:38:00		NGS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
RADER		ALS-8191		5751.3		7:51:00		2:52:00		KRTN-A7060/KLVS-FN0737

Wind Dir/Speed	Visibility	Ceiling		Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	KSAF
350/17	10			CLEAR	-4	-11	30.12			Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values	
20	42.9	272	100	Gain - Course/Up		Single		A	
				Gain - Fine/Down		Multi		B	

Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	11300	Ft	Yes	No		@	NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission	Yes X No
									Take Off: 8:53	
159	SE	22:43:00	22:47:00	0:00:00		1.1				
160	NW	22:50:00	22:53:00	0:00:00		1.1				
161	SE	22:55:00	22:57:00	0:00:00		1.1				
162	NW	22:59:00	23:03:00	0:00:00		1.2				
163	SE	23:03:00	23:05:00	0:00:00		1.2				
164	NW	23:07:00	23:09:00	0:00:00		1.2				
165	SE	23:12:00	23:14:00	0:00:00		1.1				
166	NW	23:16:00	23:18:00	0:00:00		1.1				
167	SE	23:20:00	23:22:00	0:00:00		1.1				
168	NW	23:24:00	23:26:00	0:00:00		1.1				
169	SE	23:28:00	23:29:00	0:00:00		1.1				
170	NW	23:31:00	23:32:00	0:00:00		1.1				
				0:00:00						
53	W	1:22:00	1:36:00	0:00:00		1.3			REFLIGHT	
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
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↑ Times entered are Zulu / GMT ↑			Page		2		Verify S-Turns After Mission	Yes X No

Additional Comments: | Drive #

BLOCK C

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #		Phase #		Project Name	
	12/4/2016	339	76922		2		USGS PECOS SANTA FE	

Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base
DENHAM		N404CP		5742.4		8:38:00		15:38:00		NGS

Pilot		Sensor Type		HOBBS END		Local End Time		Zulu End Time		PID
RADER		ALS-8191		5751.3		7:51:00		2:52:00		KRTN-A7060/KLVS-FN0737

Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KSAF
350/17	10		CLEAR	-4	-11	30.12		Arriving	KSAF

Scan Angle (FOV)	Scan Frequency (Hz)	Pulse Rate (kHz)	Laser Power %	Fixed Gain		Mode		Threshold Values
20	42.9	272	100	Gain - Course/Up		Single		A
				Gain - Fine/Down		Multi		B

Air Speed		AGL		MSL		Waveform Used		Waveform Mode	Pre-Trigger Dist.
150	Kts	6500	Ft	11300	Ft	Yes / No		@ NS	Ft

Line #	Dir.	Line Start Time	Line End Time	Time On Line	SV's	PDOP	Kts	Alt.	Line Notes/Comments	
Test	n/a			n/a	n/a	n/a	n/a	n/a	GPS Began Logging At:	
		↕ Times entered are Zulu / GMT ↕							Verify S-Turns Before Mission Yes X No	
									Take Off: 8:53	
159	SE	22:43:00	22:47:00	0:00:00		1.1				
160	NW	22:50:00	22:53:00	0:00:00		1.1				
161	SE	22:55:00	22:57:00	0:00:00		1.1				
162	NW	22:59:00	23:03:00	0:00:00		1.2				
163	SE	23:03:00	23:05:00	0:00:00		1.2				
164	NW	23:07:00	23:09:00	0:00:00		1.2				
165	SE	23:12:00	23:14:00	0:00:00		1.1				
166	NW	23:16:00	23:18:00	0:00:00		1.1				
167	SE	23:20:00	23:22:00	0:00:00		1.1				
168	NW	23:24:00	23:26:00	0:00:00		1.1				
169	SE	23:28:00	23:29:00	0:00:00		1.1				
170	NW	23:31:00	23:32:00	0:00:00		1.1				
				0:00:00						
53	W	1:22:00	1:36:00	0:00:00		1.3			REFLIGHT	
				0:00:00						
				0:00:00						
				0:00:00						
				0:00:00						
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Section 7: Final Deliverables

The final lidar deliverables are listed below.

- LAS v1.4 classified point cloud
- **Hydro Breaklines as ESRI geodatabase**
- **Bridge Breaklines as ESRI geodatabase**
- Digital Elevation Model in ERDAS .IMG format
- 8-bit gray scale intensity images in .TIF format
- Tile layout provided as ESRI shapefile
- Control Points provided as ESRI shapefile
- FGDC compliant metadata per product in XML format
- Lidar processing report in pdf format
- Survey report in pdf format