

Ca SoCal Wildfires 2018 D18

Airborne Lidar Report

May 2019



Contract # G16PC00022
Task Order # 140G0218F0246



Contractor Woolpert
Project # 78654

Table of Contents

1. Overview	1
About.....	1
Purpose.....	1
Specifications	2
Spatial Reference	2
Deliverables	3
2. Acquisition	5
Flight Planning	5
Lidar Sensor Information	6
GNSS and IMU Equipment.....	7
Timeline.....	8
Acquisition Quality Assurance	9
3. Processing	11
Processing Summary	11
GNSS-IMU Trajectory Processing	11
Geometric Calibration	12
Lidar Data Classification.....	12
Hydrologic Flattening	13
Digital Elevation Model	14
Intensity Imagery	14
Metadata.....	14
4. Accuracy Assessment	15
Results Summary	15
Raw Lidar Swath Testing	15
Digital Elevation Model Testing.....	15
Inter-Swath Testing	17
Intra-Swath Testing	17

Table of Contents

List of Figures

Figure 1-1. Project Area	4
Figure 2-1: Flown Flight Lines	10

List of Tables

Table 1-1. Spatial Reference System	2
Table 1-2. Deliverables	3
Table 2-1. Acquisition Requirements.....	5
Table 2-2. Leica ALS80 Sensor Info	6
Table 2-3. GNSS Base Stations.....	7
Table 2-4. Acquisition Specifications.....	9
Table 4-1. Vertical Accuracy Summary.....	15
Table 4-2. VVA Errors	16

Appendix Documents

Appendix 1: Flight Logs.....	A1-1
Appendix 2: Raw Swath NVA Checkpoint Results	A2-1
Appendix 3: DEM NVA Checkpoint Results.....	A3-1
Appendix 4: DEM VVA Checkpoint Results.....	A4-1

1. Overview

About

This project contains a comprehensive outline of the 140G0218F0246 CA SoCal Wildfires 2018 D18 task order issued by the United States Geological Survey's National Geospatial Technical Operations Center (USGS-NGTOC). This task order called for the acquisition and processing of QL1 and QL2 data over three areas of interest covering approximately 9,482 total square miles in southwestern California.

Data partially covers the following counties:

FEMA HQ QL2 AOI - 2,953.7 square miles

- Los Angeles
- Orange
- Riverside
- San Bernardino

SOCAL Wildfire QL2 AOI - 5,185 square miles

- Kern
- Los Angeles
- Orange
- San Bernardino
- San Luis Obispo
- Santa Barbara
- Ventura

Santa Barbara Ynez QL1 AOI - 1,343.3 square miles

- Santa Barbara

Purpose

Lidar data are used in predicting wildfire risk, and in post-wildfire hazards analyses. For example, lidar data provide 3D information about forest canopy and vegetation structure that is used to map wildfire fuel, a key risk factor for fire occurrence and intensity. Lidar maps the local topographic conditions (elevation, slope, and aspect), which are critical components to understanding and predicting fire behavior. After wildfires occur, lidar data are used to develop predictive models of flood and mudflow hazards that can result from steep terrain that has been stripped of vegetation. Conducting these analyses and understanding the vulnerability of California communities, farms, and infrastructure to future wildfires relies on the availability of high resolution, accurate lidar data. Wildfire applications for high resolution elevation data include:

- Assessment of wildfire hazards
- Estimates of wildfire fuel loads
- Flood and mudflow hazard models
- Development of plans and site engineering documents to support reconstruction activities
- 3D data to support ecological assessments and other long-term science requirements

Specifications

Data for this task order was acquired and produced to meet USGS Lidar Base Specification v1.3 standards and the American Society of Photogrammetry and Remote Sensing (ASPRS) Positional Accuracy Standards for Digital Geospatial Data (Edition 1, Version 1.0).

Spatial Reference

Geospatial data products were produced using the following horizontal and vertical spatial data reference system.

Table 1-1. Spatial Reference System

Area of Interest		
Horizontal	EPSG Code	6350
	Datum	NAD83 (2011)
	Projection	Albers Equal Area
	Units	Meters
Vertical	Datum	NAVD88
	Geoid	GEOID12B
	Units	Meters
	Height Type	Orthometric

Deliverables

All data products produced as part of this task order are listed below. All tiled deliverables had a tile size of 1,000-meters x 1,000-meters. Tile names are derived from the easting and northing coordinate values of the lower left corner of each tile (ex.: "w0002n0612").

Table 1-2. Deliverables

Lidar Data	
Classified lidar point cloud data	Tiles in .las v1.4 format Classes • 1 – Processed, not Classified • 2 – Ground • 7 – Noise • 9 – Water • 17 – Bridge Decks • 18 – High Noise • 20 – Ignored Ground
Breaklines used for hydro-flattening	• Lake and River features as feature classes in an Esri file geodatabase • Water bodies greater than 2 acres as polygon features • Rivers 30.5 meters / 100 feet and greater in width as polyline features • Bridges used in DEM generation as point features in Esri shapefile format
Hydro-flattened bare earth digital elevation model (DEM)	1-meter pixel size, 32-bit floating-point; no bridges or overpass structures GeoTIFF format
Intensity Imagery	1-meter pixel size, 8-bit gray-scale (linear rescaling from 16-bit intensity) GeoTIFF format
Flight Line Index	Polygon features in an Esri file geodatabase
Control Data	
Lidar calibration points	Esri shapefile format
Lidar NVA checkpoints	Esri shapefile format
Lidar VVA checkpoints	Esri shapefile format
Other Data	
Data Extent	Esri shapefile format
Delivery Diagram	Esri shapefile format
Tile Index	Esri shapefile format
Metadata and Reports	
Metadata	Deliverable-level FGDC CSDGM/USGS MetaParser Compliant metadata in .xml format
Lidar Project Report	Project report with flight logs in .pdf format
Survey Report	Survey report in .pdf format

Figure 1-1. Project Area



2. Acquisition

Flight Planning

Aerial lidar data was collected using the specifications listed below.

Table 2-1. Acquisition Requirements

Specification	Target
Resolution	QL1 • 8 points per square meter • 0.35-meter nominal point spacing QL2 • 2 points per square meter • 0.7-meter nominal point spacing
Overlap	At contractor's discretion, but enough to ensure there are no data gaps between usable portions of the swath and nominal point density is achieved.
Acquisition Window	Acquisition window shall be at a period of annual minimal water level in the spring 2018 leaf-off window running March 1 – April 30, 2018. With USGS authorization and as mutually agreed, the contractor may extend the window based on weather, ground and vegetation conditions.
Acquisition Conditions	• Cloud and fog-free between the aircraft and ground • Ground is snow free • Ground has no unusual flooding or inundation, except in cases where the goal of the collection is to map the inundation • Preference of vegetation is leaf-off. As numerous factors will affect vegetative condition at the time of collection, the USGS National Geospatial Program (NGP) only requires that penetration to the ground must be adequate to produce an accurate and reliable bare-earth surface suitable for incorporation into the 3D Elevation Program (3DEP) 1-meter product holdings. • Time of day is not of concern
Data Voids	Not allowed except • Where caused by water bodies • Where caused by areas of low near infra-red (NIR) reflectivity (i.e. asphalt or composition roofing) • Where caused by lidar shadowing from buildings or other features • Where appropriately filled-in by another swath
Control	Airborne Global Positioning System (ABGPS) and Inertial Measurement Unit (IMU) data to be used along with differentially-corrected GPS ground control points

Lidar Sensor Information

Aerial lidar data was acquired using three Leica ALS80 lidar sensor systems. A total of 2,418 flight lines were collected.

Table 2-2. Leica ALS80 Sensor Info

Sensor Specifications	
Operating Altitude (m AGL)	100 - 3,500 at 10% reflective target
Maximum Measurement Rate (kHz)	1,000
Field of view (degrees, full angle, user adjustable)	0 - 72
Roll stabilization (automatic adaptive, degrees)	72 - active FOV
Scan patterns (user selectable)	sine, triangle raster
Maximum Scan Rate (Hz) • Scan • Triangle • Raster	• 200 • 158 • 120
Number of Returns	unlimited
Number of intensity measurements	3 (first, second, third)
Pulse Mode(s)	2 - 6 pulses in air
Laser Specifications	
Laser Beam Divergence	Dual Divergence: 0.20-0.26 mrad (1/e) and 0.8 mrad (1/e) nominal
Laser Classification	Class IV laser product (FDA CFR 21)
Eye Safe Range	400m single shot depending on laser repetition rate
Accuracy	
Range Resolution	Better than 1 cm
Elevation Accuracy	6 - 19 cm single shot (one standard deviation)
Horizontal Accuracy	1/5,500 x altitude (m AGL)
Physical Specifications	
Size (cm), Weight (kg) • Scanner • Control Electronics	• 37 W x 68 L x 26 H cm, 47 kg • 45 W x 47 D x 25 H cm, 33 kg
Operating Temperature • Scanner • Control Electronics	• 0 - 40°C cabin-side temperature • 0 - 40°C
Flight Management	Leica FlightPro
Power Consumption	922 W @ 22.0 – 30.3 VDC

Source: Leica ALS80-HP Product Specifications

https://w3.leica-geosystems.com/downloads123/zz/airborne/als80/product-specification/leica_als80_hp_productspec_en.pdf

GNSS and IMU Equipment

Prior to mobilizing to the project site, flight crews coordinated with the necessary air traffic control personnel to ensure airspace access. Crews were on-site, operating a Global Navigation Satellite System (GNSS) Base Station for the airborne GPS support.

Flight navigation during acquisition was performed using IGI CCNS (Computer Controlled Navigation System). 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 was used to support the aerial data acquisition. See the table below for stations operated during acquisition.

Table 2-3. GNSS Base Stations

Station Name	Latitude (DMS)	Longitude (DMS)	Ellipsoid Height L1 Phase Center (Meters)
KBFL_Airport	35° 25' 37.60238"	119° 02' 30.88356"	116.482
P521_CORC	34° 53' 18.82954"	119° 48' 55.22883"	1709.801
OZST_CORC	34° 41' 00.12412"	119° 21' 12.21803"	1059.917
P560_CORC	34° 49' 18.50629"	118° 32' 27.07015"	839.033
CASN_CORC	34° 24' 56.46392"	119° 50' 42.98105"	4.197
P516_CORC	35° 06' 22.31039"	120° 23' 00.15930"	263.688
P563_CORC	35° 25' 07.19643"	119° 25' 16.14588"	57.334
CSST_CORC	34° 24' 29.11344"	119° 22' 16.45027"	163.164
P567_CORC	35° 25' 15.39385"	118° 45' 12.82575"	706.980
SFDM_CORC	34° 27' 35.28710"	118° 45' 16.17441"	292.283
P554_CORC	34° 47' 32.25605"	118° 50' 52.85165"	1170.807
P558_CORC	35° 08' 18.96650"	118° 36' 41.90665"	1412.193
SKYB_CORC	34° 26' 19.03344"	118° 28' 43.01647"	521.018
CCCC_CORC	35° 33' 55.11069"	117° 40' 16.17069"	814.733
ORES_CORC	34° 44' 20.60496"	120° 16' 42.76169"	144.527
P591_CORC	35° 09' 08.71554"	118° 00' 59.25900"	709.603
P582_CORC	34° 38' 03.31729"	117° 32' 55.84568"	848.817
TJRN_CORC	34° 29' 00.49573"	120° 07' 57.17752"	157.906
JPLM_CORC	34° 12' 17.34133"	118° 10' 23.57006"	424.836
TOST_CORC	34° 14' 52.62972"	118° 50' 11.94452"	275.127
EWPP_CORC	34° 06' 15.10135"	117° 31' 32.05858"	331.280
NOCO_CORC	33° 55' 10.93880"	117° 34' 10.44336"	187.614
P598_CORC	34° 11' 32.84862"	116° 42' 36.91319"	2747.287

MLFP_CORS	33° 55' 06.24082"	117° 19' 04.60177"	473.789
P584_CORS	33° 53' 33.35714"	116° 57' 05.85953"	739.570
DSSC_CORS	33° 43' 59.97961"	116° 42' 43.47523"	1661.703
TRAK_CORS	33° 37' 04.55490"	117° 48' 12.31851"	116.923
VNDP_CORS	34° 33' 22.71092"	120° 36' 59.17438"	-9.060
SBCC_CORS	33° 33' 10.78854"	117° 39' 41.30294"	89.496

Timeline

Lidar data was collected from May 28, 2018 through October 12, 2018. Acquisition specifications are listed in the table below. An initial quality control process was immediately performed on to review the data coverage, airborne GPS data, and trajectory solution.

Table 2-4. Acquisition Specifications

Settings	QL1	QL2	QL2
Max. Number of Returns	Infinite	Infinite	Infinite
Nominal Point Spacing	0.35 m	0.7 m	0.7 m
Nominal Point Density	8 ppsm	2 ppsm	2 ppsm
Flying Height Above Ground Level	1,524 m	1,981 m	2,377 m
Flight Speed	130 knots	150 knots	150 knots
Scan Angle	20°	40°	40°
Scan Rate Used	50 Hz	42.9 Hz	35.5 Hz
Pulse Rate Used	371 kHz	272 kHz	346 kHz
Multi-Pulse in Air	Enabled	Enabled	Enabled
Swath Width	298 m	1,443 m	1,731 m
Swath Overlap	25%	25%	25%

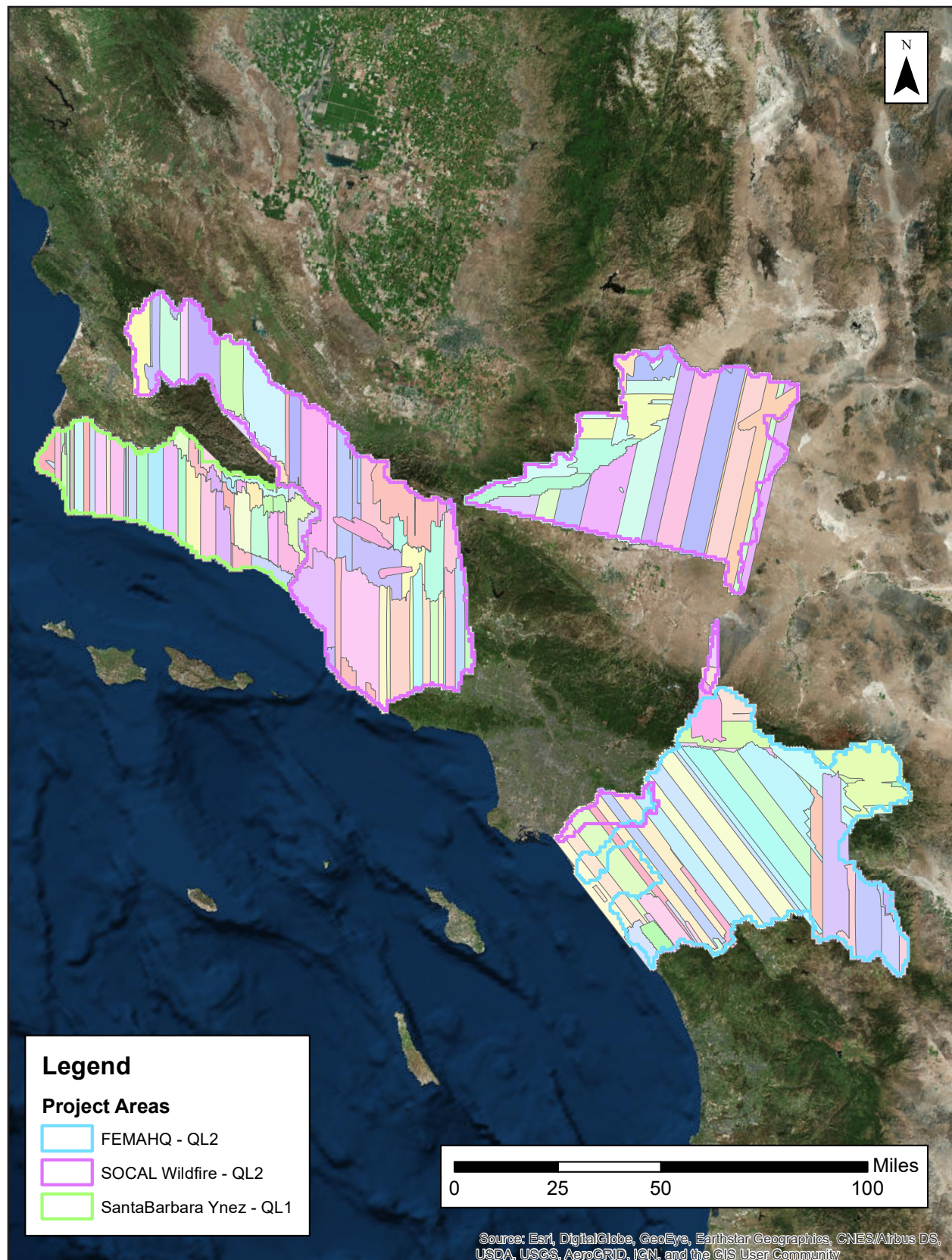
For more information, see the Flight Logs in Appendix 1.

Acquisition Quality Assurance

Woolpert developed a quality assurance and validation plan to ensure the acquired lidar data meets the USGS Base Specification Version 1.3. For quality assurance purposes, the lidar data was processed immediately following acquisition to verify the coverage has appropriate density, distribution, and no unacceptable data voids. Accompanying GPS data was post processed using differential and Kalman filter algorithms to derive a best estimate of trajectory. The quality of the solution was verified to be consistent with the accuracy requirements of the task order. Any required re-flights were scheduled at the earliest opportunity.

The spatial distribution of the geometrically usable first return lidar points was reviewed for density requirements as well as regular and uniform point distribution - verifying the lidar data is spaced so that 90% of the cells in a 2*NPS grid placed over the data contain at least one lidar point. The NPS assessment is made against single swath, first return data located within the geometrically usable center portion (typically ~90%) of each swath. Additionally, the data was reviewed for unacceptable data voids – verifying no area greater than or equal to $(4 \times \text{ANPS})^2$ exhibited data coverage gaps.

Figure 2-1: Flown Flight Lines



3. Processing

Processing Summary

Once the lidar data passed initial QC, the dataset was corrected for aircraft orientation and movement. This process used airborne inertial, orientation, and GPS data collected during acquisition along with ground-based GPS data. The data went through a geometric calibration that further corrected each laser point. This calibrated data set was used to create the LAS point cloud. The LAS point data was initially classified into “ground” and “non-ground”, then further refined using the classes specified in this task order. Breaklines were drawn to denote hydrological features. After the hydro-flattening process, the final deliverables products were created.

GNSS-IMU Trajectory Processing

Kinematic corrections for the aircraft position were resolved using aircraft GPS and static ground GPS (1-Hz) for each geodetic control (base station) for three subsystems: inertial measurement unit (IMU), sensor orientation information, and airborne GPS data.

Post-processing of the IMU system data and aircraft position with attitude data was completed to compute an optimally accurate, blended navigation solution based on Kalman filtering technology, or the smoothed best estimate of trajectory (SBET).

Software: POSPac Software v. 5.3, IPAS Pro v.1.35., Novatel Inertial Explorer v8.60.6129

Trajectory Quality

The GNSS trajectory and 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).

Combination Separation

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

The data for this task order was processed with a goal to maintain a combined separation difference of less than ten (10) centimeters.

Estimated Positional Accuracy

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.

PDOP

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

The data for this task order was processed with a goal 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.

Geometric Calibration

After the initial phase was complete, a formal reduction process was performed on the data. Laser point position was calculated by associating the SBET position to each laser point return time, scan angle, intensity, etc. Raw laser point cloud data was created for the whole project area 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. Statistical reports were generated for comparison and used to make the necessary adjustments to remove any residual systematic error.

Software: Proprietary Software, TerraMatch v18, Leica CloudPro 1.2.4

Lidar Data Classification

LAS data was 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 of higher accuracy.

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 the following client-specified classes:

- Class 1 – Default / Processed, but not Classified
- Class 2 – Bare Earth Ground
- Class 7 – Low Noise
- Class 9 – Water
- Class 17 – Bridge Decks
- Class 18 – High Noise
- Class 20 – Ignored Ground

Classified LAS files were evaluated through a series of manual QA/QC steps as well as a peer-based review to eliminate remaining artifacts from the ground class. This included a review of the DEM surface to remove artifacts and ensure topographic quality.

Software: Proprietary Software, TerraScan v18

Hydrologic Flattening

The lidar task order required compilation of breaklines defining the following types of water body features:

Lakes, reservoirs, ponds	Minimum of 2-acres or greater Compiled as closed polygons, collected at a constant elevation
Rivers, streams	Nominal width of 30.5 meters / 100 feet Compiled in direction of flow, with both sides maintaining an equal elevation gradient
Bridge breaklines	Breaklines used to enforce a logical terrain surface below a bridge

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. The newly acquired lidar data was utilized to manually compile 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. An integrated software approach was applied 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. All classified ground points from inside the hydrologic feature polygons were reclassified to water, class nine (9).
4. All classified ground points were reclassified from within a buffer along the hydrologic feature breaklines to buffered ground, class twenty (20). The buffer distance was approximately the task order designed nominal pulse spacing distance.
5. Breaklines used for bridge removal during the hydrologic flattening were included with the hydrologic breakline geodatabase deliverable. The purpose of these breaklines is for a more aesthetically pleasing DEM appearance.
6. The lidar ground points and breaklines were used to generate a digital elevation model (DEM).
7. QA/QC for this task was performed by reviewing the hydrologically flattened DEM and hydrologic breakline features. Additionally, a combined approach utilizing commercial off the shelf software and proprietary methods were used to review the overall connectivity of the hydrologic breaklines.

TerraScan was used to add the hydrologic breakline vertices and export the lattice models.

Breaklines defining the water bodies greater than 2-acres were provided as polygon features. Rivers and streams with a nominal minimum width of 30.5 meters (100 feet) were provided as polyline features. All lake and river breaklines compiled as part of the flattening process were provided in an Esri file geodatabase.

Breaklines used for DEM generation were provided as point features in Esri shapefile format.

Software: TerraScan v18, TerraModeler v18, Esri ArcMap v10.4, LP360 v2018.1.57.4

Digital Elevation Model

TerraScan was used to add the hydrologic breakline vertices and export the lattice models. Class 2 (ground) lidar points in conjunction with the hydro breaklines and bridge breaklines were used to create 1-meter hydro-flattened bare-earth raster DEM files. Using automated scripting routines within ArcMap, an 32-bit floating point raster GeoTIFF file was created for each tile. #Files were produced to the full extents of the tile boundaries. Each surface is reviewed using Global Mapper to check for any surface anomalies or incorrect elevations found within the surface.

Intensity Imagery

Lidar intensity data derived from the acquired lidar data was linearly rescaled from 16-bit intensity and provided as 1-meter pixel, 8-bit, 256 gray scale GeoTIFF format intensity imagery files. Files were produced to the full extents of the tile boundaries.

Software: TerraScan v18

Metadata

FGDC CSDGM/USGS MetaParser-compliant metadata was produced in XML format. The metadata includes a complete description of the task order client information, contractor information, project purpose, lidar acquisition and ground survey collection parameters, lidar acquisition and ground survey collection dates, spatial reference system information, data processing including acquisition quality assurance procedures, GPS and base station processing, geometric calibration, lidar classification, hydrologic flattening, intensity imagery development, and final product development.

Other metadata deliverables included Esri shapefiles of the ground control and QA/QC points, delivery tile index, delivery extent, and delivery diagram. A georeferenced, polygonal representation of the detailed extents of each acquired lidar swath was produced as a polygon feature class in an Esri file geodatabase.

4. Accuracy Assessment

Results Summary

The tables below show a summary of all test results. The following sections describe the testing methods used.

Software: TerraScan v18, Esri ArcMap v10.4

Table 4-1. Vertical Accuracy Summary

Testing Categories	Target	Measured	Minimum Points	Points Used
Raw Swath NVA RMSEz 95% at Confidence Level	0.196 m	0.104 m	190	205
DEM NVA RMSEz at 95% Confidence Level	0.196 m	0.112 m	190	205
DEM VVA RMSEz at 95th Percentile	0.30 m	0.211 m	135	146

Raw Lidar Swath Testing

This project required Non-Vegetated Vertical Accuracy (NVA) to be tested on the raw lidar point cloud swath data. The dataset was required to meet a target value of 19.6 cm at a 95% confidence level using an RMSEz target value of 10 cm x 1.9600. Testing was assessed and reported using guidelines developed by the National Digital Elevation Program (NDEP) and the American Society for Photogrammetry and Remote Sensing (ASPRS).

The raw NVA was to be calculated with a minimum of 190 independent checkpoints that were not used in the calibration or post processing of the lidar point cloud data. Checkpoints were to be distributed throughout the project area and located in bare earth and urban (non-vegetated) land cover classes.

Testing was performed using TINs created from the final calibrated and controlled swath data. For each NVA checkpoint, an elevation value was derived from the TIN at the point's x,y location. This value was compared to the checkpoint's surveyed elevation value.

The raw NVA was tested using 205 checkpoints. These checkpoints were surveyed using GPS techniques. See the survey report for acquisition methodologies. This dataset was tested to be 0.104 meters using an RMSEz of 0.53 meters x 1.9600.

For full checkpoint results, see the tables in Appendix 2.

Digital Elevation Model Testing

This project required Non-Vegetated Accuracy (NVA) and Vegetated Vertical Accuracy (VVA) testing of the digital elevation model (DEM) dataset. The calculated NVA value was required to meet 19.6 cm at a 95% confidence level using an RMSEz target value of 10 cm x 1.9600. VVA was required to meet 0.30 cm at the 95th percentile error. Testing was assessed and reported using guidelines developed by the National Digital Elevation Program (NDEP) and the American Society for Photogrammetry and Remote Sensing

(ASPRS).

Testing was performed using the bare earth DEM created as part of this task order. For each checkpoint, an elevation value was derived from the DEM at the point's x,y location. This value was compared to the checkpoint's surveyed elevation value.

The NVA was to be calculated with a minimum of 190 independent checkpoints falling on bare earth and urban (non-vegetated) classes. VVA had a minimum of checkpoints requirement of 135 points falling in brush/tall grass/weeds (vegetated) land cover classes. These points were not used in the calibration or post processing of the lidar point cloud data and distributed throughout the project area. Checkpoints were surveyed using GPS techniques. See the survey report for acquisition methodologies.

The DEM NVA measured 0.112 meters using an RMSEz of 0.057 meters x 1.9600 using 205 checkpoints. VVA tested 0.211 meters at the 95th percentile using 146 checkpoints.

VVA errors larger than the 95th percentile are listed below. All values are in meters.

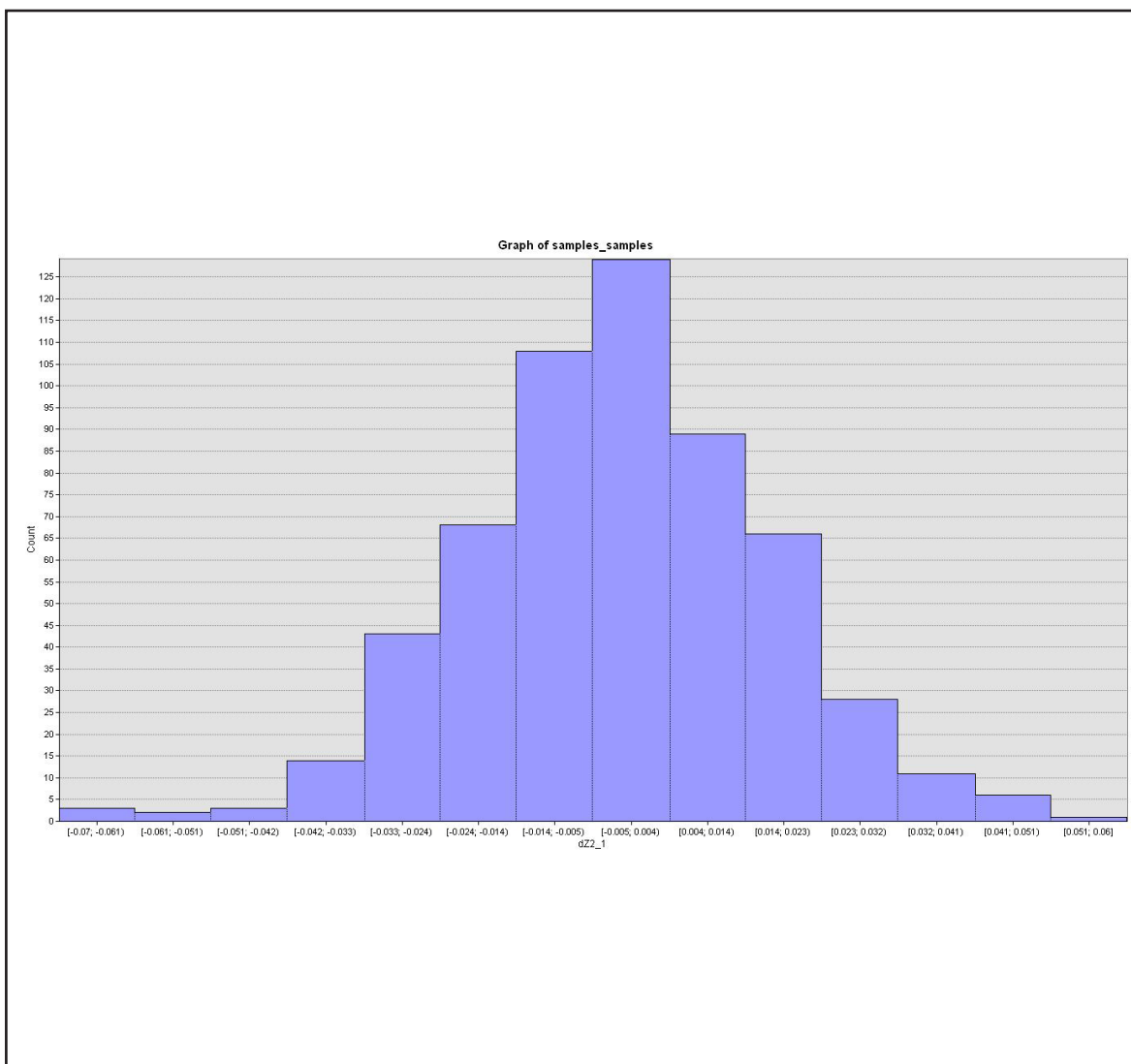
For full checkpoint results, see the tables in Appendix 3 and 4.

Table 4-2. VVA Errors

Point ID	Easting	Northing	Z-Error
3077_2018_CA	-1945063.058	1457930.402	0.362
3097_2018_CA	-1938440.076	1396590.711	0.295
3109_2018_CA	-1887449.327	1394887.519	0.759
3117_2018_CA	-1988753.358	1396665.122	0.834
3126_2018_CA	-2192991.882	1567265.055	0.216
3130_2018_CA	-2171464.060	1559272.954	0.279
3147_2018_CA	-2002529.278	1409473.938	0.266

Inter-Swath Testing

Inter-swath accuracy was tested against well-distributed flight line overlap locations. The relative accuracy for the lidar measured at 0.019 meters RMSE.



Values are in meters.

Approved By	Name	Signature	Date
Associate Member, Lidar Specialist Certified Photogrammetrist #1381	Qian Xiao		May 2019

Intra-Swath Testing

Intra-swath accuracy, also known as “within swath” accuracy, was tested against single swath first return data located in flat open areas. The intra-swath accuracy for the lidar measured at 0.032 meters RMSDz.

Appendix 1: Flight Logs

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
	5/28/2018	148	78654	2	SoCal Wildfire Lidar Block 1 A/B				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time	Base
Kennedy		6255Q		1092.2		12:57:00		19:57:00	WOOLPERT PIN
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time	PID
Scott		8170		1096.6		17:19		0:19	SBA
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing
180/8	10		CL	18	12	29.98			LAF
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	Mode
40		43		272		100		Gain - Course/Up	Single
								Gain - Fine/Down	Multi
Air Speed		AGL		MSL		Waveform Used		Waveform Mode	
150		Kts	6500/8500	Ft	6513/8513	Ft	Yes	No	@ NS
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: 12:25:00	
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission	
								Yes	X No
16	N	20:16:00	20:24:00	0:08:00	20	0.6	1.2		
17	S	20:27:00	20:35:00	0:08:00	19	0.7	1.3		
18	N	20:38:00	20:46:00	0:08:00	18	0.7	1.2		
19	S	20:49:00	20:56:00	0:07:00	16	0.7	1.3		
1	N	21:04:00	21:05:00	0:01:00	16	0.8	1.5		
2	S	21:09:00	21:10:00	0:01:00	16	0.8	1.5		
3	N	21:14:00	21:16:00	0:02:00	16	0.8	1.5		
4	S	21:20:00	21:22:00	0:02:00	15	0.8	1.5		
5	N	21:25:00	21:27:00	0:02:00	14	0.9	1.7		
6	N	21:30:00	21:31:00	0:01:00	15	0.8	1.3		
7	N	21:41:00	21:49:00	0:08:00	15	0.8	1.4		
8	S	21:51:00	21:58:00	0:07:00	15	0.8	1.5		
9	N	22:02:00	22:09:00	0:07:00	14	1.2	1.9		
10	S	22:12:00	22:19:00	0:07:00	15	0.8	1.3		
11	N	22:22:00	22:29:00	0:07:00	15	0.8	1.3		
12	S	22:33:00	22:40:00	0:07:00	17	0.8	1.2		
13	N	22:43:00	22:50:00	0:07:00	17	0.8	1.2		
14	S	22:53:00	23:00:00	0:07:00	20	0.7	1.1		
15	N	23:04:00	23:11:00	0:07:00	19	0.7	1.1		
16	S	23:14:00	23:21:00	0:07:00	18	0.7	1.2		
17	N	23:25:00	23:32:00	0:07:00	19	0.7	1.2		
18	S	23:35:00	23:41:00	0:06:00	19	0.7	1.2		
19	N	23:44:00	23:50:00	0:06:00	20	0.6	1.1		
20	S	23:53:00	0:00:00	0:07:00	19	0.7	1.2		
		↑ 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				
	5/31/2018		151		78654		2		SoCal Wildfire Lidar Block 1 A				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base			
Kennedy		6255Q		1097.2		9:57:00		16:57:00		WOOLPERT PIN			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID			
Scott		8170		1101.6		14:15		21:15		BFL			
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL		
270/5	10		CL	18	4	29.92				Arriving	BFL		
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		B	
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.			
150		Kts	6500	Ft	6500	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: 9:10:00	
		↑ Times entered are Zulu / GMT ↓								Verify 5-Turns Before Mission		Yes	X No
20	S	17:26:00	17:32:00	0:06:00	27	0.5	0.9						
21	N	17:36:00	17:43:00	0:07:00	25	0.5	1						
22	S	17:46:00	17:53:00	0:07:00	24	0.6	1.1						
23	N	17:56:00	18:02:00	0:06:00	21	0.6	1.3						
24	S	18:05:00	18:11:00	0:06:00	21	0.6	1.3						
25	N	18:14:00	18:19:00	0:05:00	21	0.6	1.3						
26	S	18:22:00	18:27:00	0:05:00	21	0.6	1.3						
27	N	18:30:00	18:35:00	0:05:00	21	0.6	1.3						
28	S	18:38:00	18:43:00	0:05:00	23	0.6	1.1						
29	N	18:46:00	18:52:00	0:06:00	24	0.5	1						
30	S	18:55:00	19:01:00	0:06:00	24	0.5	1						
31	N	19:04:00	19:11:00	0:07:00	23	0.6	1						
32	S	19:13:00	19:19:00	0:06:00	22	0.6	1						
33	N	19:22:00	19:28:00	0:06:00	19	0.6	1.1						
34	S	19:30:00	19:36:00	0:06:00	19	0.6	1.1						
35	N	19:39:00	19:45:00	0:06:00	20	0.6	1.1						
36	S	19:48:00	19:54:00	0:06:00	20	0.6	1.1						
37	N	19:58:00	20:03:00	0:05:00	20	0.6	1.1						
38	S	20:05:00	20:10:00	0:05:00	19	0.6	1.3						
39	N	20:12:00	20:16:00	0:04:00	19	0.6	1.3						
40	S	20:19:00	20:23:00	0:04:00	17	0.7	1.2						
41	N	20:25:00	20:27:00	0:02:00	19	0.6	1.1						
42	S	20:30:00	20:32:00	0:02:00	17	0.7	1.2						
43	N	20:34:00	20:36:00	0:02:00	18	0.7	1.2						
44	S	20:39:00	20:40:00	0:01:00	18	0.7	1.2						
45	N	20:45:00	20:51:00	0:06:00	18	0.7	1.2						
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify 5-Turns After Mission		Yes	X	No	
Additional Comments:											Drive #		

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name				
	6/2/2018		153		78654		2		SoCal Wildfire Lidar Block 1 C				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base			
Kennedy		6255Q		1102.4		2:36:00		21:36:00		WOOLPERT PIN			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID			
Scott		8170		1106.7		6:51		1:51		BFL			
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL		
280/8G15	10		CL	32	11	29.95				Arriving	BFL		
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		B	
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.			
150		Kts	10500	Ft	10500	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: 9:10:00	
		↑ Times entered are Zulu / GMT ↓								Verify S-Turns Before Mission		Yes	X No
1	S	22:07:00	22:10:00	0:03:00	18	0.7	1.1						
2	N	22:13:00	22:16:00	0:03:00	18	0.7	1.1						
3	S	22:19:00	22:22:00	0:03:00	19	0.7	1.1						
4	N	22:26:00	22:27:00	0:01:00	18	0.7	1.2						
5	N	22:32:00	22:38:00	0:06:00	18	0.7	1.2						
6	S	22:42:00	22:48:00	0:06:00	19	0.7	1.1						
7	N	22:53:00	23:02:00	0:09:00	19	0.7	1.2						
8	S	23:05:00	23:13:00	0:08:00	20	0.7	1.2						
9	N	23:16:00	23:24:00	0:08:00	19	0.7	1.3						
10	S	23:26:00	23:35:00	0:09:00	21	0.7	1.1						
11	N	23:37:00	23:45:00	0:08:00	20	0.7	1.2						
12	S	23:48:00	23:55:00	0:07:00	18	0.7	1.2						
13	N	23:59:00	0:06:00	0:07:00	18	0.7	1.2						
14	S	0:12:00	0:14:00	0:02:00	17	0.7	1.3						
15	S	0:19:00	0:22:00	0:03:00	17	0.7	1.3						
16	N	0:26:00	0:29:00	0:03:00	17	0.7	1.3						
17	S	0:32:00	0:35:00	0:03:00	16	0.7	1.4						
18	N	0:38:00	0:41:00	0:03:00	16	0.7	1.4						
19	S	0:44:00	0:48:00	0:04:00	16	0.7	1.4						
20	N	0:50:00	0:54:00	0:04:00	16	0.7	1.5						
21	S	0:56:00	1:00:00	0:04:00	17	0.7	1.3						
22	N	1:03:00	1:06:00	0:03:00	19	0.7	1.1						
23	S	1:09:00	1:11:00	0:02:00	20	0.6	1.1						
24	N	1:15:00	1:17:00	0:02:00	20	0.6	1.2						
25	S	1:20:00	1:22:00	0:02:00	21	0.6	1.1						
26	N	1:25:00	1:28:00	0:03:00	21	0.6	1.1						
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X	No	
Additional Comments:											Drive #		

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name					
		6/5/2018	156	78654	2	SoCal Wildfire Lidar Block 1 A/B					
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base	
Kennedy		6255Q		1111.0		8:19:00		15:19:00		WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID	
Scott		8170		1115.6		12:53		19:53		BFL	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL
340/5	10		CL	24	-2	29.81				Arriving	BFL
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	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	65/8500	Ft	65/8500	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:		7:50:00	
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes	☒ No
A48	S	15:45:00	15:52:00	0:07:00	19	0.6	1.2				
49	N	15:56:00	16:03:00	0:07:00	21	0.6	1.1				
50	S	16:06:00	16:12:00	0:06:00	18	0.6	1.2				
51	N	16:16:00	16:22:00	0:06:00	20	0.6	1.2				
52	S	16:24:00	16:30:00	0:06:00	19	0.6	1.2				
53	N	16:32:00	16:37:00	0:05:00	22	0.6	1.1				
54	S	16:40:00	16:44:00	0:04:00	22	0.6	1.1				
55	N	16:47:00	16:50:00	0:03:00	25	0.5	1				
56	S	16:53:00	16:56:00	0:03:00	24	0.6	1.1				
B25	N	17:05:00	17:12:00	0:07:00	24	0.6	1.1				
26	S	17:15:00	17:21:00	0:06:00	22	0.6	1.1				
27	N	17:24:00	17:31:00	0:07:00	22	0.6	1.1				
28	S	17:34:00	17:40:00	0:06:00	22	0.6	1.2				
29	N	17:43:00	17:49:00	0:06:00	21	0.6	1.3				
30	S	17:52:00	17:58:00	0:06:00	21	0.6	1.3				
31	N	18:00:00	18:05:00	0:05:00	21	0.6	1.3				
32	S	18:07:00	18:14:00	0:07:00	20	0.6	1.2				
33	N	18:16:00	18:21:00	0:05:00	22	0.6	1.1				
34	S	18:24:00	18:29:00	0:05:00	22	0.6	1.1				
35	N	18:31:00	18:36:00	0:05:00	23	0.6	1				
36	S	18:38:00	18:43:00	0:05:00	23	0.6	1				
37	N	18:51:00	18:56:00	0:05:00	22	0.6	1				
38	S	18:59:00	19:03:00	0:04:00	22	0.6	1				
39	N	19:07:00	19:13:00	0:06:00	19	0.6	1.2				
40	S	19:16:00	19:21:00	0:05:00	18	0.7	1.3				
41	N	19:24:00	19:29:00	0:05:00	22	0.6	1.1				
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	☒ No
Additional Comments:										Drive #	

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name					
		6/6/2018	157	78654	2	SoCal Wildfire Lidar Block 1 B					
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base	
Kennedy		6255Q		1118.1		8:10:00		15:10:00		WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID	
Scott		8170		1122.3		12:19		19:19		BFL	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL
320/6	10		CL	23	5	29.84				Arriving	BFL
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	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150		Kts	8500	Ft	8500	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:		7:50:00	
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes	☒ No
54	S	15:32:00	15:38:00	0:06:00	21	0.7	1.4				
55	N	15:41:00	15:47:00	0:06:00	22	0.6	1.2				
56	S	15:50:00	15:56:00	0:06:00	24	0.6	1.1				
57	N	16:00:00	16:07:00	0:07:00	24	0.6	1.1				
58	S	16:10:00	16:18:00	0:08:00	22	0.6	1.2				
59	N	16:22:00	16:28:00	0:06:00	21	0.6	1.2				
60	S	16:32:00	16:39:00	0:07:00	23	0.6	1.1				
61	N	16:42:00	16:49:00	0:07:00	24	0.6	1				
62	S	16:52:00	16:59:00	0:07:00	23	0.6	1.1				
63	N	17:01:00	17:08:00	0:07:00	25	0.5	1				
64	S	17:13:00	17:19:00	0:06:00	24	0.5	1				
65	N	17:22:00	17:28:00	0:06:00	22	0.6	1.2				
66	S	17:31:00	17:37:00	0:06:00	21	0.6	1.3				
67	N	17:40:00	17:46:00	0:06:00	21	0.6	1.3				
68	S	17:50:00	17:56:00	0:06:00	21	0.6	1.4				
69	N	17:58:00	18:04:00	0:06:00	21	0.6	1.4				
70	S	18:08:00	18:14:00	0:06:00	23	0.6	1.3				
71	N	18:16:00	18:23:00	0:07:00	23	0.6	1.1				
72	S	18:27:00	18:33:00	0:06:00	24	0.6	1.1				
73	N	18:35:00	18:41:00	0:06:00	22	0.6	1				
74	S	18:43:00	18:49:00	0:06:00	22	0.6	1				
75	N	18:52:00	18:58:00	0:06:00	22	0.6	1				
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	☒ No
Additional Comments:										Drive #	

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name					
		6/10/2018		161		78654		92		SoCal Wildlife Block 1B and 1C					
Operator			Aircraft			HOBBS Start			Local Start Time			ZULU Start Time		Base	
Denham			N6255Q			1144.7			8:22:00			15:22:00		WOOLPERT PIN	
Pilot			Sensor Type/Number			HOBBS END			Local End Time			Zulu End Time		PID	
Garrison			SH8170			1150.9			2:55			21:55		BFL1	
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure		Haze/Fire/Cloud	
														Departing	
														Arriving	
														BFL	
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	10500C/8500B	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: 8:14:00			
		⬆ Times entered are Zulu / GMT ⬆								Verify S-Turns Before Mission		Yes	X	No	
C97	NW	16:11:00	16:20:00	0:09:00	24	0.6	1.2								
C98	SE	16:27:00	16:34:00	0:07:00	26	0.6	1								
C99	NW	16:41:00	16:49:00	0:08:00	27	0.5	1								
C100	SE	16:57:00	17:03:00	0:06:00	26	0.6	1								
C101	NW	17:10:00	17:18:00	0:08:00	25	0.6	1.1								
C102	SE	17:34:00	17:40:00	0:06:00	22	0.7	1.3								
C103	NW	17:47:00	17:54:00	0:07:00	22	0.7	1.3								
C104	SE	18:01:00	18:06:00	0:05:00	24	0.6	1.1								
C105	NW	18:14:00	18:21:00	0:07:00	26	0.6	0.9								
C106	SE	18:29:00	18:34:00	0:05:00	24	0.6	1								
C107	NW	18:42:00	18:48:00	0:06:00	21	0.7	1.2								
C108	SE	18:55:00	19:00:00	0:05:00	17	0.7	1.3								
C109	NW	19:06:00	19:08:00	0:02:00	20	0.6	1.1								
C110	SE	19:15:00	19:16:00	0:01:00	20	0.6	1.1								
B78	NW	19:36:00	19:45:00	0:09:00	18	0.7	1.2								
B79	SE	19:52:00	20:00:00	0:08:00	17	0.7	1.2								
B80	NW	20:08:00	20:16:00	0:08:00	16	0.8	1.4								
B81	SE	20:23:00	20:31:00	0:08:00	15	0.8	1.4								
B82	NW	20:37:00	20:45:00	0:08:00	14	0.8	1.5								
B83	SE	20:51:00	21:07:00	0:16:00	14	0.8	1.4								
		⬆ Times entered are Zulu / GMT ⬆		Page		1		Verify S-Turns After Mission		Yes	X	No			
Additional Comments:												Drive #			

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name				
	6/14/2018		165		78654		2		So Calif USGS				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base			
GALAMBOS		N404CP		6660..6		8:33:00		15:33:00		CORS			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID			
Gebhart		8191		6667.2		2:43		20:43					
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure	
130 3		10		Clear				26		8		29.77	
Haze/Fire/Cloud		Departing		KBFL		Arriving		KBFL					
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		255		Mode	
20		50		371		100		Gain - Course/Up		Single		A	
Gain - Fine/Down		Multi		X		B							
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.			
130		Kts		5,000		Ft		11,500		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: 14:55:00					
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 1				Verify S-Turns Before Mission		Yes		X No	
E1	W	15:33:50	15:35:07	0:01:17	22	0.6	1.2	Eye Safety error shutter closed					
E1	W	15:37:50	15:38:31	0:00:41	22	0.6	1.2	BLOCK 4 area E					
E2	E	15:41:42	15:43:48	0:02:06	22	0.6	1.2	WHAT DRIVE					
E3	W	15:47:14	15:49:22	0:02:08	22	0.6	1.2						
E4	E	15:53:02	15:55:09	0:02:07	25	0.6	1.1						
E5	W	15:58:54	16:01:14	0:02:20	25	0.6	1.1						
E6	E	16:04:20	16:06:35	0:02:15	26	0.5	1						
E7	W	16:09:57	16:12:18	0:02:21	26	0.5	1						
E8	E	16:15:20	16:17:34	0:02:14	24	0.5	1						
E9	W	16:21:51	16:25:47	0:03:56	24	0.5	1						
E10	E	16:29:05	16:32:54	0:03:49	24	0.5	1						
E11	W	16:36:18	16:39:26	0:03:08	24	0.5	1						
E12	E	16:42:34	16:46:04	0:03:30	24	0.5	1						
E13	W	16:49:13	16:52:36	0:03:23	24	0.5	1						
E14	E	16:55:13	16:57:28	0:02:15	19	0.6	1.4						
E15	W	17:00:52	17:03:02	0:01:09	19	0.6	1.4						
E16	E	17:06:19	17:08:27	0:02:41	19	0.6	1.4						
E17	W	17:11:29	17:12:38	0:01:09	19	0.6	1.4						
E18	E	17:15:39	17:16:48	0:01:09	19	0.6	1.4						
E19	W	17:20:59	17:23:40	0:02:41	19	0.6	1.4						
E20	E	17:26:39	17:39:15	0:12:36	19	0.6	1.4						
E21	W	17:32:40	17:35:20	0:02:40	21	0.6	1.1						
E22	E	17:38:26	17:41:00	0:02:34	21	0.6	1.1						
E23	W	17:44:48	17:48:58	0:04:10	21	0.6	1.1						
E24	E	17:52:12	17:56:24	0:04:12	21	0.6	1.1						
E25	W	18:00:15	18:04:49	0:04:34	21	0.6	1.1						
E26	E	18:08:24	18:12:24	0:04:00	21	0.6	1.1						
E27	W	18:15:46	18:19:53	0:04:07	18	0.6	1.2						
E28	E	18:23:13	18:27:18	0:04:05	18	0.6	1.2						
E29	W	18:30:42	18:34:53	0:04:11	18	0.6	1.2	Go to Page to this mission continues					
E30	E	18:37:53	18:39:23	0:01:30	18	0.6	1.2						
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes		X No	
Additional Comments:										Drive #			
63 GB of data										????			

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name			
		6/14/2018	165	78654	2	So Calif USGS			
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base	
GALAMBOS		N404CP		6660..6	8:33:00		15:33:00	CORS	
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID	
Gebhart		8191		6667.2	2:43		20:43		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KBFL
130 3	10	Clear		26	8	29.77		Arriving	KBFL
Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %	Fixed Gain	255	Mode	Threshold Values
20	50		371		100	Gain - Course/Up		Single	A
						Gain - Fine/Down		Multi	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode	
130	Kts	5,000	Ft	11,500	Ft	Yes	NO	X	@ NS
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:	14:55:00
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 1				Verify S-Turns Before Mission	Yes X No
E31	W	18:43:27	18:45:39	0:02:12	21	0.7	1.2	Block 4	
E32	E	18:48:33	18:50:48	0:02:15	21	0.7	1.2		
E33	W	18:54:06	18:55:01	0:00:55	21	0.7	1.2		
E34	E	18:58:06	18:59:10	0:01:04	21	0.7	1.2		
E35	W	19:02:26	19:03:09	0:00:43	21	0.7	1.2		
E36	SW	19:08:38	19:09:29	0:00:51	21	0.7	1.2		
E37	NE	19:12:34	19:13:23	0:00:49	21	0.7	1.2		
E38	SW	19:16:40	19:17:30	0:00:50	21	0.7	1.2		
E39	NE	19:27:37	19:28:30	0:00:53	21	0.7	1.2		
E40	SW	19:31:41	19:32:57	0:01:16	21	0.7	1.2		
E41	NE	19:35:59	19:36:43	0:00:44	20	0.7	1.2		
E42	SW	19:40:06	19:40:56	0:00:50	20	0.7	1.2		
E43	NE	19:43:19	19:44:31	0:01:12	20	0.7	1.2		
E44	SE	19:48:00	19:49:13	0:01:13	20	0.7	1.2		
E45	NW	19:52:34	19:53:51	0:01:17	20	0.7	1.2		
E46	SE	19:56:46	19:58:28	0:01:42	20	0.7	1.2		
E47	NW	20:01:41	20:02:44	0:01:03	20	0.7	1.2		
E48	SE	20:06:48	20:08:42	0:01:54	20	0.7	1.2		
E49	NW	20:11:36	20:13:20	0:01:44	18	0.8	1.3		
E50	SE	20:16:33	20:18:15	0:01:42	18	0.8	1.3		
E51	NW	20:21:59	20:25:23	0:03:24	18	0.8	1.3		
E52	SE	20:28:42	20:31:44	0:03:02	18	0.8	1.3		
E53	NW	20:34:33	20:37:50	0:03:17	16	0.9	1.5		
E54	SE	20:40:22	20:42:46	0:02:24	16	0.9	1.5		
E55	NW	20:45:24	20:47:54	0:02:30	16	0.9	1.5		
E56	SE	20:50:59	20:52:54	0:01:55	16	0.9	1.5		
E57	NW	20:55:39	20:57:25	0:01:46	17	0.9	1.7		
E58	SE	19:59:56	21:01:07	1:01:11	17	0.9	1.7		
E59	NW	21:03:45	21:04:48	0:01:03	17	0.9	1.7		
E60	SE	21:07:57	21:08:55	0:00:58	17	0.9	1.7		
E61	NW	21:12:03	17:55:00	20:42:57	17	0.9	1.7		
		↑ Times entered are Zulu / GMT ↑		Page		2		Verify S-Turns After Mission	Yes X No
Additional Comments:								Drive #	

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
	6/17/2018	167	78654	92	SoCal Wildfire Block 2 A				
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base	
Denham		N6255Q		1157.9	8:21:00		15:21:00	WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID	
Garrison		SH8170		1164.5	3:17		22:17	BFL	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	BFL
								Arriving	BFL
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	8500	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:	8:10:00
		↑ Times entered are Zulu / GMT ↓					Verify S-Turns Before Mission		Yes ☒ No ☐
1	SE	16:31:00	16:32:00	0:01:00	24	0.5	1		
2	N	16:40:00	16:40:00	0:00:00	23	0.6	1.1		
3	S	16:48:00	16:49:00	0:01:00	22	0.6	1.2		
4	N	16:56:00	16:59:00	0:03:00	21	0.6	1.3		
5	S	17:06:00	17:07:00	0:01:00	21	0.6	1.3		
6	N	17:14:00	17:16:00	0:02:00	21	0.6	1.3		
7	S	17:24:00	17:26:00	0:02:00	21	0.6	1.2		
8	N	17:33:00	17:35:00	0:02:00	22	0.6	1.1		
9	S	17:43:00	17:45:00	0:02:00	22	0.6	1		
10	N	17:52:00	17:54:00	0:02:00	23	0.6	1		
11	S	18:01:00	18:03:00	0:02:00	21	0.6	1		
12	N	18:10:00	18:12:00	0:02:00	21	0.6	1		
13	S	18:20:00	18:22:00	0:02:00	19	0.6	1.1		
14	N	18:29:00	18:31:00	0:02:00	18	0.7	1.1		
15	S	18:38:00	18:40:00	0:02:00	19	0.6	1.1		
16	N	18:48:00	18:50:00	0:02:00	19	0.6	1.2		
17	S	18:57:00	19:00:00	0:03:00	18	0.6	1.1		
18	N	19:06:00	19:08:00	0:02:00	17	0.7	1.3		
19	S	19:16:00	19:18:00	0:02:00	17	0.7	1.2		
20	N	19:26:00	19:28:00	0:02:00	16	0.7	1.2		
21	S	19:36:00	19:38:00	0:02:00	16	0.7	1.2		
22	N	19:45:00	19:47:00	0:02:00	16	0.7	1.1		
23	S	19:55:00	19:57:00	0:02:00	15	0.8	1.4		
24	N	20:04:00	20:06:00	0:02:00	13	0.8	1.6		
25	S	20:14:00	20:17:00	0:03:00	13	0.9	1.6		
26	N	20:24:00	20:27:00	0:03:00	14	0.8	1.3		
27	S	19:55:00	19:57:00	0:02:00	15	0.8	1.4		
28	N	20:45:00	20:47:00	0:02:00	13	0.9	1.5		
29	S	20:55:00	20:58:00	0:03:00	14	0.7	1.2		
30	N	21:05:00	21:07:00	0:02:00	15	0.7	1.7		
31	S	21:15:00	21:18:00	0:03:00	16	0.7	1.1		
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission	
								Yes	☒ No ☐
Additional Comments:									Drive #
BLOCK 1 B Blocked by Cloud Marine Layer. Proceeded to BLOCK 2 A as Alternate. Mission continues on next page.									

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name							
	6/19/2018		170		76854		92		SoCal Wildfire Block 1B/Block 2A							
Operator		Aircraft			HOBBS Start			Local Start Time			ZULU Start Time		Base			
Denham		N6255Q			1169.9			9:08:00			16:08:00		WOOLPERT PIN			
Pilot		Sensor Type/Number			HOBBS END			Local End Time			Zulu End Time		PID			
Scott		SH8170			1174.9			2:27			21:27		BFL			
Wind Dir/Speed		Visibility		Ceiling	Cloud Cover %		Temp		Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL	
														Arriving	BFL	
Scan Angle (FOV)		Scan Frequency (Hz)			Pulse Rate (kHz)		Laser Power %			Fixed Gain		Mode		Threshold Values		
150		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	8500		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:		8:34:00		
		↑ Times entered are Zulu / GMT ↓										Verify S-Turns Before Mission		Yes	X	No
103	SE	16:40:00		16:52:00		0:12:00		20	0.6	1.3		BLOCK 1 B				
104	NW	16:58:00		17:11:00		0:13:00		20	0.6	1.3		BLOCK 1 B				
105	SE	17:14:00		17:28:00		0:14:00		22	0.6	1.2		BLOCK 1 B				
106	NW	17:31:00		17:45:00		0:14:00		23	0.6	1		BLOCK 1 B				
107	SE	17:47:00		18:01:00		0:14:00		21	0.6	1		BLOCK 1 B				
108	NW	18:04:00		18:17:00		0:13:00		20	0.6	1		BLOCK 1 B				
109	SE	18:22:00		18:33:00		0:11:00		20	0.7	1.3		BLOCK 1 B				
110	NW	18:37:00		18:49:00		0:12:00		20	0.6	1.1		BLOCK 1 B				
44	N	19:09:00		19:12:00		0:03:00		17	0.7	1.2		BLOCK 2 A				
45	S	19:15:00		19:19:00		0:04:00		16	0.7	1.2		BLOCK 2 A				
46	N	19:22:00		19:26:00		0:04:00		15	0.8	1.5		BLOCK 2 A				
47	S	19:28:00		19:32:00		0:04:00		16	0.8	1.4		BLOCK 2 A				
48	N	19:35:00		19:39:00		0:04:00		16	0.8	1.4		BLOCK 2 A				
49	S	19:42:00		19:46:00		0:04:00		16	0.8	1.4		BLOCK 2 A				
50	N	19:50:00		19:54:00		0:04:00		13	0.8	1.5		BLOCK 2 A/ PUSHED OFF LINE				
51	S	19:58:00		20:02:00		0:04:00		15	0.8	1.5		BLOCK 2 A				
52	N	20:05:00		20:10:00		0:05:00		15	0.8	1.5		BLOCK 2 A				
53	S	20:13:00		20:17:00		0:04:00		15	0.9	1.5		BLOCK 2 A				
54	N	20:20:00		20:25:00		0:05:00		14	0.9	1.7		BLOCK 2 A				
55	S	20:29:00		20:35:00		0:06:00		13	1	1.7		BLOCK 2 A				
56	N	20:38:00		20:44:00		0:06:00		15	0.8	1.3		BLOCK 2 A				
57	S	20:47:00		20:53:00		0:06:00		16	0.8	1.2		BLOCK 2 A				
		↑ Times entered are Zulu / GMT														

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name			
	6/19/2018		170		78654		2		So Calif USGS			
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base		
GALAMBOS		N404CP		6667.2		12:25:00		19:25:00		CORS		
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID		
Gebhart		8191		6672.6		16:43		23:43				
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	KBFL	
var 5	10	Clear		28	10	29.99				Arriving	KBFL	
Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	255	Mode	Threshold Values		
20	50		371		100		Gain - Course/Up		Single	A		
							Gain - Fine/Down		Multi	X	B	
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.		
130	Kts	5,000	Ft	11,500	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:		18:43:04		
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 1852Z				Verify S-Turns Before Mission		Yes	X	No
D1	SE	19:25:03	19:28:16	0:03:13	16	0.8	1.4	Eye Safe shutter closed				
D2	NW	19:31:11	19:34:21	0:03:10	16	0.8	1.4					
D3	SE	19:37:36	19:40:53	0:03:17	16	0.8	1.4					
D4	NW	19:44:04	19:46:44	0:02:40	16	0.8	1.4					
D5	SE	19:50:09	19:53:04	0:02:55	16	0.8	1.4					
D6	NW	19:56:33	19:59:28	0:02:55	15	0.8	1.5					
D7	SE	20:02:50	20:06:00	0:03:10	15	0.8	1.5					
D8	NW	20:09:29	20:12:28	0:02:59	15	0.8	1.5					
D9	SE	20:15:50	20:17:21	0:01:31	15	0.8	1.5					
D10	NW	20:20:25	20:20:57	0:00:32	16	0.8	1.4					
D11	E	20:25:28	20:26:04	0:00:36	14	0.9	1.7					
D12	SE	20:32:37	20:33:56	0:01:19	14	1	1.7					
D13	NW	20:36:53	20:38:10	0:01:17	14	1	1.7					
D14	SE	20:41:08	20:42:15	0:01:07	14	1	1.7					
D15	NW	20:45:44	20:47:10	0:01:26	14	1	1.7					
D16	SE	20:50:41	20:51:50	0:01:21	15	0.8	1.4					
D17	NW	20:55:23	20:56:32	0:01:13	17	0.7	1.1					
D18	SE	20:59:21	21:00:02	0:00:41	17	0.7	1.1					
D19	NW	21:04:20	21:05:41	0:01:21	17	0.7	1.1					
D20	SE	21:09:08	21:10:21	0:01:13	17	0.7	1.1					
D21	NW	21:14:07	21:15:29	0:01:22	17	0.7	1.1					
D22	SE	21:18:47	21:20:09	0:01:22	17	0.7	1.2					
D23	NW	21:23:36	21:25:15	0:01:39	17	0.7	1.2					
D24	SE	21:28:55	21:30:42	0:01:47	17	0.7	1.1					
D25	NW	21:34:09	21:35:46	0:01:37	17	0.7	1.1					
D26	SE	21:38:44	21:39:53	0:01:09	16	0.7	1.2					
D27	NW	21:43:06	21:44:02	0:00:56	16	0.7	1.2					
D28	SE	21:47:33	21:49:02	0:01:29	16	0.7	1.2					
D29	NW	21:52:17	21:53:47	0:01:30	16	0.7	1.2					
D30	SE	21:57:01	22:58:36	1:01:35	16	0.7	1.2	Go to Page #2				
D31	NW	22:01:47	22:03:30	0:01:43	16	0.7	1.2					
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X	No
Additional Comments:											Drive #	
											162	

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name			
		6/20/2018	171	78654	2	So Calif USGS			
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base	
GALAMBOS		N404CP		6672.6	8:20:00		15:20:00	CORS	
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID	
Gebhart		8191		6679.5	14:17		21:17		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KBFL
130 3	10	Clear		23	12	29.93		Arriving	KBFL
Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)	Laser Power %		Fixed Gain	255	Mode	Threshold Values
20	50		371	100		Gain - Course/Up		Single	A
						Gain - Fine/Down		Multi	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode	
130	Kts	5,000	Ft	11,500	Ft	Yes	No	X	@ NS
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:	14:44:24
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 1450z				Verify S-Turns Before Mission	Yes X No
D51	SE	15:20:01	15:20:29	0:00:28	24	0.7	1.1	Eye Safety shutter closed	
D51	SE				24	0.7	1.1	Block D/ wrong line selected/UL001	
D51	SE	15:29:01	15:32:48	0:03:47	24	0.7	1.1	Eye Safety = Naked	
D52	NW	15:35:42	15:39:20	0:03:38	25	0.5	1		
D53	SE	15:42:56	15:46:40	0:03:44	25	0.5	1	Today's Mission 79GB	
D54	NW	15:49:20	15:52:22	0:03:02	25	0.5	1		
D55	SE	15:55:49	15:59:00	0:03:11	25	0.5	1		
D56	NW	16:02:10	16:05:08	0:02:58	25	0.5	1		
D57	SE	16:08:48	16:11:55	0:03:07	25	0.5	1		
D58	NW	16:14:59	16:17:57	0:02:58	21	0.6	1.3		
D59	SE	16:21:27	16:24:27	0:03:00	21	0.6	1.3		
D60	NW	16:27:12	16:29:05	0:01:53	21	0.6	1.3		
D61	SE	16:33:21	16:36:09	0:02:48	21	0.6	1.3		
D62	NW	16:38:55	16:41:29	0:02:34	21	0.6	1.3		
D63	SE	16:44:59	16:47:31	0:02:32	21	0.6	1.3		
D64	NW	16:50:51	16:53:18	0:02:26	21	0.6	1.3		
D65	SE	16:56:58	17:00:00	0:09:27	21	0.6	1.3		
D66	NE	17:02:54	17:05:31	0:02:37	21	0.6	1.3		
D67	SE	17:08:44	17:11:10	0:02:26	21	0.6	1.3		
D68	NW	17:14:18	17:23:45	0:09:27	22	0.7	1.1		
D69	SE	17:20:43	17:29:30	0:08:47	22	0.7	1.1		
D70	NW	17:26:38	17:29:31	0:02:53	22	0.7	1.1		
D71	SE	17:33:09	17:36:00	0:02:51	22	0.7	1.1		
D72	NW	17:39:15	17:42:08	0:02:53	22	0.7	1.1		
D73	SE	17:45:19	17:47:41	0:02:22	22	0.7	1.1		
D74	NW	17:50:16	17:52:42	0:02:26	22	0.7	1.1		
D75	SE	17:55:44	17:57:49	0:02:05	22	0.7	1.1		
D76	NW	18:00:33	18:02:30	0:01:57	22	0.7	1.1		
D77	SE	18:05:47	18:07:41	0:01:54	21	0.6	1.1		
D78	NW	18:10:58	18:13:11	0:02:13	22	0.7	1.1	Go to Page #2	
D79	SE	18:16:18	18:18:22	0:02:04	22	0.7	1.1		
		↑ Times entered are Zulu / GMT ↑		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				
	6/20/2018		171		78654		2		So Calif USGS				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base			
GALAMBOS		N404CP		6672.6		8:20:00		15:20:00		CORS			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID			
Gebhart		8191		6679.5		14:17		21:17					
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure	
130 3		10		Clear				23		12		29.93	
Haze/Fire/Cloud		Departing		KBFL		Arriving		KBFL					
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		255		Mode	
20		50		371		100		Gain - Course/Up		Single		A	
Gain - Fine/Down		Multi		X		B							
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.			
130		Kts		5,000		Ft		11,500		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:		14:44:24			
		↓ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes		No	
D80	NW	18:21:23	18:23:35	0:02:12	21	0.6	1.1						
D81	SE	18:26:56	18:29:02	0:02:06	22	0.7	1.1						
D82	NW	18:31:49	18:32:48	0:00:59	22	0.7	1.1						
D83	SE	18:36:57	18:39:03	0:02:06	19	0.7	1.3						
D84	NW	18:41:38	18:43:42	0:02:04	19	0.7	1.3						
D85	SE	18:46:54	18:49:07	0:02:13	19	0.7	1.3						
D86	NW	18:51:54	18:53:57	0:02:03	19	0.7	1.3						
D87	SE	18:56:54	18:58:58	0:02:04	19	0.7	1.3						
D88	NW	19:01:50	19:03:43	0:01:53	19	0.7	1.3						
D89	SE	19:07:27	19:10:06	0:02:39	17	0.7	1.3						
D90	NW	19:12:50	19:15:34	0:02:44	17	0.7	1.3						
D91	SE	19:18:54	19:21:43	0:02:49	17	0.7	1.3						
D92	NW	19:24:39	19:26:24	0:01:45	17	0.7	1.3						
D93	SE	19:29:00	19:31:00	0:02:00	17	0.7	1.3						
D94	NW	19:34:00	19:36:03	0:02:03	17	0.7	1.3						
D95	SE	19:39:39	19:41:50	0:02:11	17	0.7	1.3						
D96	NW	19:43:32	19:44:50	0:01:18	17	0.7	1.3						
D97	SE	19:48:20	19:51:41	0:03:21	17	0.7	1.3						
D98	NW	19:54:08	19:57:21	0:03:13	15	0.9	1.5						
D99	SE	20:01:17	20:05:32	0:04:15	15	0.9	1.5						
D100	NW	20:08:13	20:12:20	0:04:07	15	0.9	1.5						
D101	SE	20:15:00	20:19:02	0:04:02	15	0.9	1.5	Parachute					
D102	NW	20:21:27	20:25:24	0:03:57	16	0.7	1.3						
D103	SE	20:29:15	20:35:06	0:05:51	16	0.7	1.3						
D104	NW	20:37:33	20:43:16	0:05:43	16	0.7	1.3						
D105	SE	20:46:21	20:51:45	0:05:24	16	0.7	1.3						
D106	NW	20:54:09	20:59:48	0:05:39	16	0.7	1.3						
D107	SE	21:02:52	21:08:42	0:05:50	16	0.7	1.3						
D108	NW	21:11:25	21:16:58	0:05:33	16	0.7	1.3						
								Go back to page one					
		↑ Times entered are Zulu / GMT ↑		Page		2		Verify S-Turns After Mission		Yes		No	
Additional Comments:								Drive #					

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name			
	6/20/2018		171		76854		92		SoCal Wildfire Block 1 B Flight 1			
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base		
Denham		N6255Q		1174.9		7:42:00		14:42:00		WOOLPERT PIN		
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID		
Scott		SH8170		1179.6		12:46		19:46		BFL		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing		BFL		
								Arriving		BFL		
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	8500	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:		7:10:00		
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes	X	No
111	SE	15:11:00	15:23:00	0:12:00	22	0.6	1.2					
112	NW	15:26:00	15:38:00	0:12:00	24	0.6	1.1					
113	SE	15:44:00	15:52:00	0:08:00	25	0.5	1					
114	NW	15:55:00	16:02:00	0:07:00	24	0.6	1.1					
115	SE	16:08:00	16:13:00	0:05:00	25	0.5	1					
116	NW	16:15:00	16:19:00	0:04:00	25	0.5	1					
117	SE	16:24:00	16:28:00	0:04:00	24	0.6	1.1					
118	NW	16:31:00	16:35:00	0:04:00	22	0.6	1.2					
119	SE	16:40:00	16:45:00	0:05:00	21	0.6	1.3					
120	NW	16:48:00	16:52:00	0:04:00	21	0.6	1.3					
121	SE	16:56:00	17:01:00	0:05:00	21	0.6	1.3					
122	NW	17:03:00	17:08:00	0:05:00	21	0.6	1.2					
123	SE	17:13:00	17:18:00	0:05:00	22	0.6	1.1					
124	NW	17:21:00	17:25:00	0:04:00	22	0.6	1					
125	SE	17:30:00	17:34:00	0:04:00	22	0.6	1					
126	NW	17:37:00	17:41:00	0:04:00	23	0.6	1					
127	SE	17:47:00	17:54:00	0:07:00	22	0.6	0.9					
128	NW	17:57:00	18:03:00	0:06:00	21	0.6	1.1					
129	SE	18:07:00	18:13:00	0:06:00	19	0.7	1.2					
130	NW	18:17:00	18:23:00	0:06:00	19	0.7	1.2					
131	SE	18:26:00	18:32:00	0:06:00	19	0.7	1.2					
132	NW	18:34:00	18:39:00	0:05:00	19	0.7	1.2					
133	SE	18:42:00	18:47:00	0:05:00	19	0.6	1.2					
134	NW	18:50:00	18:55:00	0:05:00	18	0.7	1.3					
135	SE	18:57:00	19:01:00	0:04:00	18	0.7	1.3					
136	NW	19:04:00	19:09:00	0:05:00	18	0.7	1.2					
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X	No
Additional Comments:											Drive #	
BLOCK 1 B.												

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name							
	6/21/2018		172		78654		92		SoCal Wildfire Block 2 A Flight 1							
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base				
Denham		N6255Q			1182.1		7:46:00			14:46:00		WOOLPERT PIN				
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID				
Scott		SH8170			1187.4		1:22			20:22		BFL				
Wind Dir/Speed		Visibility		Ceiling	Cloud Cover %		Temp		Dew Point	Pressure			Haze/Fire/Cloud	Departing		BFL
														Arriving		BFL
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	8500		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:		7:14:00		
		↑ Times entered are Zulu / GMT ↓										Verify S-Turns Before Mission		Yes	X	No
58	N	15:47:00		15:53:00		0:06:00		25	0.5	1						
59	S	15:57:00		16:04:00		0:07:00		23	0.6	1.1						
60	N	16:06:00		16:13:00		0:07:00		23	0.6	1.1						
61	S	16:16:00		16:23:00		0:07:00		21	0.6	1.1						
62	N	16:26:00		16:33:00		0:07:00		20	0.6	1.2						
63	S	16:35:00		16:43:00		0:08:00		20	0.6	1.3						
64	N	16:46:00		16:53:00		0:07:00		20	0.6	1.3						
65	S	16:56:00		17:03:00		0:07:00		19	0.7	1.2						
66	N	17:05:00		17:13:00		0:08:00		20	0.7	1.2						
67	S	17:15:00		17:23:00		0:08:00		19	0.6	1.1						
68	N	17:25:00		17:33:00		0:08:00		19	0.6	1.1						
69	S	17:35:00		17:43:00		0:08:00		22	0.6	1						
70	N	17:46:00		18:00:00		0:14:00		20	0.6	1						
71	S	18:02:00		18:16:00		0:14:00		18	0.7	1.2						
72	N	18:18:00		18:32:00		0:14:00		19	0.6	1.1						
73	S	18:34:00		18:47:00		0:13:00		19	0.6	1.2						
74	N	18:50:00		19:03:00		0:13:00		18	0.7	1.3						
75	S	19:05:00		19:17:00		0:12:00		17	0.7	1.3						
76	N	19:20:00		19:32:00		0:12:00		18	0.7	1.2						
77	S	19:34:00		19:46:00		0:12:00		17	0.8	1.5						
		↑ Times entered are Zulu / GMT ↑				Page				1		Verify S-Turns After Mission		Yes	X	No

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name			
		6/21/2018	172	78654	2	So Calif USGS			
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base	
GALAMBOS		N404CP		6679.5	8:30:00		15:30:00	CORS	
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID	
Gebhart		8191		6686.8	14:44		21:44		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KBFL
140 3	10	Clear		22	9	29.93		Arriving	KBFL
Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %	Fixed Gain	255	Mode	Threshold Values
20	50		371		100	Gain - Course/Up		Single	A
						Gain - Fine/Down		Multi	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode	
130	Kts	5,000	Ft	11,500	Ft	Yes	No	X	@ NS
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:	14:56:42
		↑ Times entered are Zulu / GMT ↓		TAKEOFF: 1503				Verify S-Turns Before Mission	Yes X No
D109	SE	15:30:28	15:36:34	0:06:06	24	0.6	1.1	Eye Safety off = Naked	
D110	NW	15:39:44	15:45:55	0:06:11	24	0.6	1.1	Used 109GB	
D111	SE	15:49:21	15:56:00	0:06:39	24	0.6	1.1		
D112	NW	15:59:08	16:05:25	0:06:17	24	0.6	1.1		
D113	SE	16:08:40	16:14:52	0:06:12	24	0.6	1.1		
D114	NW	16:17:46	16:24:36	0:06:50	24	0.6	1.1		
D115	SE	16:27:48	16:34:07	0:06:19	24	0.6	1.1		
D116	NW	16:38:48	16:46:50	0:08:02	19	0.7	1.3		
D117	SE	16:50:03	16:58:13	0:08:10	19	0.7	1.3		
D118	NW	17:01:00	17:09:20	0:08:20	19	0.7	1.3		
D119	SE	17:12:27	17:20:15	0:07:48	19	0.7	1.3		
D120	NW	17:23:04	17:31:00	0:07:56	19	0.7	1.3		
D121	SE	17:34:03	17:42:09	0:08:06	19	0.7	1.3		
D122	NW	17:44:53	17:52:23	0:07:30	19	0.7	1.3		
D123	SE	17:55:38	18:03:23	0:07:45	19	0.6	1.4		
D124	NW	18:06:17	18:14:40	0:07:34	19	0.6	1.4		
D125	SE	18:17:25	18:25:09	0:07:35	19	0.6	1.4		
D126	NW	18:28:01	18:36:15	0:08:14	20	0.6	1.2		
D127	SE	18:39:41	18:47:15	0:07:34	19	0.6	1.4		
D128	NW	18:50:27	18:58:02	0:07:35	19	0.6	1.4		
D129	SE	19:01:07	19:08:20	0:07:13	19	0.6	1.4		
D130	NW	19:10:56	19:18:28	0:07:32	21	0.6	1.1		
D131	SE	19:21:30	19:27:32	0:06:02	21	0.6	1.1		
D132	NW	19:30:09	19:46:38	0:16:29	17	0.8	1.6		
D133	SE	19:39:48	19:46:00	0:06:12	17	0.8	1.6		
D134	NW	19:49:50	19:53:17	0:03:27	17	0.8	1.6		
D135	SE	19:56:10	19:59:40	0:03:30	17	0.8	1.6		
D136	NW	20:02:37	20:06:20	0:03:43	18	1.1	1.8		
D137	SE	20:12:49	20:18:28	0:05:39	18	1.1	1.8		
D138	NW	20:19:00	20:22:10	0:03:10	18	1.1	1.8	Go to Page #2	
D139	SE	20:25:31	20:27:48	0:02:17	18	1.1	1.8		
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission	Yes X No
Additional Comments:									Drive #
									162

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name			
	6/22/2018		173		78654		92		SoCal Wildfire Block 2 B			
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base		
Denham		N6255Q		1187.4		7:47:00		11:47:00		WOOLPERT PIN		
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID		
Scott		SH8170		1191.9		12:40		19:40		BFL		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	BFL			
								Arriving	BFL			
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	10300	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:		7:14:00		
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes	X	No
85	NE	16:00:00	16:02:00	0:02:00	22	0.6	1.1					
86	SW	16:05:00	16:07:00	0:02:00	22	0.6	1.1					
87	NE	16:10:00	16:12:00	0:02:00	23	0.6	1					
88	SW	16:15:00	16:17:00	0:02:00	21	0.6	1.1					
89	NE	16:20:00	16:24:00	0:04:00	21	0.6	1.2					
90	SW	16:26:00	16:30:00	0:04:00	21	0.6	1.2					
91	NE	16:33:00	16:36:00	0:03:00	20	0.6	1.3					
92	SW	16:39:00	16:43:00	0:04:00	20	0.6	1.4	Fly 100 ft lower for Better Returns				
93	NE	16:45:00	16:48:00	0:03:00	20	0.6	1.4					
94	SW	16:50:00	16:55:00	0:05:00	20	0.6	1.4					
95	NE	16:57:00	16:59:00	0:02:00	20	0.6	1.3					
96	SW	17:02:00	17:03:00	0:01:00	21	0.6	1.3					
1	SW	17:08:00	17:09:00	0:01:00	21	0.6	1.1					
2	NE	17:13:00	17:14:00	0:01:00	21	0.6	1.1					
3	SW	17:16:00	17:18:00	0:02:00	20	0.6	1.2					
4	NE	17:23:00	17:26:00	0:03:00	21	0.6	1.1					
5	SW	17:29:00	17:32:00	0:03:00	22	0.6	1					
6	NE	17:35:00	17:39:00	0:04:00	23	0.5	1					
7	SW	17:41:00	17:45:00	0:04:00	21	0.6	1					
8	NE	17:48:00	17:52:00	0:04:00	20	0.6	1					
9	SW	17:54:00	17:59:00	0:05:00	17	0.7	1.2					
10	NE	18:01:00	18:06:00	0:05:00	17	0.7	1.2					
11	SW	18:09:00	18:14:00	0:05:00	18	0.7	1.2					
12	NE	18:16:00	18:21:00	0:05:00	18	0.7	1.2					
13	SW	18:23:00	18:29:00	0:06:00	18	0.7	1.2					
14	NE	18:31:00	18:36:00	0:05:00	18	0.7	1.2					
15	SW	18:38:00	18:44:00	0:06:00	18	0.7	1.1					
16	NE	18:46:00	18:51:00	0:05:00	16	0.7	1.3					
17	SW	18:54:00	18:59:00	0:05:00	16	0.7	1.2					
18	NE	19:01:00	19:06:00	0:05:00	15	0.8	1.3					
19	SW	19:09:00	19:14:00	0:05:00	16	0.8	1.3					
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X	No
Additional Comments:										Drive #		
BLOCK 2 B												

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name									
		6/22/2018	173	78654	2		So Calif Wildfires USGS									
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base						
GALAMBOS		N404CP		6686.8		8:28:00		15:28:00		CORS						
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID						
Gebhart		8191		6690.6		11:17		18:17								
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	KBFL				
130 4		10	Clear		23	11	29.93				Arriving	KBFL				
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	6,500	Ft	14,500	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:		14:47:00			
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 14:54z							Verify 5-Turns Before Mission		Yes	X	No	
E1	E	15:28:03		15:29:54		0:01:51		21	0.6	1.2	Eye Safe = Naked/ Block 1 area E					
E2	W	15:33:26		15:34:30		0:01:04		21	0.6	1.2						
E3	E	15:37:50		15:39:47		0:01:57		21	0.6	1.2						
E4	W	15:43:19		15:45:00		0:01:41		23	0.5	1						
E5	E	15:48:17		15:49:40		0:01:23		21	0.6	1.2						
											Block 1 area D/ 12,500					
D53	E	16:00:00		16:01:01		0:01:01		21	0.6	1.2						
D52	W	16:06:09		16:09:29		0:03:20		21	0.6	1.2						
D51	E	16:12:26		16:14:35		0:02:09		21	0.6	1.2						
D50	W	16:18:33		16:21:10		0:02:37		21	0.6	1.2						
D49	E	16:30:22		2:44:00		10:13:38		21	0.6	1.2						
D48	W	16:38:42		16:44:36		0:05:54		21	0.6	1.2						
D47	E	16:47:57		16:53:44		0:05:47		21	0.6	1.2						
D46	W	16:56:39		17:01:22		0:04:43		21	0.6	1.2						
D45	E	17:05:11		17:07:58		0:02:47		21	0.6	1.1						
D44	W	17:11:05		17:14:02		0:01:15		21	0.6	1.1						
D43	E	17:17:29		17:20:01		0:05:15		21	0.6	1.1						
D42	SE	17:27:34		17:28:12		0:00:38		21	0.6	1.1						
D41	NW	17:30:52		17:32:07		0:01:15		21	0.6	1.1						
D40	SE	17:38:39		17:43:54		0:05:15		19	0.7	1.2						
D39	NW	17:46:57		17:52:28		0:05:31		19	0.7	1.2						
D38	SE	17:55:56		18:01:12		0:05:16		19	0.7	1.2						
D37	NW	18:04:10		18:09:55		0:05:45		19	0.7	1.2						
D36	SE	18:12:52		18:17:35		0:04:43		19	0.7	1.2						

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name				
	6/23/2018		174		78654		2		So Calif Wildfires USGS				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base			
GALAMBOS		N404CP		6690.6		8:33:00		15:33:00		CORS			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID			
Gebhart		8191		6697.1		14:08		21:08					
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure	
130 4		10		Clear				23		11		29.93	
Haze/Fire/Cloud		Departing		KBFL		Arriving		KBFL					
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		255		Mode	
20		50		371		100		Gain - Course/Up		Single		A	
Gain - Fine/Down		Multi		X		B							
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.			
130		Kts		5,000		Ft		7,500		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: 14:54:50					
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 1505Z				Verify S-Turns Before Mission		Yes		X No	
C178	S	15:33:49	15:35:09	0:01:20	26	0.5	1	Eye Safe = Naked/ Block 1 area E/Parach					
C177	N	15:38:08	15:39:48	0:01:40	26	0.5	1	Block 4 area C					
C176	S	15:56:33	15:58:05	0:01:32	25	0.6	1	TM1B Error reboot drive 133					
C175	N	16:01:23	16:02:14	0:00:51	25	0.6	1	gps Began Logging At:15:48:40 Circles					
C174	S	16:05:14	16:06:06	0:00:52	25	0.6	1						
C173	N	16:09:55	16:11:20	0:01:25	24	0.6	1						
C172	S	16:14:21	16:15:37	0:01:16	24	0.6	1						
C171	N	16:18:50	16:20:40	0:01:50	24	0.6	1						
C170	S	16:23:42	16:25:34	0:01:52	23	0.6	1						
C169	N	16:28:51	16:30:47	0:01:56	20	0.6	1.3						
C168	S	16:33:58	16:36:02	0:02:04	20	0.6	1.3						
C167	N	16:39:34	16:42:20	0:02:46	22	0.6	1.1						
C166	S	16:45:33	16:48:05	0:02:32	22	0.6	1.1						
C165	N	16:55:24	16:55:58	0:00:34	22	0.6	1.1						
C164	S	16:58:49	16:59:26	0:00:37	22	0.6	1.1						
C163	N	17:02:34	17:03:13	0:00:57	22	0.6	1.1						
C162	S	17:06:23	17:08:01	0:01:00	21	0.6	1.1						
C161	N	17:10:19	17:11:02	0:00:43	21	0.6	1.1						
C160	S	17:14:14	17:15:11	0:00:57	21	0.6	1.1						
C159	N	17:18:02	17:19:02	0:01:00	19	0.7	1.2						
C158	S	17:22:27	17:23:29	0:01:02	23	0.6	1						
C157	N	17:26:35	17:27:45	0:01:10	23	0.6	1						
C156	S	17:31:08	17:32:45	0:01:37	23	0.6	1						
C155	N	17:35:08	17:36:52	0:01:44	23	0.6	1						
C154	S	17:39:52	17:41:28	0:01:36	17	0.7	1.3						
C153	N	17:44:31	17:46:14	0:01:43	17	0.7	1.3						
C152	S	17:49:15	17:51:22	0:02:07	17	0.7	1.3						
C151	N	17:54:10	17:56:30	0:02:20	17	0.7	1.3						
C150	S	17:59:20	18:01:42	0:02:22	17	0.7	1.3						
C149	N	18:04:15	18:06:38	0:02:23	17	0.7	1.3	GO TO PAGE #2					
C148	S	18:09:46	18:18:03	0:08:17	17	0.7	1.3						
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes		X No	
Additional Comments:											Drive #		
											162		

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name								
	6/24/2018		175		78654		92		SoCal Wildfire Block 2 B Flight 1								
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base					
Denham		N6255Q			1197.0		8:23:00			15:23:00		WOOLPERT PIN					
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID					
Scott		SH8170			1201.2		12:55			19:55		BFL					
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %		Temp	Dew Point		Pressure		Haze/Fire/Cloud		Departing	BFL			
													Arriving	BFL			
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	10300	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:		7:51:00			
		↑ Times entered are Zulu / GMT ↓										Verify S-Turns Before Mission		Yes	X	No	
27	SW	16:04:00		16:09:00		0:05:00		22	0.6	1.1							
28	NE	16:12:00		16:18:00		0:06:00		22	0.6	1.1							
29	SW	16:21:00		16:24:00		0:03:00		20	0.6	1.2							
30	NE	16:26:00		16:30:00		0:04:00		20	0.6	1.3							
31	SW	16:32:00		16:35:00		0:03:00		20	0.6	1.3							
32	NE	16:38:00		16:42:00		0:04:00		19	0.6	1.3							
33	SW	16:44:00		16:49:00		0:05:00		19	0.6	1.3							
34	NE	16:51:00		16:56:00		0:05:00		21	0.6	1.1							
35	SW	16:58:00		17:02:00		0:04:00		21	0.6	1.1							
36	NE	17:09:00		17:18:00		0:09:00		20	0.6	1.1							
37	SW	17:24:00		17:31:00		0:07:00		23	0.6	1							
38	NE	17:34:00		17:43:00		0:09:00		22	0.6	1							
39	SW	17:46:00		17:54:00		0:08:00		19	0.7	1.2							
40	NE	17:56:00		18:04:00		0:08:00		17	0.7	1.1							
41	SW	18:06:00		18:13:00		0:07:00		20	0.6	1.1							
42	NE	18:15:00		18:22:00		0:07:00		20	0.6	1.2							
43	SW	18:26:00		18:32:00		0:06:00		20	0.6	1.1							
44	NE	18:35:00		18:43:00		0:08:00		19	0.7	1.3							
45	SW	18:45:00		18:52:00		0:07:00		19	0.7	1.2							
46	NE	18:54:00		19:01:00		0:07:00		19	0.7	1.2							
47	SW	19:04:00		19:09:00		0:05:00		19	0.7	1.2							
48	NE	19:12:00		19:19:00		0:07:00		19	0.7	1.1							
49	SW	19:21:00		19:27:00		0:06:00		16	0.8	1.4							
						</											

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name			
	6/24/2018	175	78654	2	So Calif Wildfires USGS			
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base
GALAMBOS		N404CP		6697.1	8:32:00		15:32:00	CORS
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID
Gebhart		8191		6702.1	12:05		19:05	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing
calm	9	Clear		26	9	29.76		KBFL
Arriving	KBFL							
Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %	Fixed Gain	255	Mode
20	50		371		100	Gain - Course/Up	Single	Threshold Values
						Gain - Fine/Down	Multi	X
Air Speed		AGL		MSL		Waveform Used		Waveform Mode
150	Kts	5,000	Ft	7,500	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: 14:48:53
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 14:56z				Verify S-Turns Before Mission
								Yes
								X
								No
C43	NW	15:32:14	15:33:26	0:01:12	25	0.5	1	Eye Safe = Naked/block 4 Area C
C42	SE	15:37:05	15:38:51	0:01:46	25	0.5	1	
C41	NW	15:41:27	15:43:00	0:01:33	25	0.5	1	
C40	SE	15:46:33	15:48:26	0:01:53	25	0.5	1	
C39	NW	15:52:30	15:56:16	0:03:46	26	0.5	1	
C38	SE	16:00:10	16:05:01	0:04:51	22	0.6	1.2	
C37	NW	16:08:01	16:12:37	0:04:36	22	0.6	1.2	
C36	SE	16:16:37	16:21:14	0:04:37	22	0.6	1.3	
C35	NW	16:24:15	16:28:52	0:04:37	22	0.6	1.3	
C34	SE	16:33:13	16:39:19	0:06:06	22	0.6	1.3	
C33	NW	16:41:57	16:47:52	0:05:55	22	0.6	1.3	
C32	SE	16:51:20	16:57:19	0:05:59	22	0.6	1.3	
C31	NW	17:00:39	17:07:27	0:06:48	21	0.6	1.2	
C30	SE	17:11:09	17:18:03	0:06:54	21	0.6	1.2	
C29	NW	17:20:45	17:27:27	0:06:42	24	0.6	1	
C28	SE	17:30:54	17:37:45	0:06:33	24	0.6	1	
C27	NW	17:40:44	17:46:35	0:06:29	24	0.6	1	
C26	SE	17:50:34	17:56:22	0:05:48	24	0.6	1	
C25	NW	17:58:51	18:05:24	0:06:33	21	0.6	1.1	
C24	SE	18:09:14	18:15:43	0:06:29	19	0.7	1.2	
C23	NW	18:17:58	18:24:37	0:06:39	19	0.7	1.2	
C22	SE	18:27:36	18:34:01	0:06:25	20	0.7	1.3	
C21	NW	18:36:23	18:42:17	0:05:54	20	0.7	1.3	
C20	SE	18:45:28	18:50:44	0:05:16	20	0.7	1.3	
C19	NW	18:53:14	18:57:52	0:04:38	20	0.7	1.3	
C18	SE	19:00:51	19:05:20	0:04:29	20	0.7	1.3	
								approx 66 gb
		↑ Times entered are Zulu / GMT ↑		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							
	6/25/2018		176		78654		2		So Calif Wildfires USGS							
Operator		Aircraft			HOBB5 Start		Local Start Time			ZULU Start Time		Base				
GALAMBOS		N404CP			6702.1		8:51:00			15:51:00		CORS				
Pilot		Sensor Type/Number			HOBB5 END		Local End Time			Zulu End Time		PID				
Gebhart		8191			6707.5		13:05			20:05						
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	KBFL				
300 6		9	Clear		23	13	29.90				Arriving	KBFL				
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		255	Mode	Threshold Values				
40		429		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	6,500	Ft	12,500	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:		14:54:51		
		↑ Times entered are Zulu / GMT ↓		TAKEOFF: 15:02z							Verify S-Turns Before Mission		Yes	X	No	
D35	NW	15:51:31		15:56:05		0:04:34		26	0.5	1		Eye Safe = Naked/block 1 Area D				
D34	SE	15:59:21		16:04:02		0:04:41		25	0.5	1						
D33	NW	16:06:53		16:11:43		0:04:50		25	0.5	1						
D32	SE	16:14:49		16:19:32		0:04:43		25	0.5	1						
D31	NW	16:22:32		16:27:16		0:04:44		26	0.5	1						
D30	SE	16:30:19		16:34:44		0:04:25		21	0.7	1.3						
D29	NW	16:37:50		16:42:16		0:04:26		21	0.7	1.3						
D28	SE	16:44:00		16:50:27		0:06:27		21	0.7	1.3						
D27	NW	16:53:22		16:57:42		0:04:20		21	0.7	1.3						
D26	SE	17:01:06		17:05:53		0:04:47		22	0.6	1.3						
D25	NW	17:08:38		17:11:10		0:02:32		22	0.6	1.3						
D24	SE	17:17:54		17:19:08		0:01:14		22	0.6	1.3						
D23	NW	17:22:12		17:26:51		0:04:39		21	0.6	1.2						
D22	SE	17:30:43		17:36:04		0:05:21		19	0.7	1.2						
D21	NW	17:41:00		17:45:10		0:04:10		19	0.7	1.2						
D20	SE	17:47:40		17:50:19		0:03:25		19	0.7	1.2						
D19	NW	17:54:40		17:59:23		0:03:11		19	0.7	1.2						
D18	SE	18:02:18		18:05:53		0:03:35		19	0.7	1.2						
D17	NW	18:08:15		18:11:40		0:03:25		19	0.7	1.2						
D16	SE	18:14:45		18:17:56		0:03:11		19	0.7	1.2						
D15	NW	18:20:51		18:23:57		0:03:06		18	0.7	1.2						
D14	SE	18:26:46		18:30:07		0:03:21		18	0.7	1.2						
D13	NW	18:33:01		18:36:05		0:03:04		18	0.7	1.2						
D12	SE	18:38:52		18:42:10		0:03:18		18	0.7	1.2						
D11	NW	18:44:58		18:48												

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name			
	6/26/2018		177		78654		92		SoCal Wilfire Block 2B/ Block 1B			
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base		
Denham		N6255Q		1201.2		7:55:00		14:55:00		WOOLPERT PIN		
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID		
Scott		SH8170		1206.4		1:19		20:19		BFL		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL	
										Arriving	BFL	
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	10300	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:		7:27:00		
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes	X	No
50	NE	15:31:00	15:36:00	0:05:00	23	0.6	1.1	BLOCK 2 B				
51	SW	15:38:00	15:44:00	0:06:00	24	0.6	1	BLOCK 2 B				
52	NE	15:46:00	15:51:00	0:05:00	24	0.6	1.1	BLOCK 2 B				
53	SW	15:54:00	15:59:00	0:05:00	22	0.6	1.1	BLOCK 2 B				
54	NE	16:01:00	16:06:00	0:05:00	22	0.6	1.1	BLOCK 2 B				
55	SW	16:08:00	16:13:00	0:05:00	21	0.6	1.2	BLOCK 2 B				
56	NE	16:15:00	16:19:00	0:04:00	20	0.7	1.3	BLOCK 2 B				
57	SW	16:22:00	16:27:00	0:05:00	20	0.7	1.4	BLOCK 2 B				
58	NE	16:29:00	16:33:00	0:04:00	20	0.7	1.4	BLOCK 2 B				
59	SW	16:36:00	16:40:00	0:04:00	20	0.7	1.4	BLOCK 2 B				
60	NE	16:42:00	16:46:00	0:04:00	20	0.7	1.3	BLOCK 2 B				
61	SW	16:48:00	16:52:00	0:04:00	21	0.6	1.1	BLOCK 2 B				
62	NE	16:59:00	17:06:00	0:07:00	21	0.6	1.1	BLOCK 2 B				
63	SW	17:09:00	17:15:00	0:06:00	23	0.5	0.9	BLOCK 2 B				
64	NE	17:18:00	17:24:00	0:06:00	22	0.6	0.9	BLOCK 2 B				
65	SW	17:27:00	17:33:00	0:06:00	19	0.6	1	BLOCK 2 B				
66	NE	17:35:00	17:41:00	0:06:00	17	0.7	1.2	BLOCK 2 B				
67	SW	17:43:00	17:49:00	0:06:00	17	0.7	1.2	BLOCK 2 B				
149	SE	17:59:00	18:06:00	0:07:00	18	0.6	1.2	BLOCK 1 B				
150	NW	18:08:00	18:16:00	0:08:00	18	0.6	1.2	BLOCK 1 B				
151	SE	18:17:00	18:24:00	0:07:00	17	0.6	1.2	BLOCK 1 B				
152	NW	18:27:00	18:37:00	0:10:00	16	0.7	1.3	BLOCK 1 B				
153	SE	18:39:00	18:48:00	0:09:00	16	0.7	1.2	BLOCK 1 B				
154	NW	18:50:00	19:00:00	0:10:00	15	0.7	1.2	BLOCK 1 B				
155	SE	19:02:00	19:11:00	0:09:00	14	0.8	1.5	BLOCK 1 B				
156	NW	19:14:00	19:24:00	0:10:00	14	0.8	1.4	BLOCK 1 B				
157	SE	19:26:00	19:36:00	0:10:00	12	0.9	1.7	BLOCK 1 B				
158	NW	19:38:00	19:49:00	0:11:00	13	0.8	1.3	BLOCK 1 B				
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X	No
Additional Comments:											Drive #	
BLOCK 2 B. BLOCK 1 B.												

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name				
	6/26/2018		177		78654		2		So Calif Wildfires USGS				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base			
GALAMBOS		N404CP		6707.5		14:11:00		21:11:00		CORS			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID			
Gebhart		8191		6713.4		19:03		2:03					
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure	
var 5		10+		Clear				32		14		29.88	
Haze/Fire/Cloud		Departing		KBFL		Arriving		KBFL					
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		255		Mode	
20		50		371		100		Gain - Course/Up		Single		A	
Gain - Fine/Down		Multi		X		B							
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.			
130		Kts		5,000		Ft		7,600		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: 20:30:30					
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 15:02z				Verify S-Turns Before Mission		Yes		X No	
C128	SE	21:11:27	21:17:35	0:06:08	15	0.7	1.2	Eye Safe = Naked/block 4 Area C					
C127	NW	21:21:06	21:27:34	0:06:28	15	0.7	1.2						
C126	SE	21:30:54	21:37:34	0:06:40	15	0.7	1.2						
C125	NW	21:41:00	21:47:38	0:06:38	15	0.7	1.2						
C124	SE	21:50:19	21:57:04	0:06:45	15	0.7	1.2						
C123	NW	22:00:09	22:07:04	0:06:55	15	0.7	1.2						
C122	SE	22:09:52	22:16:45	0:06:53	15	0.7	1.2						
C121	NW	22:19:57	22:26:49	0:06:52	15	0.7	1.2						
C120	SE	22:29:34	22:36:14	0:06:40	16	0.7	1.4						
C119	NE	22:38:46	22:45:15	0:06:29	16	0.7	1.4						
C118	SE	22:48:09	22:54:47	0:06:38	16	0.7	1.4						
C117	NW	22:58:18	23:05:04	0:06:46	16	0.7	1.4						
C116	SE	23:07:53	23:14:06	0:06:13	16	0.7	1.4						
C115	NW	23:17:05	23:23:35	0:06:30	16	0.7	1.4						
C114	SE	23:26:30	23:32:46	0:06:16	21	0.6	1.1						
C113	NW	23:35:33	23:42:10	0:05:59	21	0.6	1.1						
C112	SE	23:44:51	23:23:54	0:06:42	21	0.6	1.1						
C111	NW	23:54:07	0:00:10	0:06:03	21	0.6	1.1						
C110	SE	0:02:41	0:08:40	0:05:59	21	0.6	1.1						
C109	NW	0:11:38	0:18:20	0:06:42	21	0.6	1.1						
C108	SE	0:21:05	0:27:09	0:06:04	21	0.6	1.1						
C107	NW	0:30:08	0:36:30	0:06:22	21	0.6	1.1						
C106	SE	0:39:02	0:45:27	0:06:25	21	0.6	1.1						
C105	NW	0:48:29	0:54:43	0:06:14	21	0.6	1.1						
C104	SE	0:57:07	0:02:47	0:05:40	15	0.8	1.6						
C103	NW	1:05:48	1:12:18	0:06:30	15	0.8	1.6						
C102	SE	1:14:58	1:21:19	0:06:21	15	0.8	1.6						
C101	NW	1:23:30	1:29:18	0:05:48	15	0.8	1.6						
C100	SE	1:31:47	1:37:36	0:05:49	15	0.8	1.6						
C99	NW	1:40:10	1:46:00	0:05:50	15	0.8	1.6	Go to Page #2					
C98	SE	1:48:16	1:54:12	0:05:56									
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes		X No	
Additional Comments:											Drive #		
											162		

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name								
	6/27/2018		178		78654		92		SoCal Wildfire Block 1 B								
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base					
Denham		N6255Q			1206.4		11:22:00			18:22:00		WOOLPERT PIN					
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID					
Scott		SH8170			1210.7		4:01			23:01		BFL					
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %		Temp	Dew Point		Pressure		Haze/Fire/Cloud		Departing	BFL			
													Arriving	BFL			
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		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:		10:37:00			
		↑ Times entered are Zulu / GMT ↓										Verify S-Turns Before Mission		Yes	X	No	
159	SE	18:53:00		19:03:00		0:10:00		16	0.8	1.5							
160	NW	19:06:00		19:17:00		0:11:00		16	0.8	1.4							
161	SE	19:19:00		19:30:00		0:11:00		13	0.9	1.6							
162	NW	19:33:00		19:44:00		0:11:00		15	0.9	1.6							
163	SE	19:47:00		19:57:00		0:10:00		15	0.9	1.7							
164	NW	20:00:00		20:10:00		0:10:00		16	1	1.7							
165	SE	20:13:00		20:22:00		0:09:00		16	0.8	1.3							
166	NW	20:13:00		20:32:00		0:19:00		18	0.8	1.4							
167	SE	20:37:00		20:44:00		0:07:00		18	0.7	1.1							
168	NW	20:47:00		20:53:00		0:06:00		19	0.7	1.2							
169	SE	20:55:00		21:01:00		0:06:00		18	0.7	1.2							
170	NW	21:03:00		21:09:00		0:06:00		18	0.7	1.3							
171	SE	21:14:00		21:16:00		0:02:00		19	0.7	1.2							
172	NW	21:20:00		21:23:00		0:03:00		20	0.6	1.1							
173	SE	21:25:00		21:28:00		0:03:00		20	0.6	1.2							
174	NW	21:30:00		21:32:00		0:02:00		20	0.6	1.2							
175	SE	21:35:00		21:39:00		0:04:00		19	0.6	1.2							
176	NW	21:41:00		21:45:00		0:04:00		19	0.7	1.3							
177	SE	21:48:00		21:51:00		0:03:00		20	0.6	1.2							
178	NW	21:54:00		21:55:00		0:01:00		19	0.7	1.2							
179	SE	21:58:00		21:59:00		0:01:00		20	0.7	1.2							
180	NW	22:01:00		22:03:00		0:02:00		19	0.7	1.2							
181	SE	22:05:00		22:07:00		0:02:00		19	0.7	1.2							
182	NW	22:10:00		22:12:00		0:02:00		19	0.7	1.3							
183	SE	22:15:00		22:16:00		0:01:00		19	0.7								

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name			
		6/26/2018	177	78654	2	So Calif Wildfires USGS			
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base	
GALAMBOS		N404CP		6713.4	13:49:00		20:49:00	CORS	
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID	
Gebhart		8191		6719.7	19:05		2:05		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KBFL
260 7	10+	Clear		34	8	29.86		Arriving	KBFL
Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %	Fixed Gain	255	Mode	Threshold Values
20	50		371		100	Gain - Course/Up		Single	A
						Gain - Fine/Down		Multi	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode	
130	Kts	5,000	Ft	7,600	Ft	Yes	No	X	@ NS
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:	20:13:30
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 20:19z				Verify S-Turns Before Mission	Yes X No
C96	SE	20:49:58	20:56:18	0:06:20	17	0.7	1.2	Eye Safe = Naked/block 4 Area C	
C95	NW	20:59:55	21:06:15	0:06:20	17	0.7	1.2		
C94	SE	21:08:53	21:15:09	0:06:16	17	0.7	1.2		
C93	NW	21:18:46	21:24:05	0:05:19	17	0.7	1.2		
C92	SE	21:27:43	21:34:26	0:06:43	17	0.7	1.2		
C91	NW	21:37:30	21:44:01	0:06:31	17	0.8	1.4		
C90	SE	21:46:54	21:53:40	0:06:46	17	0.8	1.4		
C89	NW	21:56:53	22:03:37	0:06:44	18	0.7	1.2		
C88	SE	22:06:17	22:13:09	0:06:52	18	0.7	1.2		
C87	NW	22:16:05	22:22:46	0:06:41	18	0.7	1.2		
C86	SE	22:25:24	22:32:30	0:07:06	18	0.7	1.2		
C85	NW	22:35:34	22:41:54	0:06:20	16	0.7	1.4		
C84	SE	22:44:45	22:51:34	0:06:49	16	0.8	1.5		
C83	NW	22:54:32	23:01:12	0:06:40	16	0.8	1.5		
C82	SE	23:03:52	23:10:49	0:06:57	16	0.8	1.5		
C81	NW	23:13:25	23:19:40	0:06:52	16	0.8	1.5		
C80	SE	23:22:20	23:28:33	0:06:17	20	0.6	1.1		
C79	NW	23:31:27	23:37:38	0:06:11	20	0.6	1.1		
C78	SE	23:40:39	23:47:31	0:06:52	20	0.6	1.1		
C77	NW	23:50:30	23:56:47	0:06:17	21	0.6	1.1		
C76	SE	23:59:39	0:06:09	0:06:30	21	0.6	1.1		
C75	NW	0:10:00	0:16:18	0:06:18	21	0.6	1.1		
C74	SE	0:19:00	0:25:24	0:06:24	21	0.6	1.1		
C73	NW	0:28:35	0:35:02	0:06:27	21	0.6	1.1		
C72	SE	0:37:42	0:44:03	0:06:21	15	0.8	1.6		
C71	NW	0:47:02	0:53:36	0:06:34	19	0.6	1.1		
C70	SE	0:56:25	1:02:57	0:06:32	19	0.6	1.1		
C69	NW	1:05:52	1:11:54	0:06:02	19	0.6	1.1		
C68	SE	1:14:32	1:21:13	0:06:41	19	0.6	1.1		
C67	NW	1:24:01	1:30:35	0:06:34	19	0.6	1.1	Go to Page #2	
C66	SE	1:33:02	1:39:00	0:05:58	19	0.6	1.1		
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission	Yes X No
Additional Comments:									Drive #
									162

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name				
	6/27/2018		179		78654		2		So Calif Wildfires USGS				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base			
GALAMBOS		N404CP		6719.7		11:31:00		18:31:00		CORS			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID			
Gebhart		8191		6726		16:48		23:48					
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure	
290 8		10+		Clear				81f		45f		29.90	
Haze/Fire/Cloud		Departing		KBFL		Arriving		KBFL					
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		255		Mode	
20		50		371		100		Gain - Course/Up		Single		A	
Gain - Fine/Down		Multi		X		B							
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.			
130		Kts		5,000		Ft		7,600		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: 17:55:07					
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 18:01z				Verify S-Turns Before Mission		Yes		X No	
C62	SE	18:31:51	18:37:45	0:05:54	17	0.7	1.2	Eye Safe = Naked/block 4 Area C					
C61	NW	18:41:12	18:47:25	0:06:13	17	0.7	1.2						
C60	SE	18:50:05	18:55:16	0:05:11	16	0.8	1.6						
C59	NW	18:59:30	19:04:46	0:05:16	16	0.8	1.6						
C58	SE	19:07:36	19:12:35	0:04:59	16	0.8	1.6						
C57	NW	19:15:51	19:21:32	0:05:41	16	0.8	1.6						
C56	SE	19:23:58	19:28:53	0:04:55	16	0.8	1.6						
C55	NW	19:32:12	19:38:10	0:05:58	18	0.7	1.2						
C54	SE	19:40:50	19:46:48	0:05:58	18	0.7	1.2						
C53	NW	19:49:41	19:55:52	0:06:11	18	0.7	1.2						
C52	SE	19:58:33	20:04:24	0:05:51	18	0.7	1.2						
C51	NW	20:07:22	20:13:20	0:05:58	16	0.7	1.4						
C50	SE	20:15:54	20:21:44	0:05:50	16	0.8	1.5						
C49	NW	20:24:29	20:30:23	0:05:54	16	0.8	1.5						
C48	SE	20:33:22	20:39:03	0:05:41	16	0.8	1.5						
C47	NW	20:42:24	20:48:21	0:05:57	16	0.8	1.5						
C46	SE	20:51:17	20:56:50	0:01:42	21	0.7	1.3						
C45	NW	20:59:50	21:05:58	0:06:08	21	0.7	1.3						
C44	SE	21:09:18	21:15:15	0:05:57	21	0.7	1.3						
C17	W	21:20:11	21:21:53	0:01:42	22	0.7	1.3						
C16	E	21:24:41	21:26:53	0:02:12	22	0.7	1.3						
C15	W	21:29:55	21:33:35	0:03:40	22	0.7	1.3						
C14	E	21:36:29	21:40:10	0:03:41	22	0.7	1.3						
C13	W	21:44:01	21:49:24	0:05:23	21	0.6	1.1						
C12	E	21:52:26	21:57:32	0:05:06	21	0.6	1.1						
C11	W	22:00:18	22:05:58	0:05:40	21	0.6	1.1						
C10	E	22:08:44	22:13:52	0:05:08	21	0.6	1.1						
C9	W	22:16:55	22:22:32	0:05:37	21	0.6	1.1						
C8	E	22:25:20	22:30:14	0:04:54	19	0.7	1.3						
C7	W	22:32:47	22:37:29	0:04:42	19	0.7	1.3	Go to Page #2					
C6	E	22:40:19	22:44:45	0:04:26	19	0.7	1.3						
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes		X No	
Additional Comments:											Drive #		
											162		

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name									
		6/29/2018	180	78654	2	SoCal Wildfire Lidar Block 2 A									
Operator		Aircraft		HOBBS Start	Local Start Time			ZULU Start Time		Base					
Kennedy		6255Q		1210.7	10:11:00			17:11:00		WOOLPERT PIN					
Pilot		Sensor Type/Number		HOBBS END	Local End Time			Zulu End Time		PID					
LaRocque		8170		1213.8	13:16			20:15		BFL					
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL				
290/5			CL	27	11	29.88				Arriving	BFL				
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	X	Mode	Threshold Values				
40		43		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	10300	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	
68	N	17:34:00	17:40:00	0:06:00	17	0.7	1.2								
69	S	17:43:00	17:49:00	0:06:00	19	0.7	1.2								
70	N	17:52:00	17:59:00	0:07:00	19	0.7	1.2								
71	S	18:02:00	18:10:00	0:08:00	19	0.7	1.3								
72	N	18:14:00	18:21:00	0:07:00	16	0.7	1.3								
73	S	18:24:00	18:32:00	0:08:00	16	0.7	1.3								
74	N	18:35:00	18:43:00	0:08:00	15	0.7	1.3								
75	S	18:46:00	18:52:00	0:06:00	15	0.8	1.5								
76	N	18:56:00	19:02:00	0:06:00	15	0.8	1.5								
77	S	19:04:00	19:10:00	0:06:00	14	0.8	1.5								
78	N	19:14:00	19:18:00	0:04:00	13	0.9	1.7								
79	S	19:22:00	19:25:00	0:03:00	14	0.8	1.4								
80	N	19:28:00	19:31:00	0:03:00	14	0.8	1.4								
81	S	19:34:00	19:36:00	0:02:00	14	0.8	1.4								
82	N	19:39:00	19:41:00	0:02:00	14	0.8	1.4								
83	S	19:44:00	19:46:00	0:02:00	14	0.8	1.3								
		↑ Times entered are Zulu / GMT ↑		Page			1		Verify S-Turns After Mission		Yes	X	No		
Additional Comments:												Drive #			

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
		7/2/2018	183	78654	2	SoCal Wildfire Lidar Block 2 A/B/C				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time	Base	
Kennedy		6255Q		1227.7		9:07:00		16:07:00	WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time	PID	
LaRocque		8170		1232.6		14:03		21:03	BFL	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	BFL
320/5			CL	27	12	29.89			Arriving	BFL
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	X	Mode
40		43		272		100		Gain - Course/Up	Single	Threshold Values
								Gain - Fine/Down	Multi	A
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts	6500	Ft	8300	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: 8:30:00		
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes X No
A142	S	16:45:00			23	0.6	1	Aborted, restricted area went hot		
B84	N	17:15:00	17:16:00	0:01:00	18	0.7	1.2			
C46	S	17:30:00	17:31:00	0:01:00	19	0.6	1.1			
45	N	17:34:00	17:35:00	0:01:00	19	0.6	1.1			
44	S	17:39:00	17:41:00	0:02:00	19	0.6	1.2			
43	N	17:44:00	17:46:00	0:02:00	19	0.6	1.2			
42	S	17:50:00	17:52:00	0:02:00	19	0.6	1.2			
41	N	17:55:00	17:59:00	0:04:00	18	0.6	1.1			
40	S	18:03:00	18:07:00	0:04:00	16	0.7	1.3			
39	N	18:11:00	18:15:00	0:04:00	16	0.7	1.2			
38	S	18:19:00	18:23:00	0:04:00	17	0.7	1.1			
37	N	18:26:00	18:30:00	0:04:00	16	0.7	1.2			
36	S	18:34:00	18:37:00	0:03:00	16	0.7	1.2			
35	N	18:41:00	18:43:00	0:02:00	16	0.7	1.1			
34	S	18:47:00	18:49:00	0:02:00	16	0.7	1.4			
33	N	18:53:00	18:55:00	0:02:00	15	0.8	1.4			
32	S	18:58:00	19:00:00	0:02:00	14	0.8	1.6			
31	N	19:03:00	19:05:00	0:02:00	14	0.8	1.6			
30	S	19:08:00	19:09:00	0:01:00	14	0.8	1.6			
29	N	19:16:00	19:17:00	0:01:00	15	0.8	1.3			
28	S	19:20:00	19:21:00	0:01:00	15	0.8	1.3			
27	N	19:24:00	19:26:00	0:02:00	15	0.8	1.3			
26	S	19:29:00	19:31:00	0:02:00	14	0.8	1.4			
25	N	19:35:00	19:37:00	0:02:00	15	0.8	1.2			
24	S	19:41:00	19:43:00	0:02:00	14	0.8	1.5			
23	N	19:47:00	19:49:00	0:02:00	16	0.7	1.2			
22	S	19:53:00	19:55:00	0:02:00	16	0.7	1.2			
21	N	20:00:00	20:03:00	0:03:00	17	0.7	1.2			
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes X No
Additional Comments:									Drive #	

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name					
		7/5/2018	186	78654	2	SoCal Wildfire Lidar Block 4 A					
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time	Base		
Kennedy		6255Q		1239.6		11:42:00		18:42:00	WOOLPERT PIN		
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time	PID		
Finn		8170		1244.2		16:08		23:07	BFL		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	BFL	
VAR/6	10		CL	27	13	30.09			Arriving	BFL	
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	X	Mode	
20		50		371		100		Gain - Course/Up	Single	Threshold Values	
								Gain - Fine/Down	Multi	A	
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
130		##	5000	Ft	5000	Ft	Yes	No	@	NS	
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: 11:10:00			
		↑ Times entered are Zulu / GMT ↓					Verify 5-Turns Before Mission		Yes	X	
315	W	19:19:00	19:20:00	0:01:00	16	0.8	1.3				
314	E	19:24:00	19:25:00	0:01:00	15	1	1.7				
313	W	19:28:00	19:29:00	0:01:00	15	1	1.6				
312	E	19:33:00	19:35:00	0:02:00	16	1	1.6				
311	W	19:38:00	19:40:00	0:02:00	16	0.8	1.3				
310	E	19:43:00	19:45:00	0:02:00	16	0.8	1.3				
309	W	19:49:00	19:51:00	0:02:00	17	0.8	1.3				
308	E	19:55:00	19:57:00	0:02:00	19	0.7	1.1				
307	W	20:01:00	20:06:00	0:05:00	19	0.7	1.1				
306	E	20:09:00	20:14:00	0:05:00	20	0.7	1.2				
305	W	20:18:00	20:23:00	0:05:00	19	0.7	1.2				
304	E	20:26:00	20:31:00	0:05:00	19	0.7	1.2				
303	W	20:35:00	20:40:00	0:05:00	19	0.7	1.2				
302	E	20:43:00	20:48:00	0:05:00	20	0.7	1.2				
301	W	20:52:00	20:57:00	0:05:00	21	0.7	1.2				
300	E	21:00:00	21:05:00	0:05:00	21	0.7	1.2				
299	W	21:09:00	21:14:00	0:05:00	22	0.7	1.3				
298	E	21:17:00	21:22:00	0:05:00	22	0.7	1.2				
297	W	21:25:00	21:31:00	0:06:00	22	0.7	1.2				
296	E	21:34:00	21:39:00	0:05:00	20	0.7	1.2				
295	W	21:43:00	21:48:00	0:05:00	21	0.7	1.2				
294	E	21:51:00	21:57:00	0:06:00	19	0.7	1.4				
293	W	22:00:00	22:05:00	0:05:00	19	0.7	1.4				
292	E	22:08:00	22:22:00	0:14:00	19	0.7	1.4	Diverted off line for traffic			
291	W	22:25:00	22:30:00	0:05:00	20	0.7	1.4				
290	E	22:33:00	22:38:00	0:05:00	19	0.7	1.4				
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify 5-Turns After Mission		Yes	X
Additional Comments:									Drive #		
Use 404CP Base file and log. Ours shut off early.											

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
	7/5/2018	186	78654	2	So Calif Wildfires USGS				
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base	
GALAMBOS		N404CP		6736.4	12:14:00		19:14:00	CORS	
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID	
Loroque		8191		6741.6	16:17		23:17		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	KBFL
Var 6	10+	Clear		27	13	30.09		Arriving	KBFL
Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)	Laser Power %		Fixed Gain	255	Mode	Threshold Values
20	50		371	100		Gain - Course/Up		Single	A
						Gain - Fine/Down		Multi	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode	
130	Kts	5,000	Ft	6,200	Ft	Yes	No	X	@ NS
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: 18:31:26	
		↓ Times entered are Zulu / GMT ↓		TAKEOFF: 1839Z				Verify S-Turns Before Mission	
								Yes	X No
B38	W	19:14:47	19:18:00	0:03:13	16	0.9	1.5	Eye Safe = Naked/block 4 Area B	
B37	E	19:21:02	19:24:10	0:03:08	16	0.9	1.5		
B36	W	19:27:23	19:30:44	0:03:21	16	0.9	1.5		
B35	E	19:33:44	19:37:44	0:04:00	16	0.8	1.3		
B34	W	19:43:05	19:43:38	0:00:33	16	0.8	1.3		
B33	E	19:46:43	19:50:18	0:03:35	16	0.8	1.6		
B32	W	19:53:21	19:56:45	0:03:24	18	0.7	1.2		
B31	E	19:59:38	20:03:00	0:03:22	18	0.7	1.2		
B30	W	20:05:50	20:09:22	0:03:32	18	0.7	1.2		
B29	E	20:12:22	20:15:56	0:03:34	18	0.7	1.2		
B28	W	20:19:04	20:23:05	0:04:01	18	0.7	1.2		
B27	E	20:26:08	20:30:30	0:04:22	16	0.7	1.4		
B26	W	20:33:15	20:37:43	0:04:28	16	0.8	1.5		
B25	E	20:40:40	20:44:38	0:03:58	16	0.8	1.5		
B24	W	20:47:33	20:51:01	0:03:28	16	0.8	1.5		
B23	E	20:53:59	20:57:11	0:01:06	21	0.6	1.2		
B22	W	21:00:02	21:02:53	0:01:00	21	0.6	1.2		
B43	E	21:06:04	21:07:02	0:00:58	22	0.6	1.2		
B44	E	21:13:14	21:14:20	0:01:06	22	0.6	1.2		
B45	W	21:17:15	21:18:15	0:01:00	22	0.7	1.3		
B46	E	21:21:15	21:22:14	0:00:59	22	0.7	1.3		
B47	W	21:25:06	21:27:57	0:02:51	22	0.7	1.3		
B48	E	21:31:02	21:34:32	0:03:30	20	0.7	1.3		
B49	W	21:37:15	21:41:02	0:03:47	20	0.7	1.3		
B50	E	21:44:07	21:47:49	0:03:42	20	0.7	1.3		
B51	W	21:50:45	21:54:54	0:04:09	20	0.7	1.3		
B52	E	21:58:12	22:02:49	0:04:37	20	0.7	1.3		
B53	W	22:05:11	22:10:02	0:04:51	21	0.6	1.1		
B54	E	22:13:16	22:17:32	0:04:16	19	0.7	1.3		
B55	W	22:20:23	22:20:23	0:00:00	19	0.7	1.3	Go to Page #2	
B56	E	22:27:45	22:30:10	0:02:25	19	0.7	1.3		
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission	
								Yes	X No
Additional Comments:								Drive #	
								162	

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name				
	7/6/2018		187		78654		2		So Calif Wildfires USGS				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base			
GALAMBOS		N404CP		6741.6		8:32:00		15:32:00		CORS			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID			
Loroque		8191		6747.2		13:01		20:01					
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure	
130 6		10+		Clear				23		11		30.11	
Haze/Fire/Cloud		Departing		KBFL		Arriving		KBFL					
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		255		Mode	
20		50		371		100		Gain - Course/Up		Single		A	
Gain - Fine/Down		Multi		X		B							
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.			
130		Kts		5,000		Ft		6,200		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: 14:50:45					
		↑ Times entered are Zulu / GMT ↓		TAKEOFF: 1456Z				Verify S-Turns Before Mission		Yes		X No	
B65	W	15:32:51	15:34:45	0:01:54	21	0.6	1.3	Eye Safe = Naked/block 4 Area B					
B66	E	15:37:37	15:39:30	0:01:53	21	0.6	1.3						
B67	S	15:42:57	15:43:40	0:00:43	21	0.6	1.3						
B68	N	15:46:33	15:47:20	0:00:47	21	0.6	1.3						
B69	S	15:50:29	15:51:19	0:00:50	21	0.6	1.3						
B70	N	15:54:00	15:54:50	0:00:50	21	0.6	1.3						
B71	S	15:57:44	15:58:30	0:00:46	22	0.6	1.1						
B72	NW	16:01:18	16:02:03	0:00:45	22	0.6	1.1						
B81	NE	16:05:16	16:08:00	0:02:44	22	0.6	1.1						
B82	SW	16:10:51	16:13:52	0:03:01	22	0.6	1.1						
B83	NE	16:16:50	16:20:06	0:03:16	22	0.6	1.1						
B84	SW	16:23:21	16:26:18	0:02:57	22	0.6	1.1						
B85	NE	16:29:10	16:32:08	0:02:58	22	0.6	1.1						
B86	SW	16:35:25	16:38:56	0:03:31	22	0.6	1						
B87	NE	16:41:58	16:45:39	0:03:41	22	0.6	1						
B88	SW	16:48:25	16:51:50	0:03:38	22	0.6	1						
B89	NE	16:54:49	16:59:30	0:03:14	20	0.6	1.1						
B90	SW	17:01:18	17:04:50	0:03:32	20	0.6	1.1						
B91	NE	17:07:45	17:11:23	0:03:38	20	0.6	1.1						
B92	SW	17:14:03	17:17:17	0:03:14	20	0.6	1.1						
B93	NE	17:20:24	17:23:49	0:03:25	20	0.6	1.1						
B94	SW	17:26:39	17:29:37	0:02:58	20	0.6	1.1						
B95	NE	17:32:28	17:35:27	0:02:59	19	0.6	1.2						
B96	SW	17:38:19	17:40:48	0:02:29	19	0.6	1.2						
B97	NE	17:43:44	17:46:24	0:02:40	19	0.6	1.2						
B98	SW	17:49:07	17:50:24	0:01:17	19	0.6	1.2						
B99	NW	17:53:40	18:00:22	0:06:42	17	0.7	1.3						
B100	SE	18:03:06	18:09:35	0:06:29	17	0.7	1.3						
B101	NW	18:12:26	18:19:01	0:06:35	17	0.7	1.3						
B102	SE	18:22:01	18:28:40	0:06:39	15	0.8	1.4	Go to Page #2					
B103	NW	18:31:28	18:38:22	0:06:54	15	0.8	1.4						
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes		X No	
Additional Comments:											Drive #		
											162		

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
		7/7/2018	188	78654	2	SoCal Wildfire Lidar Block 4 A				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time	Base	
Kennedy		6255Q		1244.2		7:58:00		14:58:00	WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time	PID	
Finn		8170		1249.2		12:57		19:57	BFL	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	BFL
90/3	10		CL	21	17	29.81			Arriving	BFL
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	X	Mode
20		50		371		99		Gain - Course/Up	Single	Threshold Values
								Gain - Fine/Down	Multi	A
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
130	##	5000	Ft	5000	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:		7:30:00
		↑ Times entered are Zulu / GMT ↓						Verify 5-Turns Before Mission		Yes X No
289	W	15:41:00	15:46:00	0:05:00	19	0.6	1.3			
288	E	15:49:00	15:54:00	0:05:00	19	0.6	1.2			
287	W	15:57:00	16:02:00	0:05:00	19	0.6	1.2			
286	E	16:05:00	16:10:00	0:05:00	20	0.6	1.1			
285	N	16:16:00	16:20:00	0:04:00	19	0.6	1.1			
284	S	16:23:00	16:27:00	0:04:00	22	0.6	1			
283	N	16:30:00	16:35:00	0:05:00	21	0.6	1.1			
282	S	16:38:00	16:43:00	0:05:00	22	0.6	1			
281	N	16:45:00	16:50:00	0:05:00	22	0.6	1			
280	S	16:53:00	16:57:00	0:04:00	19	0.6	1.2			
279	N	17:00:00	17:04:00	0:04:00	17	0.7	1.2			
278	S	17:07:00	17:17:00	0:10:00	19	0.7	1.2	Diverted off line for traffic		
277	N	17:20:00	17:25:00	0:05:00	19	0.7	1.2			
276	S	17:28:00	17:32:00	0:04:00	19	0.7	1.2			
275	N	17:35:00	17:40:00	0:05:00	18	0.7	1.3			
274	S	17:43:00	17:47:00	0:04:00	18	0.7	1.3			
273	N	17:50:00	17:55:00	0:05:00	16	0.7	1.4			
272	S	17:58:00	18:02:00	0:04:00	18	0.7	1.2			
271	N	18:05:00	18:10:00	0:05:00	16	0.7	1.3			
270	S	18:14:00	18:18:00	0:04:00	17	0.7	1.2			
269	N	18:21:00	18:26:00	0:05:00	16	0.8	1.5			
268	S	18:28:00	18:33:00	0:05:00	16	0.8	1.5			
267	N	18:36:00	18:41:00	0:05:00	15	0.8	1.5			
266	S	18:44:00	18:49:00	0:05:00	14	0.9	1.7			
265	N	18:52:00	18:58:00	0:06:00	15	0.8	1.4			
264	S	19:00:00	19:05:00	0:05:00	15	0.8	1.4			
263	N	19:08:00	19:14:00	0:06:00	16	0.8	1.5			
262	S	19:17:00	19:23:00	0:06:00	15	1.2	1.8			
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify 5-Turns After Mission		Yes X No
Additional Comments:										Drive #
Use 404CP Base file and log. Ours shut off early.										

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name							
	7/7/2018		188		78654		2		So Calif Wildfires USGS							
Operator		Aircraft			HOBB5 Start		Local Start Time			ZULU Start Time		Base				
GALAMBOS		N404CP			6747.2		8:11:00			15:11:00		CORS				
Pilot		Sensor Type/Number			HOBB5 END		Local End Time			Zulu End Time		PID				
Loroque		8191			6752.9		12:49			19:49						
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %		Temp	Dew Point		Pressure		Haze/Fire/Cloud		Departing	KBFL		
130 6		10+	Clear			23	11		30.11				Arriving	KBFL		
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %			Fixed Gain		255	Mode		Threshold Values		
20		50		371		100			Gain - Course/Up			Single		A		
									Gain - Fine/Down			Multi	X	B		
Air Speed		AGL		MSL		Waveform Used			Waveform Mode			Pre-Trigger Dist.				
130		Kts	5,000	Ft	6,200	Ft	Yes		20	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:		14:28:42		
		↑ Times entered are Zulu / GMT ↓		TAKEOFF: 1438Z							Verify S-Turns Before Mission		Yes	X	No	
B112	SE	15:11:37		15:19:27		0:07:50		21	0.6	1.1		Eye Safe = Binoculars--shutter closed				
B112	NW	15:22:24		15:30:22		0:07:58		19	0.6	1.3		Eye Safe = Naked/block 4 Area B				
B113	SE	15:33:26		15:41:18		0:07:52		21	0.6	1.3						
B114	NW	15:44:13		15:52:39		0:08:26		21	0.6	1.3						
B115	SE	15:55:36		16:04:08		0:08:32		21	0.6	1.3						
B116	NW	16:07:08		16:15:37		0:08:29		21	0.6	1.3						
B117	SE	16:18:37		16:27:07		0:08:30		22	0.6	1.1						
B118	NW	16:29:52		16:38:50		0:08:58		22	0.6	1.1						
B119	SE	16:41:47		16:51:04		0:09:17		22	0.6	1.1						
B120	NW	16:53:51		17:02:51		0:09:00		22	0.6	1.1						
B121	SE	17:05:47		17:14:54		0:09:07		22	0.6	1.1						
B122	NW	17:17:47		17:26:48		0:09:01		18	0.7	1.3						
B123	SE	17:29:27		17:39:32		0:10:05		18	0.7	1.3						
B124	NW	17:41:41		17:50:55		0:09:14		18	0.7	1.3						
B125	SE	17:53:51		18:03:10		0:09:19		15	0.8	1.4						
B126	NW	18:06:00		18:15:00		0:09:17		15	0.8	1.4						
B127	SE	18:17:51		18:27:00		0:08:49		15	0.8	1.4						
B128	NW	18:29:52		18:38:00		0:08:08		15	0.8	1.4						
B129	SE	18:41:47		18:51:04		0:09:17		15	0.8	1.4						
B130	NW	18:54:05		19:02:54		0:08:49		20	0.6	1.1						
B131	SE	19:05:46		19:14:44		0:08:58		15	1.2	1.9						
B132	NW	19:17:40		19:26:28		0:08:48		15	1.2	1.9						
B133	SE	19:29:42		19:38:05		0:08:23		15	1.2	1.9						
B134	NW	19:40:58		19:49:09		0:08:11		16	0.8							

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name								
	7/8/2018		189		78654		2		So Calif Wildfires USGS								
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base					
GALAMBOS		N404CP			6752.9		7:45:00			14:45:00		CORS					
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID					
Loroque		8191			6758.2		12:01			19:01							
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Haze/Fire/Cloud		Departing		KBFL	
160 4		10+		Clear				26		14		29.94		Arriving		KBFL	
Scan Angle (FOV)		Scan Frequency (Hz)			Pulse Rate (kHz)		Laser Power %			Fixed Gain		Mode		Threshold Values			
20		50			371		100			Gain - Course/Up		Single		A			
										Gain - Fine/Down		Multi		X		B	
Air Speed		AGL			MSL		Waveform Used			Waveform Mode				Pre-Trigger Dist.			
130		Kts	5,000		Ft	6,200		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:		14:09:55			
		↑ Times entered are Zulu / GMT ↓				TAKEOFF: 1416Z						Verify S-Turns Before Mission		Yes	X	No	
135	SE	14:45:35	14:54:07	0:08:32		21	0.6	1.1		Eye Safe = Naked/block 4 Area B							
136	NW	14:56:32	15:04:57	0:08:25		21	0.6	1.1									
137	SE	15:07:52	15:16:12	0:08:20		21	0.6	1.1									
138	NW	15:18:45	15:27:26	0:08:41		19	0.6	1.3									
139	SE	15:30:23	15:39:15	0:08:52		19	0.6	1.3									
140	NW	15:41:52	15:50:26	0:08:34		19	0.6	1.3									
141	SE	15:53:21	16:02:05	0:08:44		21	0.6	1.1									
142	NW	16:04:49	16:13:39	0:08:50		20	0.6	1.1									
143	SE	16:17:33	16:25:20	0:07:47		22	0.6	1.1									
144	NW	16:28:05	16:36:28	0:08:23		22	0.6	1.1									
145	SE	16:39:34	16:48:28	0:08:54		22	0.6	1.1									
146	NW	16:51:02	16:59:42	0:08:40		18	0.7	1.2									
147	SE	17:03:40	17:10:06	0:06:26		20	0.6	1.1									
148	NW	17:13:04	17:21:20	0:08:16		20	0.6	1									
149	SE	17:23:20	17:27:10	0:03:50		20	0.6	1		ATC HOLD / Man Stop							
149	SE	17:34:05	17:40:41	0:06:22		20	0.6	1		RESUME REFLIGHT							
150	NW	17:43:17	17:49:20	0:06:26		20	0.6	1.1									
151	SE	17:52:02	17:58:24	0:06:22		20	0.6	1.1									
152	NW	18:00:51	18:07:13	0:06:22		18	0.8	1.5									
153	SE	18:09:58	18:16:24	0:06:26		18	0.8	1.5									
154	NW	18:19:01	18:25:13	0:06:12		18	0.8	1.5									
155	SE	18:28:02	18:34:18	0:06:16		18	0.8	1.5									
156	NW	18:37:05	18:43:11	0:06:06		18	0.8	1.5									
157	SE	18:46:06	18:52:11	0:06:05		15	0.9	1.5									
158	NW	18:54:52	19:00:52	0:06:00		15	0.9	1.5									
		↑ Times entered are Zulu / GMT ↑				Page			1		Verify S-Turns After Mission		Yes	X	No		
Additional Comments:																Drive #	
																162	

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
		7/10/2018	191	78654	2	SoCal Wildfire Lidar Block 4 A				
Operator		Aircraft		HOBS Start		Local Start Time		ZULU Start Time	Base	
Kennedy		6255Q		1250.1		8:21:00		15:21:00	WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBS END		Local End Time		Zulu End Time	PID	
Finn		8170				13:31		20:31	BFL	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	BFL
VAR/4	10		CL	31	4	29.99			Arriving	BFL
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	X	Mode
20		50		371		99		Gain - Course/Up	Single	Threshold Values
								Gain - Fine/Down	Multi	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
130		##	5000	Ft	5000	Ft	Yes	No	@	NS
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:		8:00:00
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes X No
259	S	16:25:00	16:30:00	0:05:00	22	0.6	1	Clouds on south end		
260	N	16:33:00	16:39:00	0:06:00	21	0.6	1	Clouds on south end		
1	S	17:00:00	17:01:00	0:01:00	19	0.6	1.1			
2	N	17:04:00	17:06:00	0:02:00	19	0.6	1.2			
3	S	17:09:00	17:11:00	0:02:00	19	0.6	1.2			
4	N	17:14:00	17:16:00	0:02:00	19	0.6	1.2			
5	S	17:19:00	17:21:00	0:02:00	19	0.6	1.2			
6	N	17:24:00	17:27:00	0:03:00	18	0.7	1.3			
7	S	17:30:00	17:32:00	0:02:00	18	0.7	1.3			
8	N	17:36:00	17:38:00	0:02:00	18	0.7	1.2			
9	S	17:41:00	17:44:00	0:03:00	19	0.7	1.2			
10	N	17:47:00	17:50:00	0:03:00	19	0.7	1.1			
11	S	17:53:00	17:56:00	0:03:00	17	0.7	1.2			
12	N	17:59:00	18:02:00	0:03:00	17	0.7	1.2			
13	S	18:05:00	18:08:00	0:03:00	17	0.7	1.1			
14	N	18:11:00	18:14:00	0:03:00	16	0.8	1.4			
15	S	18:17:00	18:20:00	0:03:00	16	0.8	1.4			
16	N	18:23:00	18:27:00	0:04:00	15	0.8	1.4			
17	S	18:30:00	18:34:00	0:04:00	15	0.8	1.4			
18	N	18:37:00	18:41:00	0:04:00	14	0.9	1.6			
19	S	18:44:00	18:48:00	0:04:00	15	0.8	1.3			
20	N	18:51:00	18:55:00	0:04:00	14	0.8	1.4			
21	S	18:59:00	19:03:00	0:04:00	14	0.8	1.5			
22	N	19:06:00	19:10:00	0:04:00	14	0.8	1.5			
23	S	19:13:00	19:18:00	0:05:00	15	0.7	1.5			
24	N	19:21:00	19:27:00	0:06:00	15	0.7	1.3			
25	S	19:30:00	19:35:00	0:05:00	16	0.7	1.1			
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes X No
Additional Comments:									Drive #	
Use 404CP Base file and log. Ours shut off early.										

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
	7/10/2018	191	78654	2	So Calif Wildfires USGS				
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base	
GALAMBOS		N404CP		6762.1	8:54:00		15:54:00	CORS	
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID	
LaRocque		8191		6768	1:33		20:33		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Haze/Fire/Cloud		Departing	KBFL
110 3	10+	Clear		24	10	30.00		Arriving	KBFL
Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	Mode	Threshold Values
20	50		371		100		Gain - Course/Up	Single	A
							Gain - Fine/Down	Multi	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode	
130	Kts	5,000	Ft	6,200	Ft	Yes	No	X	@ NS
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:	15:12:21
		↑ Times entered are Zulu / GMT ↓		TAKEOFF: 15:18Z				Verify S-Turns Before Mission	Yes X No
73	W	15:54:09	15:55:44	0:01:35	22	0.6	1.1	Eye Safe = Naked/block 4 Area B	
74	E	15:59:16	16:01:49	0:02:33	22	0.6	1.1		
75	W	16:06:06	16:10:11	0:04:05	22	0.6	1.1		
76	E	16:12:48	16:16:45	0:03:57	22	0.6	1.1		
77	W	16:19:44	16:23:37	0:03:53	22	0.6	1.1		
78	E	16:23:33	16:30:12	0:06:39	22	0.6	1.1		
79	W	16:33:06	16:36:25	0:03:19	22	0.6	1.1		
80	E	16:39:36	16:42:22	0:02:46	22	0.6	1.1		
1	NW	16:47:59	16:49:09	0:01:10	22	0.6	1.1		
2	SE	16:59:56	17:02:39	0:02:43	22	0.6	1.1		
3	NW	17:05:32	17:08:20	0:02:48	19	0.6	1.2		
4	SE	17:05:32	17:08:20	0:02:48	18	0.7	1.2		
5	NW	17:11:27	17:14:46	0:03:19	17	0.7	1.2		
6	SE	17:18:25	17:20:54	0:02:29	17	0.7	1.2		
7	NW	17:23:41	17:26:07	0:02:26	17	0.7	1.2		
8	SE	17:28:59	17:31:31	0:02:59	17	0.7	1.2		
9	NW	17:34:15	17:36:48	0:03:42	17	0.7	1.2		
10	SE	17:39:30	17:42:20	0:02:50	17	0.7	1.2		
11	NW	17:45:18	17:48:17	0:02:59	17	0.7	1.2		
12	SE	17:51:34	17:55:16	0:03:42	17	0.7	1.2		
13	NW	17:58:27	18:02:08	0:03:41	17	0.7	1.2		
14	SE	18:05:16	18:08:57	0:03:41	14	0.9	1.6		
15	NW	18:12:52	18:16:02	0:03:10	14	0.9	1.6		
16	SE	18:18:53	18:22:15	0:03:22	14	0.9	1.6		
17	NW	18:25:06	18:28:25	0:03:19	14	0.9	1.6		
18	SE	18:31:15	18:34:33	0:03:18	14	0.9	1.6		
19	NW	18:37:38	18:40:51	0:03:13	14	0.9	1.6		
20	SE	18:43:44	18:47:03	0:03:19	14	0.9	1.6		
21	NW	18:50:00	18:53:10	0:03:10	14	0.9	1.5		
A80	S	19:01:09	19:10:01	0:08:52	14	0.9	1.5	Block 4 area A 5'000	
A79	N	19:12:36	19:21:09	0:08:33	14	0.9	1.5	GO TO page #2	
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission	Yes X No
Additional Comments:									Drive #
									162

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
		7/11/2018	192	78654	2	SoCal Wildfire Lidar Block 4 B				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time	Base	
Kennedy		6255Q		1255.3		10:04:00		17:04:00	WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time	PID	
Finn		8170		1259.9		2:40		21:40	BFL	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	BFL
140/5	10		CL	30	12	29.89			Arriving	BFL
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	X	Mode
20		50		371		99		Gain - Course/Up	Single	Threshold Values
								Gain - Fine/Down	Multi	A
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
130		fts	6300	Ft	6300	Ft	Yes	No	@	NS
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: 10:00:00		
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes X No
284	S	17:38:00	17:39:00	0:01:00	19	0.7	1.2			
284	N	17:41:00	17:42:00	0:01:00	19	0.7	1.2			
283	S	17:45:00	17:46:00	0:01:00	19	0.7	1.2			
282	N	17:48:00	17:49:00	0:01:00	19	0.7	1.2			
281	S	17:52:00	17:53:00	0:01:00	19	0.7	1.2			
280	N	17:56:00	17:57:00	0:01:00	18	0.7	1.1			
279	S	18:01:00	18:03:00	0:02:00	19	0.8	1.4			
278	N	18:06:00	18:08:00	0:02:00	19	0.8	1.3			
277	S	18:11:00	18:14:00	0:03:00	18	0.8	1.3			
276	N	18:17:00	18:19:00	0:02:00	18	0.8	1.3			
275	S	18:23:00	18:25:00	0:02:00	17	0.8	1.5			
274	N	18:28:00	18:31:00	0:03:00	15	0.9	1.7			
273	S	18:34:00	18:37:00	0:03:00	17	0.9	1.7			
272	N	18:40:00	18:43:00	0:03:00	17	0.8	1.4			
271	S	18:46:00	18:49:00	0:03:00	17	0.8	1.4			
270	N	18:52:00	18:55:00	0:03:00	19	0.7	1.5			
269	S	18:58:00	19:01:00	0:03:00	18	0.9	1.6			
268	N	19:04:00	19:07:00	0:03:00	17	0.9	1.6			
267	S	19:10:00	19:13:00	0:03:00	19	0.7	1.2			
266	N	19:16:00	19:18:00	0:02:00	19	0.7	1.3			
265	S	19:22:00	19:26:00	0:04:00	19	0.7	1.3			
264	N	19:29:00	19:34:00	0:05:00	21	0.7	1.1			
263	S	19:37:00	19:42:00	0:05:00	20	0.7	1.1			
262	N	19:45:00	19:49:00	0:04:00	22	0.7	1.1			
261	S	19:52:00	19:57:00	0:05:00	22	0.7	1.1			
260	N	20:00:00	20:06:00	0:06:00	22	0.7	1.1			
259	S	20:09:00	20:15:00	0:06:00	21	0.7	1.2			
258	N	20:18:00	20:24:00	0:06:00	21	0.7	1.2			
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes X No
Additional Comments:										Drive #
Use 404CP Base file and log. Ours shut off early.										

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name						
	7/11/2018		192		78654		2		So Calif Wildfires USGS						
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base			
GALAMBOS		N404CP			6768		8:22:00			15:22:00		CORS			
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID			
LaRocque		8191			6773		12:14			19:14					
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %		Temp	Dew Point		Haze/Fire/Cloud			Departing	KBFL		
110 3		10+	Clear			24	10		30.00			Arriving	KBFL		
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %			Fixed Gain		255	Mode	Threshold Values		
20		50		371		100			Gain - Course/Up			Single		A	
									Gain - Fine/Down			Multi	X	B	
Air Speed		AGL		MSL		Waveform Used			Waveform Mode			Pre-Trigger Dist.			
130		Kts	5,000	Ft	6,200	Ft	Yes	20	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:		14:44:00	
		↑ Times entered are Zulu / GMT ↓		TAKEOFF: 1444Z							Verify S-Turns Before Mission		Yes	X	No
B179	S	15:22:09		15:27:47		0:05:38		20	0.7	1.3		Eye Safe = Naked/block 4 Area B			
B180	N	15:22:09		15:36:08		0:13:59		20	0.7	1.3		possible small clouds south end			
B181	S	15:38:43		15:44:13		0:05:30		20	0.7	1.3					
B182	N	15:46:44		15:52:33		0:05:49		20	0.7	1.3					
B183	S	15:55:07		16:00:36		0:05:29		23	0.6	1					
B184	N	16:03:20		16:08:52		0:05:32		23	0.6	1					
B185	S	16:11:29		16:16:27		0:04:58		23	0.6	1					
B186	N	16:19:13		16:23:19		0:04:06		23	0.6	1					
B187	S	16:25:55		16:31:42		0:05:47		23	0.6	1					
B188	N	16:34:18		16:39:31		0:05:13		19	0.6	1.1					
B189	S	16:41:57		16:46:47		0:04:50		19	0.6	1.1					
B190	N	16:49:33		16:54:35		0:05:02		19	0.6	1.1					
B191	S	16:57:12		17:01:57		0:04:45		19	0.6	1.1					
B192	N	17:04:52		17:09:54		0:05:02		19	0.6	1.1					
B193	S	17:12:26		17:17:16		0:04:50		17	0.7	1.2					
B194	N	17:20:08		17:25:19		0:09:21		17	0.7	1.2					
A72	S	17:40:56		17:50:08		0:09:12		18	0.7	1.1		Block 4 area A 5'000			
A71	N	17:53:36		18:01:50		0:08:14		15	0.9	1.7		A72 Cloud 4/6 miles into it and EOL			
A70	S	18:04:42		18:14:03		0:09:21		15	0.9	1.7		EOL = end of line			
A69	N	18:16:33		18:25:45		0:09:12		15	0.9	1.7					
A68	S	18:28:33		18:37:54		0:09:21		15	0.9	1.7					
A67	N	18:40:49		18:49:57		0:09:08		18	0.8	1.2					
A66	S	18:52:56		19:02:04		0:09:08		15	0.9	1.7					
A65	N	19:04:59		19:14:12		0:09:13		15	0.9	1.7					

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name					
	7/13/2018		194		78654		2		So Calif Wildfires USGS					
Operator		Aircraft		HOBB5 Start		Local Start Time		ZULU Start Time		Base				
GALAMBOS		N404CP		6777		8:48:00		15:48:00		CORS				
Pilot		Sensor Type/Number		HOBB5 END		Local End Time		Zulu End Time		PID				
LaRocque		8191		6780.7		11:28		18:28						
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Haze/Fire/Cloud		Departing	KBFL				
		10+	Clear						Arriving	KBFL				
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	255	Mode	Threshold Values			
20		50		371		100		Gain - Course/Up		Single	A			
								Gain - Fine/Down		Multi	X			
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.				
130		Kts	5,000	Ft	6,200	Ft	Yes	No	X	@	NS			
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:			
						n/a		n/a	n/a	n/a	15:11:00			
		↑ Times entered are Zulu / GMT ↓		TAKEOFF: 1517Z							Verify S-Turns Before Mission	Yes	X	No
B217	S	15:48:00		15:52:08		0:04:08		22	0.6	1				
218	N	15:54:29		15:58:45		0:04:16		22	0.6	1	Eye Safe = Naked/block 4 Area B			
219	S	16:01:16		16:05:37		0:04:21		22	0.6	1				
220	N	16:08:22		16:12:53		0:04:31		22	0.6	1				
221	S	16:15:23		16:19:58		0:04:35		19	0.6	1.1				
222	N	16:22:46		16:27:33		0:04:47		19	0.6	1.1				
223	S	16:30:13		16:34:56		0:04:43		19	0.6	1.1				
224	N	16:37:56		16:42:53		0:04:57		19	0.6	1.1				
225	S	16:45:25		16:49:55		0:04:30		19	0.6	1.1				
226	N	16:52:51		16:57:40		0:04:49		22	0.6	1				
227	S	17:00:05		17:04:44		0:04:39		15	0.8	1.6				
228	N	17:07:37		17:12:36		0:04:59		15	0.8	1.6				
229	S	17:15:00		17:19:52		0:04:52		15	0.8	1.6				
230	N	17:22:49		17:28:08		0:05:19		15	0.8	1.6				
231	S	17:30:32		17:35:36		0:05:04		15	0.8	1.6				
232	N	17:38:29		17:43:45		0:04:18		15	0.8	1.6				
233	S	17:47:27		17:51:39		0:09:11		15	0.8	1.6				
234	N	17:54:40		17:59:00		0:04:20		15	0.8	1.6				
235	S	18:01:44		18:06:02		0:04:18		15	0.8	1.6				
236	N	18:09:02		18:18:13		0:09:11		15	0.8	1.6				
237	S	18:16:14		18:20:52		0:04:38		15	0.8	1.6				
238	N	18:23:49		18:28:37		0:04:48		15	0.8	1.6	no ending static			
											52gb			

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
		7/14/2018	195	78654	2	SoCal Wildfire Lidar Block 4 A				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time	Base	
Kennedy		6255Q		1262.8		10:42:00		17:42:00	WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time	PID	
Finn		8170		1267.7		15:31		22:31	BFL	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	BFL
310/9			CL	32	12	29.99			Arriving	BFL
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	X	Mode
20		50		371		99		Gain - Course/Up	Single	Threshold Values
								Gain - Fine/Down	Multi	A
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
130		Kts	5000	Ft	5000	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: 9:00:00		
		↑ Times entered are Zulu / GMT ↓						Verify 5-Turns Before Mission		Yes X No
200	S	18:17:00	18:26:00	0:09:00	15	0.9	1.5	Possible clouds on south end		
201	N	18:29:00	18:38:00	0:09:00	16	0.8	1.3			
202	S	18:40:00	18:49:00	0:09:00	17	0.8	1.3			
203	N	18:51:00	19:00:00	0:09:00	16	1	1.7			
204	S	19:03:00	19:11:00	0:08:00	16	0.8	1.3			
205	N	19:14:00	19:23:00	0:09:00	16	0.8	1.3			
206	S	19:26:00	19:35:00	0:09:00	18	0.8	1.2			
207	N	19:38:00	19:47:00	0:09:00	19	0.7	1.2			
208	S	19:49:00	19:57:00	0:08:00	18	0.7	1.3			
209	N	20:00:00	20:09:00	0:09:00	18	0.7	1.4			
210	S	20:11:00	20:20:00	0:09:00	20	0.7	1.2			
211	N	20:23:00	20:31:00	0:08:00	19	0.7	1.3			
212	S	20:34:00	20:42:00	0:08:00	21	0.7	1.1			
213	N	20:45:00	20:53:00	0:08:00	20	0.7	1.2			
214	S	20:55:00	21:03:00	0:08:00	19	0.7	1.2			
215	N	21:06:00	21:14:00	0:08:00	20	0.7	1.1			
216	S	21:17:00	21:25:00	0:08:00	18	0.7	1.3			
217	N	21:28:00	21:37:00	0:09:00	19	0.7	1.3			
218	S	21:39:00	21:47:00	0:08:00	18	0.7	1.3			
219	N	21:50:00	21:58:00	0:08:00	18	0.7	1.4			
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify 5-Turns After Mission		Yes X No
Additional Comments:									Drive #	

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
		7/15/2018	196	78654	2	SoCal Wildfire Lidar Block 4 A				
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time	Base	
Kennedy		6255Q		1267.7		10:27:00		17:27:00	WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time	PID	
Scott		8170		1272		14:49		21:49	BFL	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud	Departing	BFL
330/4			CL	31	14	29.93			Arriving	BFL
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	X	Mode
20		50		371		99		Gain - Course/Up	Single	Threshold Values
								Gain - Fine/Down	Multi	A
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
130		Kts	5000	Ft	5000	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: 10:00:00		
		↑ Times entered are Zulu / GMT ↓						Verify 5-Turns Before Mission		Yes X No
220	S	17:59:00						eyesafe mode fix		
220	S	18:03:00	18:11:00	0:08:00	16	0.8	1.5			
221	N	18:14:00	18:22:00	0:08:00	15	0.9	1.7			
222	S	18:24:00	18:33:00	0:09:00	16	0.8	1.4			
223	N	18:35:00	18:44:00	0:09:00	16	0.8	1.3			
224	S	18:46:00	18:54:00	0:08:00	16	0.8	1.3			
225	N	18:57:00	19:05:00	0:08:00	16	0.8	1.3			
226	S	19:08:00	19:16:00	0:08:00	16	0.8	1.4			
227	N	19:19:00	19:26:00	0:07:00	19	0.8	1.2			
228	S	19:29:00	19:36:00	0:07:00	21	0.8	1.1			
229	N	19:39:00	19:47:00	0:08:00	22	0.6	1			
230	S	19:49:00	19:56:00	0:07:00	20	0.7	1.1			
231	N	19:59:00	20:07:00	0:08:00	21	0.7	1.1			
232	S	20:09:00	20:17:00	0:08:00	21	0.7	1.1			
233	N	20:19:00	20:26:00	0:07:00	21	0.7	1.2			
234	S	20:28:00	20:35:00	0:07:00	23	0.6	1.1			
235	N	20:38:00	20:44:00	0:06:00	22	0.6	1.1			
236	S	20:46:00	20:53:00	0:07:00	22	0.6	1.1			
237	N	20:56:00	21:02:00	0:06:00	20	0.6	1.2			
238	S	21:04:00	21:11:00	0:07:00	19	0.6	1.2			
239	N	21:13:00	21:20:00	0:07:00	19	0.6	1.2			
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify 5-Turns After Mission		Yes X No
Additional Comments:									Drive #	

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name										
	7/15/2018		196		78654		2		So Calif Wildfires USGS										
Operator		Aircraft			HOBB5 Start			Local Start Time			ZULU Start Time		Base						
GALAMBOS		N404CP			6785.6			9:07:00			16:07:00		CORS						
Pilot		Sensor Type/Number			HOBB5 END			Local End Time			Zulu End Time		PID						
LaRocque		8191			6790.8			13:34			20:34								
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Haze/Fire/Cloud		Departing		KBFL			
130 3		10+		Clear				28		17		29.93		Arriving		KSBA			
Scan Angle (FOV)		Scan Frequency (Hz)			Pulse Rate (kHz)			Laser Power %			Fixed Gain		Mode		Threshold Values				
20		50			371			100			Gain - Course/Up		Single		A				
											Gain - Fine/Down		Multi		B				
Air Speed		AGL			MSL			Waveform Used			Waveform Mode			Pre-Trigger Dist.					
130		Kts	5,000		Ft	6,200		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:		15:30:55	
		↑ Times entered are Zulu / GMT ↓			1535z								Verify S-Turns Before Mission		Yes		X	No	
A190	S	16:07:01		16:16:08		0:09:07		20		0.6		1.2		Clouds in the middle of the line					
191	N	16:18:33		16:27:36		0:09:03		20		0.6		1.2		Eye Safe = Naked/block 4 Area A					
192	S	16:30:12		16:39:07		0:08:55		20		0.6		1.2							
193	N	16:41:57		16:51:02		0:09:05		20		0.6		1.2							
194	S	16:54:18		17:02:18		0:08:00		20		0.6		1.2							
195	N	17:05:00		17:13:10		0:08:10		18		0.7		1.2							
196	S	17:15:51		17:23:57		0:08:06		18		0.7		1.2							
197	N	17:26:42		17:35:08		0:08:26		18		0.7		1.2							
198	S	17:37:55		17:46:16		0:08:21		18		0.7		1.2							
199	N	17:48:53		17:57:34		0:08:41		16		0.8		1.5							
149	S	18:02:33		18:10:24		0:07:51		16		0.8		1.5							
148	N	18:17:19		18:25:07		0:07:48		16		0.8		1.5							
147	S	18:27:50		18:35:02		0:07:12		16		0.8		1.5							
146	N	18:37:47		18:44:05		0:06:18		16		0.8		1.5							
145	S	18:48:02		18:55:19		0:07:17		20		0.7		1.2							
144	N	18:57:51		19:05:10		0:07:03		18		0.8		1.2							
143	S	19:08:16		19:15:14		0:07:09		18		0.8		1.2							
142	N	19:17:56		19:25:08		0:07:12		18		0.8		1.2							
141	S	19:27:44		19:34:47		0:07:03		18		0.8		1.2							
140	N	19:37:26		19:44:35		0:07:09		20		0.7		1.1							
139	S	19:47:32		19:54:30		0:06:58		20		0.7		1.1							
138	N	19:57:10		20:00:18		0:03:08		20		0.7		1.1							
137	S	20:07:03		20:13:51		#VALUE!		21		0.6		1.2							
136	N	20:16:43		20:23:35		0:06:52		21		0.6		1.2							
135	S	20:26:46		20:33:44		0:06:58		21		0.6		1.2							

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name			
	7/16/2018		197		78654		2		USGS SoCal Wildfire lidar Block 4A			
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base		
Ryan		404CP		6791.4		10:54:00		17:54:00				
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID		
Ray		8194		6797.5		17:13		0:13				
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL	
230 04	10	SKC	0	31	10	2994				Arriving	BFL	
Scan Angle (FOV)	Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		Mode	Threshold Values		
20	50		371		100		Gain - Course/Up		Single	A		
							Gain - Fine/Down		Multi	B		
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.		
130	Kts	5000	Ft	5000	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
134	S	18:34:00	18:41:00	0:07:00	13	1	1.7					
133	N	18:43:00	18:51:00	0:08:00	13	0.9	1.7					
132	S	18:54:00	19:01:00	0:07:00	14	0.8	1.3					
131	N	19:04:00	19:11:00	0:07:00	16	0.8	1.1					
130	S	19:14:00	19:21:00	0:07:00	16	0.7	1.1					
129	N	19:24:00	19:31:00	0:07:00	18	0.6	1					
128	S	19:34:00	19:42:00	0:08:00	18	0.6	1.1					
127	N	19:45:00	19:52:00	0:07:00	17	0.6	1.1					
126	S	19:55:00	20:03:00	0:08:00	17	0.6	1.1					
125	N	20:05:00	20:13:00	0:08:00	18	0.6	1.1					
124	S	20:16:00	20:23:00	0:07:00	17	0.6	1.1	GPS warning. Rebooted system at end of line				
123	N	20:35:00			18	0.6	1.1	N.G. forgot eyesafe mode.				
123	S	20:47:00	20:54:00	0:07:00	17	0.6	1.2					
122	N	20:57:00	21:04:00	0:07:00	18	0.6	1.2					
64	S	21:11:00	21:20:00	0:09:00	17	0.6	1.3					
63	N	21:23:00	21:32:00	0:09:00	17	0.6	1.3					
62	S	21:35:00	21:44:00	0:09:00	16	0.7	1.4					
61	N	21:47:00	21:56:00	0:09:00	18	0.6	1.2					
60	S	21:58:00	22:07:00	0:09:00	19	0.6	1.3					
59	N	22:10:00	22:19:00	0:09:00	20	0.6	1.1					
58	S	22:22:00	22:31:00	0:09:00	22	0.6	1.1					
57	N	22:34:00	22:43:00	0:09:00	21	0.6	1.2					
56	S	22:46:00	22:54:00	0:08:00	19	0.6	1.3					
55	N	22:57:00	23:06:00	0:09:00	20	0.6	1.3					
54	S	23:09:00	23:18:00	0:09:00	19	0.6	1.2					
53	N	23:20:00	23:29:00	0:09:00	19	0.6	1.2					
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X	No
Additional Comments:										Drive #		

Woolpert

[illegible]

[illegible]

Woolpert

[illegible]

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name										
	7/18/2018		199		78654		2		USGS SoCal Wildfire lidar Block 4A										
Operator		Aircraft			HOBB5 Start			Local Start Time			ZULU Start Time		Base						
Ryan		404CP			6802.8			14:10:00			21:10:00								
Pilot		Sensor Type/Number			HOBB5 END			Local End Time			Zulu End Time		PID						
Russ		8191			6808.1			19:37			2:37								
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure		Haze/Fire/Cloud		Departing		BFL	
270 06		10		150		BKN		M		M		2991				Arriving		BFL	
Scan Angle (FOV)		Scan Frequency (Hz)			Pulse Rate (kHz)			Laser Power %			Fixed Gain		Mode		Threshold Values				
20		50			371			100			Gain - Course/Up		Single		A				
											Gain - Fine/Down		Multi		B				
Air Speed		AGL			MSL			Waveform Used			Waveform Mode			Pre-Trigger Dist.					
130		Kts		5000		Ft		5000		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	
40		S		21:57:00		22:06:00		0:09:00		21		0.6		1.1					
39		N		22:08:00		22:15:00		0:07:00		22		0.6		1.1		few small clouds			
38		S		22:19:00		22:26:00		0:07:00		23		0.6		1.2		few small clouds			
37		N		22:29:00		22:36:00		0:07:00		23		0.6		1.2		few small clouds			
36		S		22:39:00		22:46:00		0:07:00		23		0.6		1.2		few small clouds			
46		N		22:50:00		22:59:00		0:09:00		21		0.6		1.3		few small clouds			
45		S		23:02:00		23:11:00		0:09:00		21		0.6		1.2					
44		N		23:14:00		23:23:00		0:09:00		21		0.6		1.2					
43		S		23:26:00		23:35:00		0:09:00		21		0.6		1.2					
42		N		23:38:00		23:46:00		0:08:00		19		0.7		1.2					
41		S		23:49:00		23:57:00		0:08:00		20		0.6		1.1					
44		N		0:00:00		0:08:00		0:08:00		18		0.7		1.2		way pt 29-35 / 6-8 reflight			
45		S		0:11:00		0:20:00		0:09:00		16		0.7		1.4		way pt 7-9 / 29-36 reflight			
46		N		0:23:00		0:32:00		0:09:00		15		0.8		1.5		way pt 6-10 / 33-37 reflight			
43		S		0:34:00		0:37:00		0:03:00		15		0.8		1.6		way pt 2-10 reflight			
41		S		0:44:00		0:46:00		0:02:00		15		0.8		1.6		way pt 6-10 reflight			
39		S		0:53:00		0:54:00		0:01:00		16		0.7		1.3		way pt 3-5 reflight			
38		S		0:59:00		1:01:00		0:02:00		16		0.7		1.3		way pt 5-6 reflight sm clouds			
37		S		1:06:00		1:08:00		0:02:00		16		0.7		1.2		way pt 2-7 reflight			
36		S		1:18:00		1:20:00		0:02:00		17		0.7		1.2		way pt 3-8 reflight			
35		N		1:26:00		1:31:00		0:05:00		18		0.6		1					
34		S		1:35:00		1:41:00		0:06:00		17		0.7		1.1					
33		N		1:44:00		1:50:00		0:06:00		17		0.7		1.1					

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name								
	7/19/2018		200		78654		2		USGS SoCal Wildfire lidar Block 1A								
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base					
Ryan		404CP			6808.1		10:56:00			17:56:00							
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID					
Russ		8191			6812.4		15:32			22:32							
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL					
310 05		10	SKC	0	34	20	2991				Arriving	BFL					
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		B					
Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.						
150		Kts	6500	Ft	6500	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	
57	S	18:39:00		18:40:00		0:01:00		14	0.7	1.2							
58	N	18:43:00		18:44:00		0:01:00		14	0.7	1.3							
59	S	18:48:00		18:50:00		0:02:00		14	0.8	1.3							
60	N	18:53:00		18:54:00		0:01:00		15	0.7	1.2							
61	S	18:58:00		19:01:00		0:03:00		16	0.7	1.1							
62	N	19:04:00		19:08:00		0:04:00		16	0.7	1.1							
63	S	19:11:00		19:15:00		0:04:00		17	0.7	1.1							
64	N	19:18:00		19:22:00		0:04:00		17	0.6	1.1							
65	S	19:25:00		19:29:00		0:04:00		17	0.6	1.1							
66	N	19:32:00		19:36:00		0:04:00		16	0.7	1.2							
67	S	19:39:00		19:43:00		0:04:00		16	0.7	1.2							
68	N	19:46:00		19:50:00		0:04:00		17	0.7	1.2							
69	S	19:53:00		19:58:00		0:05:00		17	0.6	1.1							
70	N	20:01:00		20:07:00		0:06:00		18	0.6	1.1							
71	S	20:10:00		20:17:00		0:07:00		18	0.6	1.2							
72	N	20:20:00		20:26:00		0:06:00		19	0.6	1.1							
73	S	20:29:00		20:36:00		0:07:00		19	0.6	1.1							
74	N	20:39:00		20:46:00		0:07:00		19	0.6	1.2							
75	S	20:48:00		20:56:00		0:08:00		20	0.6	1.1							
76	N	21:00:00		21:09:00		0:09:00		18	0.7	1.3							
77	S	21:11:00		21:21:00		0:10:00		18	0.7	1.3		Clouds way pt 39-45					
78	N	21:24:00		21:33:00		0:09:00		19	0.7	1.3		clouds way pt 37-44					
79	S	21:36:00		21:46:00		0:10:00		17	0.8	1.7		clouds way pt 37-45					
80	N	21:48:00		21:58:00		0:10:00		20	0.8	1.4		clouds way pt 36-45					

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name								
	7/20/2018		201		78654		92		SoCal Wildfire Block 3B/ Area B1 (LA ATC)								
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base					
Denham		N41GD			134.0		9:12:00			16:12:00		CORS					
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID					
Raffensberger		SH8194			137.6		12:45			19:45		None					
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %		Temp	Dew Point		Pressure		Haze/Fire/Cloud		Departing	WHP			
													Arriving	WHP			
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		B				
Air Speed		AGL		MSL		Waveform Used			Waveform Mode			Pre-Trigger Dist.					
150		Kts		Ft	8500	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	SE	16:59:00		17:03:00		0:04:00		18	0.7	1.2							
2	NW	17:07:00		17:11:00		0:04:00		18	0.7	1.2							
3	SE	17:15:00		17:20:00		0:05:00		17	0.7	1.1							
4	NW	17:23:00		17:27:00		0:04:00		16	0.8	1.4							
5	SE	17:31:00		17:34:00		0:03:00		16	0.8	1.4							
6	NW	17:37:00		17:39:00		0:02:00		16	0.8	1.4							
7	SE	17:48:00		17:49:00		0:01:00		14	0.8	1.5							
8	NW	17:52:00		17:53:00		0:01:00		14	0.8	1.5							
9	SE	17:57:00		17:58:00		0:01:00		14	0.8	1.5							
10	NW	18:05:00		18:06:00		0:01:00		15	0.8	1.2							
11	SE	18:09:00		18:11:00		0:02:00		15	0.8	1.3							
12	NW	18:15:00		18:16:00		0:01:00		14	0.9	1.4							
13	SE	18:19:00		18:22:00		0:03:00		15	0.9	1.4							
14	NW	18:25:00		18:28:00		0:03:00		14	1	1.6							
15	SE	18:30:00		18:32:00		0:02:00		14	1	1.6							
16	W	18:38:00		18:40:00		0:02:00		15	0.7	1.2							
17	E	18:44:00		18:46:00		0:02:00		15	0.8	1.4							
18	W	18:50:00		18:53:00		0:03:00		16	0.7	1.2							
19	E	18:55:00		18:58:00		0:03:00		16	0.7	1.4							
20	W	19:02:00		19:05:00		0:03:00		18	0.7	1.2							
21	E	19:08:00		19:11:00		0:03:00		16	0.7	1.3							
22	W	19:14:00		19:17:00		0:03:00		17	0.7	1.2							
		↑ Times entered are Zulu / GMT ↑				Page			1								

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name												
	7/21/2018		202		78654		2		USGS SoCal Wildfire LiDAR Block 1												
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base									
Stanton		N6255Q			1278.4		14:43:00			21:43:00		WOOLPERT PIN									
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID									
Scott		ALS80/ 8170			1283		19:25			2:25		KWHP									
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure		Haze/Fire/Cloud		Departing		KWHP			
120/08		10 mi		CLR		0		29		16		30.02		light haze		Arriving		KWHP			
Scan Angle (FOV)			Scan Frequency (Hz)			Pulse Rate (kHz)			Laser Power %			Fixed Gain			X		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			5000			Ft			6,388			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:				19:18:00	
				↑ Times entered are Zulu / GMT ↓												Verify S-Turns Before Mission				Yes	
																				X	
																				No	
A138		N		22:10:00		22:17:00		0:07:00		22		0.6		1.2		Clear					
A122		S		22:24:00		22:34:00		0:10:00		20		0.6		1.3							
A123		N		22:37:00		22:47:00		0:10:00		20		0.6		1.3							
A124		S		22:49:00		22:59:00		0:10:00		21		0.6		1.2							
A125		N		23:01:00		23:11:00		0:10:00		20		0.6		1.2							
A126		S		23:13:00		23:24:00		0:11:00		20		0.6		1.1							
A127		N		23:26:00		23:35:00		0:09:00		20		0.6		1							
A128		S		23:38:00		23:46:00		0:08:00		20		0.6		1							
A129		N		23:48:00		23:55:00		0:07:00		19		0.6		1							
A130		S		23:57:00		0:05:00		0:08:00		17		0.7		1.1							
A131		N		0:07:00		0:14:00		0:07:00		15		0.7		1.3							
A132		S		0:16:00		0:23:00		0:07:00		16		0.8		1.5							
A133		N		0:25:00		0:32:00		0:07:00		16		0.8		1.5							
A134		S		0:34:00		0:41:00		0:07:00		15		0.8		1.5							
A135		N		0:44:00		0:51:00		0:07:00		16		0.7		1.2							
A136		S		0:55:00		1:02:00		0:07:00		16		0.7		1.2							
A137		N		1:04:00		1:12:00		0:08:00		17		0.6		1.1							
A105		S		1:18:00		1:28:00		0:10:00		18		0.6		1							
A106		N		1:30:00		1:40:00		0:10:00		18		0.7		1.4							
A107		S		1:41:00		1:51:00		0:10:00		20		0.6		1							
A108		N		1:53:00		2:03:00		0:10:00		19		0.6		1							

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name										
		7/21/2018		202		78654		92		SoCal Wildfire Block 3B / Area B1										
Operator		Aircraft				HOBBS Start		Local Start Time			ZULU Start Time		Base							
Denham		N41GD				137.6		9:30:00			16:30:00		CORS							
Pilot		Sensor Type/Number				HOBBS END		Local End Time			Zulu End Time		PID							
Raffensberg		SH8194				142.3		1:58			20:58									
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure		Haze/Fire/Cloud		Departing		WHP		
																Arriving		WHP		
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				B				
Air Speed		AGL				MSL		Waveform Used			Waveform Mode				Pre-Trigger Dist.					
150		Kts			Ft	8500		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				
23	SE	17:18:00		17:21:00		0:03:00		17	0.8	1.4										
24	NW	17:24:00		17:27:00		0:03:00		18	0.8	1.4										
25	SE	17:31:00		17:34:00		0:03:00		18	0.8	1.4										
26	NW	17:37:00		17:42:00		0:05:00		16	0.8	1.5										
27	SE	17:45:00		17:53:00		0:08:00		17	0.8	1.5										
28	NW	17:59:00		18:04:00		0:05:00		17	0.8	1.5										
29	SE	18:07:00		18:12:00		0:05:00		17	0.9	1.5										
30	NW	18:15:00		18:20:00		0:05:00		18	0.8	1.3										
31	SE	18:24:00		18:28:00		0:04:00		17	1	1.6										
32	NW	18:32:00		18:36:00		0:04:00		18	0.8	1.6										
33	SE	18:39:00		18:44:00		0:05:00		19	0.8	1.3										
34	NW	18:47:00		18:51:00		0:04:00		19	0.8	1.3										
35	SE	18:54:00		18:59:00		0:05:00		20	0.7	1.1										
36	NW	19:02:00		19:06:00		0:04:00		21	0.7	1.1										
37	SE	19:09:00		19:13:00		0:04:00		21	0.7	1.2										
38	NW	19:16:00		19:20:00		0:04:00		20	0.7	1.2										
39	SE	19:24:00		19:28:00		0:04:00		20	0.7	1.2										
40	NW	19:31:00		19:35:00		0:04:00		19	0.7	1.3										
41	SE	19:39:00		19:41:00		0:02:00		20	0.7	1.2										
42	SE	19:46:00		19:53:00		0:07:00		19	0.8	1.3										
43	NW	19:56:00		20:04:00		0:08:00		20	0.7	1.2										
44	SE	20:07:00		20:14:00		0:07:00		19	0.7	1.3										
45	NW	20:17:00		20:24:00		0:07:00		20	0.6	1.2										
		↑ Times entered are Zulu / GMT ↑																		

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name								
	7/22/2018		203		78654		2		USGS SoCal Wildfire LiDAR Block 3								
	Operator		Aircraft		HOBBS Start		Local Start Time			ZULU Start Time		Base					
	Stanton		N6255Q		1283.0		9:33:00			16:33:00		WOOLPERT PIN					
	Pilot		Sensor Type/Number		HOBBS END		Local End Time			Zulu End Time		PID					
	Scott		ALS80/ 8170		1287.1		13:57			20:57		KWHP					
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	KWHP					
Calm		10 mi	CLR	0	24	15	30.09		clear		Arriving	KSBD					
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain		X	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	5000	Ft	6,398	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: 16:05:00					
Block 3		⇅ Times entered are Zulu / GMT ⇅								Verify S-Turns Before Mission		Yes	X	No			
A01	SE	17:10:00		17:13:00		0:03:00		15	0.7	1.2		Clear					
A02	NW	17:16:00		17:18:00		0:02:00		14	0.9	1.6							
A20	SE	17:25:00		17:40:00		0:15:00		16	0.8	1.4							
A21	NW	17:42:00		17:58:00		0:16:00		14	1	1.2							
A22	SE	18:00:00		18:18:00		0:18:00		15	0.8	1.3							
A23	NW	18:20:00		18:37:00		0:17:00		15	1.3	2.9							
A24	SE	18:39:00		18:57:00		0:18:00		17	0.7	1.3							
A25	NW	18:59:00		19:14:00		0:15:00		19	0.7	1.3							
A25	NW	19:18:00		19:21:00		0:03:00		19	0.7	1.3							
A26	SE	19:23:00		19:41:00		0:18:00		18	0.7	1.4							
A27	NW	19:43:00		20:00:00		0:17:00		20	0.7	1.3							
A28	SE	20:03:00		20:20:00		0:17:00		20	0.7	1.3							
A29	NW	20:22:00		20:39:00		0:17:00		21	0.7	1.2							
		↑ Times entered are Zulu / GMT ↑				Page						Verify S-Turns After Mission		Yes	X	No	
Additional Comments:													Drive #				

Woolpert

[illegible]

Woolpert

Leica LIDAR		MM/DD/YEAR	Day of Year	Project #	Phase #		Project Name										
		7/22/2018	203	78654	2		USGS SoCal Wildfire lidar Block 3F										
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base							
Ryan		404CP		6824.9		11:57:00		18:57:00									
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID							
Russ		8191		6830.4		17:38		0:38									
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	BFL					
350 04		10	SKC	0	M	M	3002				Arriving	BFL					
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		B					
Air Speed		AGL		MSL		Waveform Used		Waveform Mode				Pre-Trigger Dist.					
150		Kts	6500	Ft	16500	Ft	Yes	No	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 5-Turns Before Mission		Yes	X	No	
12	S	20:14:00		20:15:00		0:01:00		21	0.7	1.2	NG clouds						
11	N	20:18:00		20:19:00		0:01:00		21	0.7	1.2	NG clouds						
10	S	20:23:00		20:24:00		0:01:00		22	0.7	1.2	NG clouds						
1	W	20:48:00		20:48:00		0:00:00		19	0.7	1.3	NG clouds						

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
	7/24/2018	205	78654	92	SoCal Wildfire Block 3 B/ Block 3 C				
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base	
Denham		N41GD		158.6	9:33:00		16:33:00	WOOLPERT PIN	
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID	
Raffensberger		SH8194		163.1	2:03		21:03	KWHP	
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	WHP
								Arriving	
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	B
Air Speed	AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.
150	Kts		Ft	8500/10500	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:	9:15:00
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission	Yes ☒ No ☐
112	NW	17:25:00	17:32:00	0:07:00	14	0.8	1.6	Block 3 B	
113	SE	17:34:00	17:41:00	0:07:00	14	0.9	1.6	Block 3 B	
1	NW	18:09:00	18:09:00	0:00:00	15	0.7	1.2	Block 3 C	
2	SE	18:12:00	18:14:00	0:02:00	15	0.7	1.2	Block 3 C	
3	NW	18:16:00	18:18:00	0:02:00	16	0.7	1.2	Block 3 C	
4	SE	18:21:00	18:23:00	0:02:00	16	0.7	1.2	Block 3 C	
5	NW	18:25:00	18:27:00	0:02:00	16	0.7	1.2	Block 3 C	
6	SE	18:30:00	18:32:00	0:02:00	16	0.7	1.3	Block 3 C	
7	NW	18:35:00	18:37:00	0:02:00	17	0.7	1.1	Block 3 C	
8	SE	13:39:00	18:40:00	5:01:00	18	0.7	1.1	Block 3 C	
9	NW	18:43:00	18:44:00	0:01:00	18	0.6	1.1	Block 3 C	
10	NE	18:49:00	18:52:00	0:03:00	18	0.6	1.1	Block 3 C	
11	SW	18:54:00	18:57:00	0:03:00	19	0.6	1	Block 3 C	
12	NE	19:00:00	19:03:00	0:03:00	18	0.6	1.1	Block 3 C	
13	SW	19:05:00	19:08:00	0:03:00	17	0.6	1.2	Block 3 C	
14	NE	19:10:00	19:13:00	0:03:00	16	0.7	1.2	Block 3 C	
15	SW	19:15:00	19:18:00	0:03:00	16	0.7	1.3	Block 3 C	
16	NE	19:21:00	19:24:00	0:03:00	18	0.6	1.1	Block 3 C	
17	SW	19:27:00	19:30:00	0:03:00	18	0.6	1.1	Block 3 C	
18	NE	19:33:00	19:36:00	0:03:00	18	0.6	1.2	Block 3 C	
19	SW	19:39:00	19:43:00	0:04:00	18	0.6	1.2	Block 3 C	
20	NE	19:46:00	19:50:00	0:04:00	18	0.6	1.2	Block 3 C	
21	SW	19:53:00	19:57:00	0:04:00	19	0.6	1.1	Block 3 C	
22	NE	19:59:00	20:03:00	0:04:00	19	0.6	1.1	Block 3 C	
23	SW	20:06:00	20:08:00	0:02:00	19	0.6	1.1	Block 3 C	
24	NE	20:11:00	20:14:00	0:03:00	19	0.6	1.1	Block 3 C	
25	SW	20:17:00	20:22:00	0:05:00	18	0.6	1.2	Block 3 C	
26	NE	20:25:00	20:31:00	0:06:00	19	0.6	1.1	Block 3 C	
27	SW	20:33:00	20:39:00	0:06:00	18	0.6	1.3	Block 3 C	
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission	Yes ☒ No ☐
Additional Comments:									Drive #
BLOCK 3 B and Block 3 C. Base Station File:42552071.T01									

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name				
	7/27/2018	208	78654	2	USGS SoCal Wildfire lidar Block 3F and Block E				
Operator		Aircraft		HOBBS Start	Local Start Time		ZULU Start Time	Base	
Ryan		404CP		6831.3	11:17:00		18:17:00		
Pilot		Sensor Type/Number		HOBBS END	Local End Time		Zulu End Time	PID	
Russ		8191		6838	18:12		1:12		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud	Departing	RAL
270 07	10	SKC	0	31	18	2991		Arriving	RAL
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	B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode	
150	Kts	6500	Ft	16500	Ft	Yes	No	@	NS
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 ☐
9	W	19:09:00	19:10:00	0:01:00	19	0.6	1.2		
8	E	19:14:00	19:15:00	0:01:00	19	0.6	1.2		
7	W	19:18:00	19:21:00	0:03:00	20	0.6	1.1		
6	E	19:24:00	19:26:00	0:02:00	19	0.7	1.2		
5	W	19:30:00	19:31:00	0:01:00	19	0.7	1.2		
4	E	19:35:00	19:37:00	0:02:00	19	0.7	1.2		
3	W	19:40:00	19:42:00	0:02:00	19	0.7	1.2		
2	E	19:46:00	19:48:00	0:02:00	18	0.7	1.3		
10	S	19:56:00	19:57:00	0:01:00	19	0.6	1.1		
11	N	20:00:00	20:01:00	0:01:00	19	0.6	1.1		
12	S	20:04:00	20:04:00	0:00:00	19	0.6	1.1		
1	W	20:27:00	20:27:00	0:00:00	18	0.7	1.3		
				0:00:00					
1	S	20:37:00	20:38:00	0:01:00	18	0.7	1.3	Block 3E 14,500'	
2	N	20:41:00	20:44:00	0:03:00	18	0.7	1.3		
3	S	20:47:00	20:50:00	0:03:00	19	0.7	1.3		
4	N	20:53:00	20:56:00	0:03:00	17	0.8	1.4		
5	S	20:59:00	21:02:00	0:03:00	17	0.8	1.4		
6	N	21:05:00	21:08:00	0:03:00	16	0.8	1.6		
7	S	21:11:00	21:14:00	0:03:00	16	0.8	1.6		
8	N	21:17:00	21:19:00	0:02:00	19	0.7	1.2		
9	S	21:21:00	21:23:00	0:02:00	19	0.6	1.1		
10	N	21:26:00	21:27:00	0:01:00	19	0.6	1.1		
11	S	21:31:00	21:32:00	0:01:00	20	0.6	1.1		
12	E	21:46:00	21:46:00	0:00:00	20	0.6	1.3		
13	W	21:50:00	21:50:00	0:00:00	20	0.6	1.4		
14	E	21:54:00	21:57:00	0:03:00	20	0.6	1.4		
15	W	22:00:00	22:03:00	0:03:00	19	0.6	1.4		
16	W	22:07:00	22:09:00	0:02:00	19	0.6	1.5		
17	SE	22:11:00	22:15:00	0:04:00	19	0.6	1.5		
18	W	22:17:00	22:18:00	0:01:00	19	0.6	1.4		
			↑ Times entered are Zulu / GMT ↑	Page		1		Verify S-Turns After Mission	Yes ☒ No ☐
Additional Comments:									Drive #

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name					
	7/27/2018		208		78654		2		USGS SoCal Wildfire lidar Block 3E					
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base		
Ryan		404CP												
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID		
Russ		8191												
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %		Temp	Dew Point		Pressure		Haze/Fire/Cloud		Departing	RAL
													Arriving	RAL
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		B		
Air Speed		AGL		MSL		Waveform Used		Waveform Mode			Pre-Trigger Dist.			
150		Kts	6500	Ft	14500	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
19	E	22:21:00		22:23:00		0:02:00		20	0.6	1.4				
20	W	22:26:00		22:29:00		0:03:00		19	0.6	1.3				
21	E	22:31:00		22:34:00		0:03:00		19	0.6	1.3				
22	W	22:37:00		22:39:00		0:02:00		20	0.6	1.3				
23	E	22:42:00		22:45:00		0:03:00		20	0.6	1.2				
24	W	22:48:00		22:50:00		0:02:00		19	0.6	1.3				
25	E	22:53:00		22:56:00		0:03:00		18	0.6	1.3				
26	W	22:59:00		23:02:00		0:03:00		18	0.6	1.4				
27	E	23:08:00		23:14:00		0:06:00		19	0.6	1.1				
28	W	23:17:00		23:23:00		0:06:00		18	0.7	1.2				
29	E	23:26:00		23:32:00		0:06:00		17	0.7	1.2				
30	W	23:35:00		23:40:00		0:05:00		15	0.7	1.3				
31	E	23:43:00		23:49:00		0:06:00		14	0.9	1.8				
32	W	23:51:00		23:57:00		0:06:00		15	0.9	1.6				
33	E	3:59:00		0:05:00		0:06:00		16	0.8	1.5				
34	W	0:07:00		0:12:00		0:05:00		16	0.8	1.5				
35	E	0:14:00		0:18:00		0:04:00		16	0.8	1.4				
36	W	0:21:00		0:24:00		0:03:00		17	0.8	1.3				
37	E	0:26:00		0:29:00		0:03:00		17	0.8	1.3				
38	W	0:31:00		0:35:00		0:04:00		18	0.7	1.2				
39	E	0:37:00		0:41:00		0:04:00		19	0.6	1.1				
40	W	0:44:00		0:46:00		0:02:00		19	0.6	1.1				
41	E	0:48:00		0:50:00		0:02:00		19	0.6	1.1				

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name										
	7/27/2018		208		78654		92		SoCal Wildfire Block 3 C										
Operator		Aircraft			HOBB5 Start			Local Start Time			ZULU Start Time		Base						
Denham		N41GD			166.1			9:43:00			16:43:00		WOOLPERT PIN						
Pilot		Sensor Type/Number			HOBB5 END			Local End Time			Zulu End Time		PID						
Raffensberger		SH8194			170.5			2:13			21:13		WHP						
Wind Dir/Speed		Visibility		Ceiling		Cloud Cover %		Temp		Dew Point		Pressure		Haze/Fire/Cloud		Departing		WHP	
																Arriving		WHP	
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		B				
Air Speed		AGL			MSL			Waveform Used			Waveform Mode				Pre-Trigger Dist.				
150		Kts		Ft		8500			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:			9:24:00		
		↑ Times entered are Zulu / GMT ↓											Verify S-Turns Before Mission			Yes	X	No	
28	SW	17:26:00		17:32:00		0:06:00		13	0.9	1.7									
29	NE	17:34:00		17:40:00		0:06:00		14	0.8	1.4									
30	SW	17:43:00		17:49:00		0:06:00		14	0.8	1.4									
31	NE	17:51:00		17:58:00		0:07:00		16	0.8	1.3									
32	SW	18:01:00		18:08:00		0:07:00		16	0.9	1.6									
33	NE	18:10:00		18:17:00		0:07:00		16	0.7	1.3									
34	SW	18:20:00		18:27:00		0:07:00		17	0.7	1.3									
35	NE	18:30:00		18:38:00		0:08:00		17	0.7	1.2									
36	SW	18:40:00		18:49:00		0:09:00		18	0.6	1.1									
37	NE	18:51:00		18:59:00		0:08:00		17	0.7	1.1									
38	SW	19:02:00		19:08:00		0:06:00		18	0.6	1.2									
39	NE	19:11:00		19:18:00		0:07:00		18	0.7	1.3									
40	SW	19:20:00		19:28:00		0:08:00		19	0.6	1.1									
41	SW	19:42:00		19:44:00		0:02:00		18	0.6	1.2									
42	NE	19:46:00		19:49:00		0:03:00		18	0.6	1.2									
43	SW	19:53:00		19:56:00		0:03:00		19	0.6	1.1									
44	NE	19:59:00		20:02:00		0:03:00		19	0.6	1.1									
45	SW	20:05:00		20:08:00		0:03:00		19	0.6	1.1									
46	NE	20:10:00		20:13:00		0:03:00		20	0.6	1.1									
47	SW	20:15:00		20:18:00		0:03:00		20	0.6	1.1									
48	NE	20:20:00		20:23:00		0:03:00		20	0.7	1.2									
49	SW	20:28:00		20:34:00		0:06:00		19	0.7	1.3									
50	NE	20:35:00		20:39:00		0:04:00		19	0.7	1.3									

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name						
	7/28/2018	209	78654	2	USGS SoCal Wildfire lidar Block 3D						
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base	
Ryan		404CP		6838.0		9:35:00		16:35:00			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID	
Russ		8191		6844.6		16:25		23:25			
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	RAL
VRB 03	6	SKC	0	23	19	2995				Arriving	RAL
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		B	
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	12500	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	E	17:05:00	17:07:00	0:02:00	15	0.8	1.5				
21	W	17:10:00	17:14:00	0:04:00	15	0.8	1.5				
22	E	17:17:00	17:21:00	0:04:00	15	0.8	1.5				
23	W	17:24:00	17:29:00	0:05:00	15	0.8	1.5				
24	E	17:32:00	17:37:00	0:05:00	16	0.8	1.2				
25	W	17:40:00	17:49:00	0:09:00	15	0.8	1.4				
26	E	17:52:00	18:01:00	0:09:00	16	1	1.6				
27	W	18:04:00	18:12:00	0:08:00	18	0.7	1.2				
28	E	18:15:00	18:23:00	0:08:00	18	0.7	1.2				
29	W	18:26:00	18:34:00	0:08:00	20	0.6	1.1				
30	E	18:38:00	18:46:00	0:08:00	19	0.7	1.2				
31	W	18:49:00	18:57:00	0:08:00	19	0.7	1.2				
32	E	19:00:00	19:08:00	0:08:00	21	0.6	1.2				
33	W	19:11:00	19:19:00	0:08:00	23	0.6	1.2				
34	E	19:22:00	19:30:00	0:08:00	22	0.7	1.3				
35	W	19:33:00	19:41:00	0:08:00	22	0.7	1.2				
36	E	19:43:00	19:50:00	0:07:00	22	0.7	1.3				
37	W	19:52:00	19:58:00	0:06:00	22	0.7	1.2				
38	E	20:00:00	20:05:00	0:05:00	22	0.7	1.1				
39	W	20:09:00	20:12:00	0:03:00	20	0.7	1.2				
40	E	20:15:00	20:19:00	0:04:00	20	0.7	1.2				
41	E	20:27:00	20:30:00	0:03:00	19	0.7	1.3				
42	W	20:33:00	20:38:00	0:05:00	19	0.7	1.3				
43	E	20:41:00	20:46:00	0:05:00	19	0.7	1.3				
44	W	20:49:00	20:56:00	0:07:00	18	0.7	1.4				
45	E	20:58:00	21:04:00	0:06:00	19	0.8	1.5				
46	W	21:08:00	21:15:00	0:07:00	20	0.7	1.3				
47	E	21:17:00	21:23:00	0:06:00	21	0.6	1.1				
48	W	21:26:00	21:33:00	0:07:00	22	0.6	1.2	small cloud 25			
49	E	21:35:00	21:42:00	0:07:00	21	0.6	1.2	rain			
60	W	21:48:00	21:49:00	0:01:00	23	0.6	1.2				
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X No
Additional Comments:										Drive #	

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name								
	7/28/2018		209		78654		92		SoCal Wildfire Block 3 C								
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base					
Denham		N41GD			170.5		9:51:00			16:51:00		WOOLPERT PIN					
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID					
Raffensberger		SH8194			174.1		1:30			20:30		WHP					
Wind Dir/Speed		Visibility	Ceiling	Cloud Cover %		Temp	Dew Point		Pressure		Haze/Fire/Cloud		Departing	WHP			
													Arriving	L35			
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		B			
Air Speed		AGL			MSL		Waveform Used			Waveform Mode			Pre-Trigger Dist.				
150		Kts		Ft	10500		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	
51	SE	17:37:00		17:42:00		0:05:00		16	0.8	1.3							
52	NW	17:44:00		17:49:00		0:05:00		15	0.8	1.4							
53	SE	17:51:00		17:56:00		0:05:00		17	0.8	1.2							
54	SE	18:08:00		18:14:00		0:06:00		17	0.7	1.2		COULDN'T MAKE NW TURN DUE TO MOUNTAINS					
55	NW	18:17:00		18:23:00		0:06:00		18	0.5	1.2							
56	SE	18:25:00		18:33:00		0:08:00		19	0.7	1.3							
57	NW	18:36:00		18:44:00		0:08:00		20	0.7	1.1							
58	SE	18:46:00		18:54:00		0:08:00		18	0.7	1.2							
59	NW	18:57:00		19:05:00		0:08:00		21	0.7	1.1							
60	SE	19:07:00		19:15:00		0:08:00		22	0.6	1.2							
61	NW	19:18:00		19:26:00		0:08:00		23	0.6	1.2							
62	SE	19:28:00		19:37:00		0:09:00		21	0.7	1.3							
63	NW	19:39:00		19:43:00		0:04:00		21	0.7	1.3							
64	SE	19:45:00		19:48:00		0:03:00		22	0.7	1.2							
65	NW	19:51:00		19:53:00		0:02:00		22	0.7	1.2							
66	SE	19:55:00		19:57:00		0:02:00		22	0.7	1.2							
67	NW	19:59:00		20:01:00		0:02:00		22	0.7	1.2							
68	SE	20:04:00		20:06:00		0:02:00		22	0.7	1.1							
69	NW	20:08:00		20:10:00		0:02:00		22	0.7	1.2							
		↑ Times entered are Zulu / GMT ↑				Page			1			Verify S-Turns After Mission		Yes	X	No	
Additional Comments:																Drive #	
BLOCK 3 C.																	

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name			
	7/29/2018		210		78654		2		USGS SoCal Wildfire lidar Block 3D			
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base		
Ryan		404CP		6844.6		9:14:00		16:14:00				
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID		
Russ		8191		6851.6		16:19		23:19				
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	RAL	
0	10	SKC	0	26	18	3001				Arriving	RAL	
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		B		
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.		
150	Kts	6500	Ft	12500	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	16:44:00	16:48:00	0:04:00	15	0.8	1.4					
2	N	16:51:00	16:56:00	0:05:00	15	0.8	1.4					
3	S	16:59:00	17:04:00	0:05:00	15	0.8	1.4					
4	N	17:07:00	17:11:00	0:04:00	13	0.8	1.5					
5	S	17:14:00	17:18:00	0:04:00	14	0.8	1.5					
6	N	17:21:00	17:26:00	0:05:00	14	0.8	1.5					
7	S	17:29:00	17:34:00	0:05:00	14	0.9	1.5					
8	N	17:37:00	17:42:00	0:05:00	14	0.9	1.6					
9	S	17:46:00	17:51:00	0:05:00	14	0.8	1.3					
10	N	17:54:00	17:59:00	0:05:00	14	0.8	1.3					
11	S	18:02:00	18:07:00	0:05:00	15	0.8	1.3					
12	N	18:10:00	18:13:00	0:03:00	15	0.8	1.3					
13	S	18:16:00	18:19:00	0:03:00	15	0.8	1.4					
14	N	18:22:00	18:24:00	0:02:00	17	0.7	1.1					
15	S	18:27:00	18:29:00	0:02:00	17	0.7	1.1					
16	N	18:33:00	18:34:00	0:01:00	17	0.7	1.1					
17	S	18:37:00	18:39:00	0:02:00	17	0.7	1.1					
18	E	18:42:00	18:43:00	0:01:00	16	0.7	1.2	TO count on TDC 0 for last second error				
61	S	19:05:00	19:07:00	0:02:00	17	0.7	1.2	Rebooted system				
62	N	19:10:00	19:13:00	0:03:00	17	0.7	1.3					
63	S	19:17:00	19:20:00	0:03:00	17	0.7	1.3					
64	N	19:26:00	19:33:00	0:07:00	18	0.7	1.3	clouds 1-3				
81	S	19:40:00	19:43:00	0:03:00	17	0.7	1.3	clouds 4, 9, 10				
77	N	19:47:00	19:48:00	0:01:00	19	0.6	1.2					
76	S	19:51:00	19:54:00	0:03:00	19	0.6	1.2					
75	N	19:57:00	19:59:00	0:02:00	19	0.6	1.1	N.G clouds				
79	S	20:03:00	20:06:00	0:03:00	20	0.6	1.1	N.G clouds				
71	N	20:12:00	20:14:00	0:02:00	19	0.6	1.2	N.G clouds				
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X	No
Additional Comments:										Drive #		

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name			
	7/29/2018		210		78654		2		USGS SoCal Wildfire lidar Block 3D			
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base		
Ryan		404CP		6844.6		9:14:00		16:14:00				
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID		
Russ		8191		6851.6		16:19		23:19				
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	RAL	
0	10	SKC	0	26	18	3001				Arriving	RAL	
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		B		
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.		
150	Kts	6500	Ft	12500	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	16:44:00	16:48:00	0:04:00	15	0.8	1.4					
2	N	16:51:00	16:56:00	0:05:00	15	0.8	1.4					
3	S	16:59:00	17:04:00	0:05:00	15	0.8	1.4					
4	N	17:07:00	17:11:00	0:04:00	13	0.8	1.5					
5	S	17:14:00	17:18:00	0:04:00	14	0.8	1.5					
6	N	17:21:00	17:26:00	0:05:00	14	0.8	1.5					
7	S	17:29:00	17:34:00	0:05:00	14	0.9	1.5					
8	N	17:37:00	17:42:00	0:05:00	14	0.9	1.6					
9	S	17:46:00	17:51:00	0:05:00	14	0.8	1.3					
10	N	17:54:00	17:59:00	0:05:00	14	0.8	1.3					
11	S	18:02:00	18:07:00	0:05:00	15	0.8	1.3					
12	N	18:10:00	18:13:00	0:03:00	15	0.8	1.3					
13	S	18:16:00	18:19:00	0:03:00	15	0.8	1.4					
14	N	18:22:00	18:24:00	0:02:00	17	0.7	1.1					
15	S	18:27:00	18:29:00	0:02:00	17	0.7	1.1					
16	N	18:33:00	18:34:00	0:01:00	17	0.7	1.1					
17	S	18:37:00	18:39:00	0:02:00	17	0.7	1.1					
18	E	18:42:00	18:43:00	0:01:00	16	0.7	1.2	TO count on TDC 0 for last second error				
61	S	19:05:00	19:07:00	0:02:00	17	0.7	1.2	Rebooted system				
62	N	19:10:00	19:13:00	0:03:00	17	0.7	1.3					
63	S	19:17:00	19:20:00	0:03:00	17	0.7	1.3					
64	N	19:26:00	19:33:00	0:07:00	18	0.7	1.3	clouds 1-3				
81	S	19:40:00	19:43:00	0:03:00	17	0.7	1.3	clouds 4, 9, 10				
77	N	19:47:00	19:48:00	0:01:00	19	0.6	1.2					
76	S	19:51:00	19:54:00	0:03:00	19	0.6	1.2					
75	N	19:57:00	19:59:00	0:02:00	19	0.6	1.1	N.G clouds				
79	S	20:03:00	20:06:00	0:03:00	20	0.6	1.1	N.G clouds				
71	N	20:12:00	20:14:00	0:02:00	19	0.6	1.2	N.G clouds				
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X	No
Additional Comments:											Drive #	

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR	Day of Year	Project #	Phase #	Project Name						
	7/30/2018	211	78654	2	USGS SoCal Wildfire lidar Block 3E and 3D						
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base	
Ryan		404CP		6851.6		9:34:00		16:34:00			
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID	
Russ		8191		6856.8		15:03		22:03			
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	RAL
0	10	200	BKN	27	17	2997				Arriving	RAL
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		B	
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.	
150	Kts	6500	Ft	14500	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
42	S	17:15:00	17:17:00	0:02:00	14	0.9	1.5	3E 14,500 MSL			
43	N	17:20:00	17:22:00	0:02:00	14	0.9	1.5				
44	S	17:25:00	17:28:00	0:03:00	15	0.9	1.5				
45	N	17:30:00	17:32:00	0:02:00	15	0.8	1.3	sm cloud frame 6			
46	S	17:36:00	17:38:00	0:02:00	14	0.8	1.4				
47	N	17:41:00	17:43:00	0:02:00	15	0.8	1.3	sm cloud frame 5			
48	S	17:47:00	17:49:00	0:02:00	15	1	1.7				
49	N	17:51:00	17:54:00	0:03:00	15	0.7	1.3				
50	S	17:57:00	17:58:00	0:01:00	16	0.7	1.3				
47	N	18:00:00	18:02:00	0:02:00	16	0.7	1.3	sm cloud frame 6			
45	S	18:05:00	18:07:00	0:02:00	16	0.7	1.3	clouds frame 1-5			
81	S	18:13:00	18:14:00	0:01:00	16	0.7	1.4	Block 3D 12,500 MSL			
80	N	18:17:00	18:20:00	0:03:00	17	0.7	1.4	clouds frame 2			
79	S	18:22:00	18:25:00	0:03:00	18	0.7	1.2	clouds frame 9			
78	N	18:27:00	18:30:00	0:03:00	18	0.7	1.2				
77	S	18:34:00	18:36:00	0:02:00	18	0.7	1.2	reflown for possible clouds			
76	N	18:38:00	18:40:00	0:02:00	18	0.7	1.2	reflown for possible clouds			
75	S	18:44:00	18:46:00	0:02:00	18	0.7	1.3				
74	N	18:49:00	18:51:00	0:02:00	19	0.7	1.4				
73	S	18:53:00	18:54:00	0:01:00	18	0.7	1.5				
72	N	18:57:00	18:58:00	0:01:00	19	0.7	1.5				
64	S	19:04:00	19:11:00	0:07:00	19	0.7	1.2	cloud frame 3			
65	N	19:14:00	19:20:00	0:06:00	18	0.7	1.3	clouds frame 2,3			
66	S	19:24:00	19:30:00	0:06:00	18	0.7	1.3	clouds frame 2-4, 10			
67	N	19:35:00	19:39:00	0:04:00	17	0.7	1.3	stopped line 3/4 way through/ clouds			
				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

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name			
	8/2/2018		214		78654		92		SoCal Wildfire Block 3 C/ BLOCK 3 B			
Operator		Aircraft		HOBBS Start		Local Start Time		ZULU Start Time		Base		
Denham		N41GD		170.5		3:05:00		22:05:00		WOOLPERT PIN		
Pilot		Sensor Type/Number		HOBBS END		Local End Time		Zulu End Time		PID		
Raffensberger		SH8194		180.3		8:00		3:00		WHP		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing	WHP	
										Arriving		
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		B
Air Speed		AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.		
150		Kts		Ft	10500/8500	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:		2:57:00		
		↑ Times entered are Zulu / GMT ↓						Verify S-Turns Before Mission		Yes	X	No
70	NE	22:53:00	22:53:00	0:00:00	18	0.7	1.1	FAST				
70	SW	22:56:00	22:57:00	0:01:00	18	0.7	1.2	REFLIGHT				
71	SE	23:00:00	23:02:00	0:02:00	17	0.7	1.3					
103	NW	23:09:00	23:10:00	0:01:00	16	0.9	1.5					
104	SE	23:13:00	23:15:00	0:02:00	15	1	2.2	PDOP HIGH				
105	NW	23:17:00	23:19:00	0:02:00	15	1	1.9					
106	SE	23:21:00	23:23:00	0:02:00	15	1	1.9					
72	NW	23:26:00	23:34:00	0:08:00	16	1	1.7					
73	SE	23:36:00	23:44:00	0:08:00	16	0.9	1.7					
74	NW	23:46:00	23:54:00	0:08:00	16	0.8	1.6					
75	SE	23:56:00	0:04:00	0:08:00	17	0.7	1.3					
76	NW	0:06:00	0:14:00	0:08:00	18	0.7	1.1					
77	SE	0:16:00	0:24:00	0:08:00	18	0.7	1.1					
78	NW	0:26:00	0:33:00	0:07:00	18	0.7	1.1					
79	SE	0:35:00	0:42:00	0:07:00	16	0.8	1.2					
80	NW	0:45:00	0:51:00	0:06:00	19	0.7	1.2					
81	SE	0:54:00	1:00:00	0:06:00	16	0.7	1.3					
82	NW	1:03:00	1:09:00	0:06:00	18	0.7	1.3					
83	SE	1:12:00	1:18:00	0:06:00	16	0.7	1.2					
84	NW	1:20:00	1:27:00	0:07:00	16	0.7	1.2					
85	SE	1:30:00	1:36:00	0:06:00	15	0.8	1.4					
86	NW	1:39:00	1:45:00	0:06:00	16	0.8	1.4					
87	SE	1:47:00	1:53:00	0:06:00	17	0.8	1.5					
100	NW	1:57:00	1:59:00	0:02:00	16	0.8	1.6	BLOCK 3 B				
99	SE	2:01:00	2:05:00	0:04:00	16	0.8	1.5	BLOCK 3 B				
94	NW	2:07:00	2:15:00	0:08:00	17	0.8	1.3	BLOCK 3 B				
		↑ Times entered are Zulu / GMT ↑		Page		1		Verify S-Turns After Mission		Yes	X	No
Additional Comments:											Drive #	
BLOCK 3C/BLOCK 3B BASE STATION FILES: 42552140.T01, 42552150.T01												

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

Leica LIDAR	MM/DD/YEAR		Day of Year		Project #		Phase #		Project Name							
	8/6/2016		218		78654		92		SoCal Wildfire Block 3A/ Block 3B							
Operator		Aircraft			HOBBS Start		Local Start Time			ZULU Start Time		Base				
Denham		N41GD			181.7		8:11:00			3:11:00		WOOLPERT PIN				
Pilot		Sensor Type/Number			HOBBS END		Local End Time			Zulu End Time		PID				
Raffensberger		SH8194			186.2		12:38			7:38		WHP				
Wind Dir/Speed		Visibility		Ceiling	Cloud Cover %	Temp	Dew Point	Pressure		Haze/Fire/Cloud		Departing		WHP		
												Arriving		WHP		
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	B				
Air Speed		AGL			MSL		Waveform Used		Waveform Mode				Pre-Trigger Dist.			
150		Kts	Ft	6500	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:		2:20:00		
		↑ Times entered are Zulu / GMT ↓										Verify S-Turns Before Mission		Yes	X	No
110	SE	3:54:00	4:05:00	0:11:00	23	0.6	1.3									
109	NW	4:08:00	4:20:00	0:12:00	26	0.5	1	ATC TRAFFIC								
108	SE	4:34:00	4:45:00	0:11:00	24	0.6	1.1									
107	NW	4:48:00	4:59:00	0:11:00	24	0.6	1.2									
106	SE	5:02:00	5:13:00	0:11:00	25	0.6	1.1									
105	NW	5:16:00	5:27:00	0:11:00	25	0.6	1.1									
104	SE	5:30:00	5:41:00	0:11:00	25	0.6	1.1									
103	NW	5:44:00	5:52:00	0:08:00	24	0.6	1.1	ATC TRAFFIC [GMU DATA MISSING]								
103	NW	6:02:00	6:08:00	0:06:00	24	0.6	1.1	UL001-MANUAL MODE-LINE PATCH								
102	SE	6:12:00	6:23:00	0:11:00	24	0.6	1.1									
101	NW	6:25:00	6:37:00	0:12:00	24	0.6	1									
100	SE	6:40:00	6:51:00	0:11:00	24	0.6	1.1									
99	NW	6:54:00	7:06:00	0:12:00	22	0.7	1.1									
				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												
				0:00:00												
		↑ Times entered are Zulu / GMT ↑			Page		1	Verify S-Turns After Mission		Yes	X	No				
Additional Comments:													Drive #			
BLOCK 3A . STUCK IN BETWEEN RESTRICTED AIRPACE AND CLASS B AIRSPACE.																

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Woolpert

[illegible]

Appendix 2: Raw Swath NVA Checkpoint Results

Coordinate values are listed in the following spatial reference system:

Horizontal: NAD83 (2011) Albers Equal Area, meters (EPSG 6350)

Vertical: NAVD88 (GEOID12B) meters

Summary	
Point Count	205
Average dZ	0.012 m
Minimum dZ	-0.196 m
Maximum dZ	0.202 m
Average Magnitude	0.040 m
Root Mean Square	0.053 m
Standard Deviation	0.052 m

Point ID	Easting	Northing	Known Z	Laser Z	dZ
2001_2018_CA	-2087649.846	1525749.593	1604.161	1604.110	-0.051
2002_2018_CA	-2068483.632	1541795.853	2046.232	2046.240	0.008
2003_2018_CA	-2094532.538	1532018.775	1059.502	1059.600	0.098
2004_2018_CA	-2067564.943	1538230.153	2053.217	2053.170	-0.047
2005_2018_CA	-2108029.506	1531999.645	462.122	462.190	0.068
2006_2018_CA	-2101823.119	1525084.258	221.855	221.850	-0.005
2007_2018_CA	-2094547.949	1521822.784	265.378	265.480	0.102
2008_2018_CA	-2105740.223	1516143.329	89.423	89.370	-0.053
2009_2018_CA	-2066546.818	1519552.655	680.849	680.880	0.031
2010_2018_CA	-2100907.796	1501094.049	37.956	37.920	-0.036
2011_2018_CA	-2100615.378	1501193.463	39.946	39.920	-0.026
2012_2018_CA	-2097680.799	1490984.794	11.171	11.250	0.079
2013_2018_CA	-2097667.661	1490955.921	11.033	11.150	0.117
2014_2018_CA	-2093116.020	1483381.287	2.641	2.720	0.079
2015_2018_CA	-2087530.356	1489479.594	20.948	20.980	0.032
2016_2018_CA	-2076211.686	1485746.619	250.690	250.710	0.020
2017_2018_CA	-2084797.555	1514285.102	211.867	211.860	-0.007
2018_2018_CA	-2064109.641	1484257.234	371.998	372.040	0.042
2019_2018_CA	-2054223.589	1516668.443	338.460	338.480	0.020

Point ID	Easting	Northing	Known Z	Laser Z	dZ
2020_2018_CA	-2068994.927	1494605.594	196.403	196.430	0.027
2021_2018_CA	-2053027.936	1494682.450	353.786	353.870	0.084
2022_2018_CA	-2077846.360	1503567.858	282.384	282.370	-0.014
2023_2018_CA	-2067400.328	1507689.031	148.859	148.900	0.041
2025_2018_CA	-2093114.998	1508114.936	115.289	115.320	0.031
2026_2018_CA	-2054411.841	1513778.935	363.440	363.490	0.050
2027_2018_CA	-2077474.163	1550507.156	1562.089	1562.060	-0.029
2028_2018_CA	-2095460.742	1550730.045	1177.868	1177.900	0.032
2029_2018_CA	-2105195.100	1555334.261	1095.646	1095.670	0.024
2030_2018_CA	-2104381.139	1559137.620	1006.415	1006.480	0.065
2031_2018_CA	-2106169.035	1563944.040	951.359	951.330	-0.029
2032_2018_CA	-2107822.853	1571055.861	856.489	856.480	-0.009
2033_2018_CA	-2108409.182	1581800.888	747.669	747.670	0.001
2034_2018_CA	-2108820.894	1577504.433	793.914	793.900	-0.014
2035_2018_CA	-2080164.421	1540497.359	1465.049	1465.120	0.071
2036_2018_CA	-2107135.314	1568031.585	907.445	907.390	-0.055
2037_2018_CA	-2122145.037	1581098.232	762.981	762.990	0.009
2038_2018_CA	-2098624.298	1544733.477	2177.622	2177.550	-0.072
2039_2018_CA	-2125102.409	1588517.124	626.168	626.130	-0.038
2040_2018_CA	-2140392.724	1594669.285	695.664	695.610	-0.054
2041_2018_CA	-2134697.693	1590173.483	755.158	755.160	0.002
2042_2018_CA	-2134845.618	1596102.018	556.717	556.680	-0.037
2043_2018_CA	-2138223.516	1601253.789	504.022	503.990	-0.032
2044_2018_CA	-2148902.228	1609232.348	429.831	429.860	0.029
2045_2018_CA	-2164361.908	1624758.330	711.782	711.770	-0.012
2046_2018_CA	-2174501.505	1611499.638	200.142	200.160	0.018
2047_2018_CA	-2171998.304	1613739.520	220.489	220.470	-0.019
2048_2018_CA	-2163591.254	1609641.939	299.720	299.710	-0.010
2049_2018_CA	-2157570.151	1617849.486	413.374	413.400	0.026
2050_2018_CA	-2167002.616	1602179.887	469.575	469.490	-0.085
2051_2018_CA	-2083811.431	1566980.655	1857.545	1857.510	-0.035
2052_2018_CA	-2136435.631	1583958.674	1665.230	1665.210	-0.020
2053_2018_CA	-2141901.733	1586489.315	1640.799	1640.730	-0.069
2054_2018_CA	-2145664.842	1590985.875	1506.886	1506.690	-0.196

Point ID	Easting	Northing	Known Z	Laser Z	dZ
2055_2018_CA	-2149153.583	1597727.197	1499.264	1499.220	-0.044
2056_2018_CA	-2130789.324	1593033.243	578.887	578.890	0.003
2057_2018_CA	-2127153.277	1586490.330	684.691	684.650	-0.041
2058_2018_CA	-2151486.879	1602741.692	1267.072	1267.030	-0.042
2059_2018_CA	-2085520.723	1475423.140	9.094	9.100	0.006
2060_2018_CA	-2048594.503	1553430.053	1174.822	1174.780	-0.042
2061_2018_CA	-2038126.170	1552055.308	951.073	951.040	-0.033
2062_2018_CA	-1967862.707	1561630.986	833.726	833.710	-0.016
2063_2018_CA	-2030973.310	1549910.048	910.591	910.590	-0.001
2064_2018_CA	-2025216.246	1549350.894	891.341	891.330	-0.011
2065_2018_CA	-2020672.101	1548281.178	857.861	857.860	-0.001
2066_2018_CA	-2013648.525	1546679.428	799.540	799.570	0.030
2067_2018_CA	-2003552.491	1544362.817	741.729	741.680	-0.049
2068_2018_CA	-1990275.998	1545318.111	716.323	716.300	-0.023
2069_2018_CA	-1990293.544	1545321.938	716.096	716.050	-0.046
2070_2018_CA	-1987096.747	1565857.045	844.321	844.300	-0.021
2071_2018_CA	-1987096.537	1565871.938	844.447	844.420	-0.027
2074_2018_CA	-1942427.236	1558990.853	813.784	813.810	0.026
2077_2018_CA	-1948645.853	1526403.168	882.804	882.790	-0.014
2078_2018_CA	-1942215.472	1593502.927	692.394	692.410	0.016
2079_2018_CA	-1946035.842	1520886.876	935.575	935.520	-0.055
2080_2018_CA	-1980860.780	1554744.616	761.580	761.590	0.010
2081_2018_CA	-1986615.652	1556794.380	784.198	784.150	-0.048
2082_2018_CA	-2001307.597	1560084.712	961.999	962.020	0.021
2083_2018_CA	-2002454.778	1563328.709	1077.312	1077.340	0.028
2084_2018_CA	-2007532.900	1558652.353	1085.674	1085.670	-0.004
2085_2018_CA	-1933266.419	1572002.944	868.738	868.720	-0.018
2086_2018_CA	-2017817.120	1556082.457	991.438	991.460	0.022
2087_2018_CA	-2021872.523	1555130.081	1084.802	1084.810	0.008
2088_2018_CA	-2029917.348	1555534.548	1128.742	1128.730	-0.012
2089_2018_CA	-2014487.657	1558072.653	1078.142	1078.130	-0.012
2089A_2018_CA	-2014520.828	1555062.486	956.470	956.470	0.000
2090_2018_CA	-1982949.341	1601928.343	1204.426	1204.460	0.034
2091_2018_CA	-1997853.905	1579680.822	1254.751	1254.740	-0.011

Point ID	Easting	Northing	Known Z	Laser Z	dZ
2092_2018_CA	-2002465.369	1582693.107	1329.258	1329.260	0.002
2093_2018_CA	-1987740.355	1575495.253	1122.502	1122.490	-0.012
2094_2018_CA	-2006321.515	1573312.154	1336.559	1336.540	-0.019
2095_2018_CA	-1994464.036	1568877.291	1086.469	1086.520	0.051
2098_2018_CA	-1952937.232	1562611.524	745.545	745.570	0.025
2099_2018_CA	-1950891.816	1570492.381	820.332	820.320	-0.012
2100_2018_CA	-1948062.876	1575844.271	907.113	907.100	-0.013
2101_2018_CA	-1944772.563	1582575.956	1100.569	1100.590	0.021
2102_2018_CA	-1958304.098	1591560.543	589.772	589.810	0.038
2103_2018_CA	-1962302.462	1602114.116	1008.236	1008.290	0.054
2104_2018_CA	-1968185.541	1590976.056	725.693	725.760	0.067
2105_2018_CA	-1971800.730	1582572.579	715.351	715.320	-0.031
2106_2018_CA	-1978513.977	1575145.524	808.914	808.850	-0.064
2107_2018_CA	-1954487.192	1495916.478	1006.354	1006.390	0.036
2108_2018_CA	-1953330.033	1500777.111	939.706	939.730	0.024
2109_2018_CA	-1953453.244	1505861.973	890.310	890.300	-0.010
2110_2018_CA	-1954616.387	1491765.150	1090.226	1090.260	0.034
2111_2018_CA	-1956537.027	1490515.407	1127.995	1127.990	-0.005
2112_2018_CA	-1953842.999	1489091.627	1173.898	1173.970	0.072
2113_2018_CA	-1956567.126	1483672.888	1516.088	1516.070	-0.018
2114_2018_CA	-1957195.262	1483127.357	1605.335	1605.340	0.005
2115_2018_CA	-1954599.128	1475825.040	1762.667	1762.720	0.053
2116_2018_CA	-1956232.067	1471256.609	1845.519	1845.580	0.061
2117_2018_CA	-1946300.266	1471268.948	1003.756	1003.770	0.014
2118_2018_CA	-1945188.513	1466428.617	869.831	869.910	0.079
2119_2018_CA	-1942575.878	1420940.098	499.657	499.620	-0.037
2120_2018_CA	-1960921.611	1433009.645	179.358	179.350	-0.008
2121_2018_CA	-1960925.831	1432991.141	179.387	179.360	-0.027
2122_2018_CA	-1942580.149	1420922.488	499.509	499.440	-0.069
2123_2018_CA	-1950812.886	1468546.066	1297.819	1297.890	0.071
2124_2018_CA	-1965572.735	1462004.740	896.793	896.870	0.077
2125_2018_CA	-1962005.460	1457669.366	701.409	701.580	0.171
2126_2018_CA	-1945062.362	1457940.659	684.890	684.960	0.070
2127_2018_CA	-1950737.374	1452602.806	446.456	446.460	0.004

Point ID	Easting	Northing	Known Z	Laser Z	dZ
2128_2018_CA	-1940146.544	1449926.803	444.913	444.960	0.047
2129_2018_CA	-1933739.924	1453244.760	449.986	450.010	0.024
2130_2018_CA	-1906218.532	1454044.064	2174.611	2174.620	0.009
2131_2018_CA	-1921699.772	1456308.872	1715.071	1715.120	0.049
2132_2018_CA	-1891611.927	1442332.487	1979.132	1979.270	0.138
2133_2018_CA	-1925026.614	1439095.309	403.920	403.940	0.020
2134_2018_CA	-1922223.221	1448393.926	634.532	634.560	0.028
2135_2018_CA	-1893666.828	1450999.162	2080.722	2080.650	-0.072
2136_2018_CA	-1883602.404	1446895.764	2281.328	2281.420	0.092
2137_2018_CA	-1900552.639	1448679.227	2408.442	2408.380	-0.062
2138_2018_CA	-1905248.314	1441689.987	1702.843	1702.930	0.087
2139_2018_CA	-1916263.388	1413048.423	465.919	465.940	0.021
2140_2018_CA	-1914587.732	1436374.235	718.874	718.840	-0.034
2141_2018_CA	-1912987.617	1428442.023	792.521	792.470	-0.051
2142_2018_CA	-2013738.354	1422637.191	3.031	3.180	0.149
2143_2018_CA	-2007346.052	1428964.949	11.947	12.000	0.053
2143A_2018_CA	-2012190.646	1425614.566	4.003	4.170	0.167
2144_2018_CA	-2001472.970	1431962.164	26.793	26.820	0.027
2145_2018_CA	-1995244.868	1431427.428	49.980	50.000	0.020
2146_2018_CA	-1998432.750	1436551.658	142.235	142.260	0.025
2147_2018_CA	-1991735.927	1436592.420	107.065	107.100	0.035
2148_2018_CA	-1984190.442	1435805.492	307.136	307.190	0.054
2149_2018_CA	-1985861.285	1431297.214	107.523	107.580	0.057
2150_2018_CA	-2003357.613	1411035.443	4.355	4.500	0.145
2151_2018_CA	-1997268.367	1416636.160	20.669	20.730	0.061
2152_2018_CA	-1991844.335	1422279.980	54.302	54.300	-0.002
2153_2018_CA	-1982540.804	1420205.628	172.510	172.460	-0.050
2154_2018_CA	-1977219.632	1391211.639	179.505	179.490	-0.015
2155_2018_CA	-1981798.271	1384637.937	64.521	64.560	0.039
2156_2018_CA	-1970206.443	1400149.837	349.296	349.270	-0.026
2157_2018_CA	-1951314.755	1392380.783	930.816	930.890	0.074
2158_2018_CA	-1965522.381	1419886.159	409.101	409.020	-0.081
2159_2018_CA	-1970862.555	1432904.417	178.259	178.250	-0.009
2160_2018_CA	-1971865.783	1450688.306	322.428	322.630	0.202

Point ID	Easting	Northing	Known Z	Laser Z	dZ
2161_2018_CA	-1961444.187	1447535.821	311.642	311.610	-0.032
2161A_2018_CA	-1961447.781	1447443.771	311.089	311.110	0.021
2162_2018_CA	-1952157.943	1440856.239	284.272	284.300	0.028
2163_2018_CA	-1942612.816	1440788.288	307.062	307.080	0.018
2163A_2018_CA	-1942650.176	1440797.093	307.363	307.350	-0.013
2164_2018_CA	-1948773.619	1431475.225	233.897	233.850	-0.047
2165_2018_CA	-1952160.251	1420210.217	403.163	403.080	-0.083
2166_2018_CA	-1889720.524	1382518.986	1432.612	1432.700	0.088
2167_2018_CA	-1903954.470	1390438.181	682.228	682.230	0.002
2168_2018_CA	-1912803.961	1395478.731	559.195	559.230	0.035
2169_2018_CA	-1926768.232	1409297.469	448.831	448.800	-0.031
2170_2018_CA	-1937191.464	1407798.601	483.191	483.220	0.029
2171_2018_CA	-1954822.607	1407538.867	363.384	363.390	0.006
2172_2018_CA	-1938429.002	1396607.130	425.412	425.510	0.098
2173_2018_CA	-2209896.408	1579140.824	5.294	5.330	0.036
2174A_2018_CA	-2150154.469	1567848.714	993.775	993.820	0.045
2175_2018_CA	-2207484.482	1567774.243	213.192	213.220	0.028
2176_2018_CA	-2104025.743	1542654.769	1281.802	1281.820	0.018
2177_2018_CA	-2200449.314	1579762.686	73.017	73.000	-0.017
2178_2018_CA	-2192304.343	1576013.062	146.527	146.530	0.003
2179A_2018_CA	-2200722.082	1571115.428	27.767	27.770	0.003
2179B_2018_CA	-2200658.573	1571097.993	28.120	28.130	0.010
2180_2018_CA	-2142889.719	1533334.061	58.065	58.120	0.055
2181_2018_CA	-2142903.622	1533337.414	58.478	58.530	0.052
2182_2018_CA	-2194387.250	1562527.640	132.829	132.870	0.041
2183_2018_CA	-2207192.677	1557458.944	29.058	29.070	0.012
2184_2018_CA	-2202061.353	1566325.859	124.895	124.940	0.045
2185_2018_CA	-2183085.549	1551727.149	104.196	104.250	0.054
2186_2018_CA	-2170380.494	1543432.477	11.895	11.960	0.065
2187_2018_CA	-2162199.713	1540204.465	45.059	45.050	-0.009
2188_2018_CA	-2125157.082	1528462.970	253.958	254.000	0.042
2189_2018_CA	-2128289.307	1533784.364	924.191	924.180	-0.011
2190_2018_CA	-2150036.340	1563916.378	700.259	700.180	-0.079
2191_2018_CA	-2157357.874	1571219.881	968.665	968.640	-0.025

Point ID	Easting	Northing	Known Z	Laser Z	dZ
2192_2018_CA	-2145444.214	1545875.791	280.404	280.470	0.066
2193_2018_CA	-2160298.394	1557911.007	213.136	213.150	0.014
2194A_2018_CA	-2150466.232	1563861.614	730.843	730.800	-0.043
2195_2018_CA	-2167422.057	1570570.969	309.075	309.090	0.015
2196_2018_CA	-2174280.667	1567345.269	180.239	180.260	0.021
2197_2018_CA	-2174332.784	1557346.320	130.155	130.190	0.035
2198_2018_CA	-2184262.689	1569545.229	184.289	184.300	0.011
2199_2018_CA	-2150776.399	1542417.300	894.243	894.270	0.027
2200_2018_CA	-2164645.393	1549683.103	1019.018	1019.080	0.062
2201_2018_CA	-1934499.709	1596575.446	878.514	878.520	0.006
2202_2018_CA	-1964838.269	1570222.145	709.190	709.200	0.010
2203_2018_CA	-2176995.069	1598026.386	122.095	122.080	-0.015
2204_2018_CA	-1966177.612	1384014.980	475.579	475.600	0.021
2205_2018_CA	-1891920.871	1397134.065	1829.906	1829.850	-0.056
2206_2018_CA	-2120004.879	1523992.030	68.300	68.440	0.140
2207_2018_CA	-2133883.634	1536740.726	1106.856	1106.900	0.044

Appendix 3: DEM NVA Checkpoint Results

Coordinate values are listed in the following spatial reference system:

Horizontal: NAD83 (2011) Albers Equal Area, meters (EPSG 6350)

Vertical: NAVD88 (GEOID12B) meters

Summary	
Point Count	205
Root Mean Square Error	0.057 m
95% Confidence Level	0.112 m
Mean of Residuals	0.044 m
Standard Deviation	0.037 m

Point ID	Easting	Northing	Known Z	DEM Z	dZ
2001_2018_CA	-2087649.846	1525749.593	1604.161	1604.090	0.071
2002_2018_CA	-2068483.632	1541795.853	2046.232	2046.200	0.032
2003_2018_CA	-2094532.538	1532018.775	1059.502	1059.600	0.098
2004_2018_CA	-2067564.943	1538230.153	2053.217	2053.180	0.037
2005_2018_CA	-2108029.506	1531999.645	462.122	462.200	0.078
2006_2018_CA	-2101823.119	1525084.258	221.855	221.890	0.035
2007_2018_CA	-2094547.949	1521822.784	265.378	265.510	0.132
2008_2018_CA	-2105740.223	1516143.329	89.423	89.360	0.063
2009_2018_CA	-2066546.818	1519552.655	680.849	680.910	0.061
2010_2018_CA	-2100907.796	1501094.049	37.956	37.930	0.026
2011_2018_CA	-2100615.378	1501193.463	39.946	39.930	0.016
2012_2018_CA	-2097680.799	1490984.794	11.171	11.280	0.109
2013_2018_CA	-2097667.661	1490955.921	11.033	11.150	0.117
2014_2018_CA	-2093116.020	1483381.287	2.641	2.730	0.089
2015_2018_CA	-2087530.356	1489479.594	20.948	20.980	0.032
2016_2018_CA	-2076211.686	1485746.619	250.690	250.700	0.01
2017_2018_CA	-2084797.555	1514285.102	211.867	211.880	0.013
2018_2018_CA	-2064109.641	1484257.234	371.998	372.060	0.062
2019_2018_CA	-2054223.589	1516668.443	338.460	338.470	0.01
2020_2018_CA	-2068994.927	1494605.594	196.403	196.380	0.023

Point ID	Easting	Northing	Known Z	DEM Z	dZ
2021_2018_CA	-2053027.936	1494682.450	353.786	353.890	0.104
2022_2018_CA	-2077846.360	1503567.858	282.384	282.460	0.076
2023_2018_CA	-2067400.328	1507689.031	148.859	148.900	0.041
2025_2018_CA	-2093114.998	1508114.936	115.289	115.280	0.009
2026_2018_CA	-2054411.841	1513778.935	363.440	363.470	0.03
2027_2018_CA	-2077474.163	1550507.156	1562.089	1562.060	0.029
2028_2018_CA	-2095460.742	1550730.045	1177.868	1177.890	0.022
2029_2018_CA	-2105195.100	1555334.261	1095.646	1095.670	0.024
2030_2018_CA	-2104381.139	1559137.620	1006.415	1006.490	0.075
2031_2018_CA	-2106169.035	1563944.040	951.359	951.290	0.069
2032_2018_CA	-2107822.853	1571055.861	856.489	856.440	0.049
2033_2018_CA	-2108409.182	1581800.888	747.669	747.650	0.019
2034_2018_CA	-2108820.894	1577504.433	793.914	793.910	0.004
2035_2018_CA	-2080164.421	1540497.359	1465.049	1465.120	0.071
2036_2018_CA	-2107135.314	1568031.585	907.445	907.390	0.055
2037_2018_CA	-2122145.037	1581098.232	762.981	762.960	0.021
2038_2018_CA	-2098624.298	1544733.477	2177.622	2177.570	0.052
2039_2018_CA	-2125102.409	1588517.124	626.168	626.130	0.038
2040_2018_CA	-2140392.724	1594669.285	695.664	695.580	0.084
2041_2018_CA	-2134697.693	1590173.483	755.158	755.220	0.062
2042_2018_CA	-2134845.618	1596102.018	556.717	556.670	0.047
2043_2018_CA	-2138223.516	1601253.789	504.022	503.990	0.032
2044_2018_CA	-2148902.228	1609232.348	429.831	429.860	0.029
2045_2018_CA	-2164361.908	1624758.330	711.782	711.780	0.002
2046_2018_CA	-2174501.505	1611499.638	200.142	200.130	0.012
2047_2018_CA	-2171998.304	1613739.520	220.489	220.460	0.029
2048_2018_CA	-2163591.254	1609641.939	299.720	299.720	0
2049_2018_CA	-2157570.151	1617849.486	413.374	413.420	0.046
2050_2018_CA	-2167002.616	1602179.887	469.575	469.470	0.105
2051_2018_CA	-2083811.431	1566980.655	1857.545	1857.510	0.035
2052_2018_CA	-2136435.631	1583958.674	1665.230	1665.180	0.05
2053_2018_CA	-2141901.733	1586489.315	1640.799	1640.740	0.059
2054_2018_CA	-2145664.842	1590985.875	1506.886	1506.700	0.186
2055_2018_CA	-2149153.583	1597727.197	1499.264	1499.210	0.054

Point ID	Easting	Northing	Known Z	DEM Z	dZ
2056_2018_CA	-2130789.324	1593033.243	578.887	578.890	0.003
2057_2018_CA	-2127153.277	1586490.330	684.691	684.660	0.031
2058_2018_CA	-2151486.879	1602741.692	1267.072	1267.040	0.032
2059_2018_CA	-2085520.723	1475423.140	9.094	9.080	0.014
2060_2018_CA	-2048594.503	1553430.053	1174.822	1174.770	0.052
2061_2018_CA	-2038126.170	1552055.308	951.073	951.040	0.033
2062_2018_CA	-1967862.707	1561630.986	833.726	833.700	0.026
2063_2018_CA	-2030973.310	1549910.048	910.591	910.610	0.019
2064_2018_CA	-2025216.246	1549350.894	891.341	891.340	0.001
2065_2018_CA	-2020672.101	1548281.178	857.861	857.870	0.009
2066_2018_CA	-2013648.525	1546679.428	799.540	799.570	0.03
2067_2018_CA	-2003552.491	1544362.817	741.729	741.670	0.059
2068_2018_CA	-1990275.998	1545318.111	716.323	716.280	0.043
2069_2018_CA	-1990293.544	1545321.938	716.096	716.070	0.026
2070_2018_CA	-1987096.747	1565857.045	844.321	844.280	0.041
2071_2018_CA	-1987096.537	1565871.938	844.447	844.420	0.027
2074_2018_CA	-1942427.236	1558990.853	813.784	813.790	0.006
2077_2018_CA	-1948645.853	1526403.168	882.804	882.790	0.014
2078_2018_CA	-1942215.472	1593502.927	692.394	692.410	0.016
2079_2018_CA	-1946035.842	1520886.876	935.575	935.560	0.015
2080_2018_CA	-1980860.780	1554744.616	761.580	761.600	0.02
2081_2018_CA	-1986615.652	1556794.380	784.198	784.150	0.048
2082_2018_CA	-2001307.597	1560084.712	961.999	962.010	0.011
2083_2018_CA	-2002454.778	1563328.709	1077.312	1077.320	0.008
2084_2018_CA	-2007532.900	1558652.353	1085.674	1085.670	0.004
2085_2018_CA	-1933266.419	1572002.944	868.738	868.750	0.012
2086_2018_CA	-2017817.120	1556082.457	991.438	991.480	0.042
2087_2018_CA	-2021872.523	1555130.081	1084.802	1084.800	0.002
2088_2018_CA	-2029917.348	1555534.548	1128.742	1128.710	0.032
2089_2018_CA	-2014487.657	1558072.653	1078.142	1078.110	0.032
2089A_2018_CA	-2014520.828	1555062.486	956.470	956.470	0
2090_2018_CA	-1982949.341	1601928.343	1204.426	1204.450	0.024
2091_2018_CA	-1997853.905	1579680.822	1254.751	1254.730	0.021
2092_2018_CA	-2002465.369	1582693.107	1329.258	1329.250	0.008

Point ID	Easting	Northing	Known Z	DEM Z	dZ
2093_2018_CA	-1987740.355	1575495.253	1122.502	1122.520	0.018
2094_2018_CA	-2006321.515	1573312.154	1336.559	1336.530	0.029
2095_2018_CA	-1994464.036	1568877.291	1086.469	1086.540	0.071
2098_2018_CA	-1952937.232	1562611.524	745.545	745.570	0.025
2099_2018_CA	-1950891.816	1570492.381	820.332	820.320	0.012
2100_2018_CA	-1948062.876	1575844.271	907.113	907.100	0.013
2101_2018_CA	-1944772.563	1582575.956	1100.569	1100.540	0.029
2102_2018_CA	-1958304.098	1591560.543	589.772	589.810	0.038
2103_2018_CA	-1962302.462	1602114.116	1008.236	1008.320	0.084
2104_2018_CA	-1968185.541	1590976.056	725.693	725.780	0.087
2105_2018_CA	-1971800.730	1582572.579	715.351	715.320	0.031
2106_2018_CA	-1978513.977	1575145.524	808.914	808.820	0.094
2107_2018_CA	-1954487.192	1495916.478	1006.354	1006.360	0.006
2108_2018_CA	-1953330.033	1500777.111	939.706	939.760	0.054
2109_2018_CA	-1953453.244	1505861.973	890.310	890.310	0
2110_2018_CA	-1954616.387	1491765.150	1090.226	1090.270	0.044
2111_2018_CA	-1956537.027	1490515.407	1127.995	1128.030	0.035
2112_2018_CA	-1953842.999	1489091.627	1173.898	1173.980	0.082
2113_2018_CA	-1956567.126	1483672.888	1516.088	1516.080	0.008
2114_2018_CA	-1957195.262	1483127.357	1605.335	1605.340	0.005
2115_2018_CA	-1954599.128	1475825.040	1762.667	1762.730	0.063
2116_2018_CA	-1956232.067	1471256.609	1845.519	1845.600	0.081
2117_2018_CA	-1946300.266	1471268.948	1003.756	1003.770	0.014
2118_2018_CA	-1945188.513	1466428.617	869.831	869.900	0.069
2119_2018_CA	-1942575.878	1420940.098	499.657	499.610	0.047
2120_2018_CA	-1960921.611	1433009.645	179.358	179.350	0.008
2121_2018_CA	-1960925.831	1432991.141	179.387	179.340	0.047
2122_2018_CA	-1942580.149	1420922.488	499.509	499.460	0.049
2123_2018_CA	-1950812.886	1468546.066	1297.819	1297.910	0.091
2124_2018_CA	-1965572.735	1462004.740	896.793	896.860	0.067
2125_2018_CA	-1962005.460	1457669.366	701.409	701.610	0.201
2126_2018_CA	-1945062.362	1457940.659	684.890	684.960	0.07
2127_2018_CA	-1950737.374	1452602.806	446.456	446.430	0.026
2128_2018_CA	-1940146.544	1449926.803	444.913	444.960	0.047

Point ID	Easting	Northing	Known Z	DEM Z	dZ
2129_2018_CA	-1933739.924	1453244.760	449.986	450.030	0.044
2130_2018_CA	-1906218.532	1454044.064	2174.611	2174.530	0.081
2131_2018_CA	-1921699.772	1456308.872	1715.071	1715.130	0.059
2132_2018_CA	-1891611.927	1442332.487	1979.132	1979.250	0.118
2133_2018_CA	-1925026.614	1439095.309	403.920	403.920	0
2134_2018_CA	-1922223.221	1448393.926	634.532	634.540	0.008
2135_2018_CA	-1893666.828	1450999.162	2080.722	2080.660	0.062
2136_2018_CA	-1883602.404	1446895.764	2281.328	2281.420	0.092
2137_2018_CA	-1900552.639	1448679.227	2408.442	2408.360	0.082
2138_2018_CA	-1905248.314	1441689.987	1702.843	1702.880	0.037
2139_2018_CA	-1916263.388	1413048.423	465.919	465.930	0.011
2140_2018_CA	-1914587.732	1436374.235	718.874	718.840	0.034
2141_2018_CA	-1912987.617	1428442.023	792.521	792.460	0.061
2142_2018_CA	-2013738.354	1422637.191	3.031	3.170	0.139
2143_2018_CA	-2007346.052	1428964.949	11.947	12.000	0.053
2143A_2018_CA	-2012190.646	1425614.566	4.003	4.160	0.157
2144_2018_CA	-2001472.970	1431962.164	26.793	26.820	0.027
2145_2018_CA	-1995244.868	1431427.428	49.980	49.990	0.01
2146_2018_CA	-1998432.750	1436551.658	142.235	142.260	0.025
2147_2018_CA	-1991735.927	1436592.420	107.065	107.100	0.035
2148_2018_CA	-1984190.442	1435805.492	307.136	307.190	0.054
2149_2018_CA	-1985861.285	1431297.214	107.523	107.540	0.017
2150_2018_CA	-2003357.613	1411035.443	4.355	4.510	0.155
2151_2018_CA	-1997268.367	1416636.160	20.669	20.730	0.061
2152_2018_CA	-1991844.335	1422279.980	54.302	54.280	0.022
2153_2018_CA	-1982540.804	1420205.628	172.510	172.460	0.05
2154_2018_CA	-1977219.632	1391211.639	179.505	179.490	0.015
2155_2018_CA	-1981798.271	1384637.937	64.521	64.560	0.039
2156_2018_CA	-1970206.443	1400149.837	349.296	349.270	0.026
2157_2018_CA	-1951314.755	1392380.783	930.816	930.880	0.064
2158_2018_CA	-1965522.381	1419886.159	409.101	409.010	0.091
2159_2018_CA	-1970862.555	1432904.417	178.259	178.240	0.019
2160_2018_CA	-1971865.783	1450688.306	322.428	322.620	0.192
2161_2018_CA	-1961444.187	1447535.821	311.642	311.630	0.012

Point ID	Easting	Northing	Known Z	DEM Z	dZ
2161A_2018_CA	-1961447.781	1447443.771	311.089	311.060	0.029
2162_2018_CA	-1952157.943	1440856.239	284.272	284.310	0.038
2163_2018_CA	-1942612.816	1440788.288	307.062	307.080	0.018
2163A_2018_CA	-1942650.176	1440797.093	307.363	307.350	0.013
2164_2018_CA	-1948773.619	1431475.225	233.897	233.830	0.067
2165_2018_CA	-1952160.251	1420210.217	403.163	403.060	0.103
2166_2018_CA	-1889720.524	1382518.986	1432.612	1432.670	0.058
2167_2018_CA	-1903954.470	1390438.181	682.228	682.240	0.012
2168_2018_CA	-1912803.961	1395478.731	559.195	559.250	0.055
2169_2018_CA	-1926768.232	1409297.469	448.831	448.810	0.021
2170_2018_CA	-1937191.464	1407798.601	483.191	483.220	0.029
2171_2018_CA	-1954822.607	1407538.867	363.384	363.400	0.016
2172_2018_CA	-1938429.002	1396607.130	425.412	425.500	0.088
2173_2018_CA	-2209896.408	1579140.824	5.294	5.320	0.026
2174A_2018_CA	-2150154.469	1567848.714	993.775	993.840	0.065
2175_2018_CA	-2207484.482	1567774.243	213.192	213.210	0.018
2176_2018_CA	-2104025.743	1542654.769	1281.802	1281.790	0.012
2177_2018_CA	-2200449.314	1579762.686	73.017	73.000	0.017
2178_2018_CA	-2192304.343	1576013.062	146.527	146.470	0.057
2179A_2018_CA	-2200722.082	1571115.428	27.767	27.770	0.003
2179B_2018_CA	-2200658.573	1571097.993	28.120	28.120	0
2180_2018_CA	-2142889.719	1533334.061	58.065	58.120	0.055
2181_2018_CA	-2142903.622	1533337.414	58.478	58.530	0.052
2182_2018_CA	-2194387.250	1562527.640	132.829	132.880	0.051
2183_2018_CA	-2207192.677	1557458.944	29.058	29.050	0.008
2184_2018_CA	-2202061.353	1566325.859	124.895	124.920	0.025
2185_2018_CA	-2183085.549	1551727.149	104.196	104.280	0.084
2186_2018_CA	-2170380.494	1543432.477	11.895	11.940	0.045
2187_2018_CA	-2162199.713	1540204.465	45.059	45.070	0.011
2188_2018_CA	-2125157.082	1528462.970	253.958	253.970	0.012
2189_2018_CA	-2128289.307	1533784.364	924.191	924.200	0.009
2190_2018_CA	-2150036.340	1563916.378	700.259	700.180	0.079
2191_2018_CA	-2157357.874	1571219.881	968.665	968.690	0.025
2192_2018_CA	-2145444.214	1545875.791	280.404	280.470	0.066

Point ID	Easting	Northing	Known Z	DEM Z	dZ
2193_2018_CA	-2160298.394	1557911.007	213.136	213.140	0.004
2194A_2018_CA	-2150466.232	1563861.614	730.843	730.790	0.053
2195_2018_CA	-2167422.057	1570570.969	309.075	309.100	0.025
2196_2018_CA	-2174280.667	1567345.269	180.239	180.240	0.001
2197_2018_CA	-2174332.784	1557346.320	130.155	130.190	0.035
2198_2018_CA	-2184262.689	1569545.229	184.289	184.310	0.021
2199_2018_CA	-2150776.399	1542417.300	894.243	894.260	0.017
2200_2018_CA	-2164645.393	1549683.103	1019.018	1019.080	0.062
2201_2018_CA	-1934499.709	1596575.446	878.514	878.550	0.036
2202_2018_CA	-1964838.269	1570222.145	709.190	709.190	0
2203_2018_CA	-2176995.069	1598026.386	122.095	122.040	0.055
2204_2018_CA	-1966177.612	1384014.980	475.579	475.580	0.001
2205_2018_CA	-1891920.871	1397134.065	1829.906	1829.830	0.076
2206_2018_CA	-2120004.879	1523992.030	68.300	68.440	0.14
2207_2018_CA	-2133883.634	1536740.726	1106.856	1106.910	0.054

Appendix 4: DEM VVA Checkpoint Results

Coordinate values are listed in the following spatial reference system:

Horizontal: NAD83 (2011) Albers Equal Area, meters (EPSG 6350)

Vertical: NAVD88 (GEOID12B) meters

Summary	
Point Count	146
Root Mean Square Error	0.134 m
95th Percentile	0.211 m
Mean of Residuals	0.081 m
Standard Deviation	0.108 m

Point ID	Easting	Northing	Known Z	DEM Z	dZ
3001_2018_CA	-2120580.819	1585479.824	675.483	675.470	0.013
3002_2018_CA	-2108383.861	1581783.561	748.499	748.490	0.009
3003_2018_CA	-2107863.426	1571097.151	855.491	855.440	0.051
3004_2018_CA	-2096516.584	1490727.346	11.353	11.410	0.057
3005_2018_CA	-2087552.813	1489475.142	19.280	19.300	0.020
3006_2018_CA	-2091687.086	1496751.232	28.410	28.520	0.110
3007_2018_CA	-2092904.664	1506342.930	85.817	85.920	0.103
3008_2018_CA	-2115187.332	1579140.991	754.968	755.030	0.062
3009_2018_CA	-2142508.305	1590054.292	1350.780	1350.720	0.060
3010_2018_CA	-2136406.925	1583947.592	1664.933	1664.890	0.043
3011_2018_CA	-2167046.276	1602109.316	475.528	475.450	0.078
3012_2018_CA	-2077860.696	1559979.706	2544.336	2544.180	0.156
3013_2018_CA	-2130756.413	1592987.936	575.583	575.590	0.007
3015_2018_CA	-2104673.030	1547925.021	1595.812	1595.750	0.062
3016_2018_CA	-2091076.687	1529222.269	1546.694	1546.690	0.004
3017_2018_CA	-2085385.982	1475483.204	24.845	25.030	0.185
3018_2018_CA	-2154237.506	1613661.341	414.078	414.100	0.022
3019_2018_CA	-2162017.331	1611414.647	326.193	326.230	0.037
3020_2018_CA	-2175715.369	1609261.009	206.028	206.010	0.018
3021_2018_CA	-2151509.237	1602760.775	1266.560	1266.580	0.020

Point ID	Easting	Northing	Known Z	DEM Z	dZ
3022_2018_CA	-2125285.506	1588752.459	622.894	622.880	0.014
3023_2018_CA	-2164303.383	1624713.476	706.616	706.640	0.024
3024_2018_CA	-2107124.391	1567985.512	907.879	907.850	0.029
3025_2018_CA	-2104314.198	1559155.322	1008.046	1008.080	0.034
3026_2018_CA	-2077523.740	1550486.180	1562.753	1562.850	0.097
3027_2018_CA	-2095501.138	1550718.381	1177.522	1177.520	0.002
3028_2018_CA	-2084009.233	1563487.884	2481.489	2481.360	0.129
3029_2018_CA	-2068382.016	1541744.315	2045.355	2045.310	0.045
3030_2018_CA	-2070634.381	1503302.121	394.665	394.650	0.015
3031_2018_CA	-2065728.856	1520738.079	780.079	780.240	0.161
3032_2018_CA	-2054832.289	1514490.158	343.796	343.850	0.054
3033_2018_CA	-2053022.232	1494731.301	349.069	349.220	0.151
3034_2018_CA	-2063445.366	1495041.641	213.289	213.380	0.091
3035A_2018_CA	-2053425.151	1484143.608	299.363	299.550	0.187
3036_2018_CA	-2069963.979	1483288.752	304.710	304.690	0.020
3037_2018_CA	-2107972.593	1531963.933	462.072	462.150	0.078
3038_2018_CA	-2080160.379	1540557.960	1465.794	1465.870	0.076
3039_2018_CA	-2099169.210	1540156.521	1187.063	1187.060	0.003
3040_2018_CA	-2105870.786	1522734.197	215.012	215.070	0.058
3041_2018_CA	-2095064.993	1566676.898	1203.342	1203.440	0.098
3042_2018_CA	-2109957.884	1519019.245	186.880	186.910	0.030
3043_2018_CA	-2002037.943	1550668.097	800.000	800.040	0.040
3044_2018_CA	-2013113.501	1545683.800	791.141	791.280	0.139
3045_2018_CA	-2035863.105	1550202.976	915.875	915.900	0.025
3047_2018_CA	-2048411.258	1553301.670	1170.655	1170.600	0.055
3048_2018_CA	-2038498.680	1554893.810	1028.837	1028.950	0.113
3049_2018_CA	-2030794.119	1559333.612	1350.049	1350.050	0.001
3050_2018_CA	-2017793.448	1556090.827	991.084	991.200	0.116
3051_2018_CA	-2021874.938	1555107.633	1085.346	1085.320	0.026
3052_2018_CA	-2007565.660	1558625.763	1083.965	1083.900	0.065
3053_2018_CA	-2001286.959	1560079.456	962.811	962.810	0.001
3054_2018_CA	-2002866.332	1570994.523	1340.572	1340.670	0.098
3055_2018_CA	-1997917.536	1580135.005	1256.318	1256.270	0.048
3056_2018_CA	-1988822.129	1578583.256	1868.610	1868.570	0.040

Point ID	Easting	Northing	Known Z	DEM Z	dZ
3057_2018_CA	-1968157.711	1590968.210	729.136	729.210	0.074
3058_2018_CA	-1958350.532	1591525.946	588.876	588.920	0.044
3059_2018_CA	-1975533.475	1603750.849	1337.449	1337.490	0.041
3060_2018_CA	-1940901.919	1599165.212	821.162	821.210	0.048
3061_2018_CA	-1944727.672	1582587.109	1102.520	1102.550	0.030
3062_2018_CA	-1950847.396	1570472.069	820.575	820.590	0.015
3063_2018_CA	-1978455.738	1575139.914	808.015	807.990	0.025
3064_2018_CA	-1975399.400	1559096.426	805.806	805.810	0.004
3066_2018_CA	-1953792.448	1558608.449	725.928	726.010	0.082
3070_2018_CA	-1946625.698	1526218.004	918.347	918.360	0.013
3071_2018_CA	-1980983.886	1554383.367	760.285	760.310	0.025
3073_2018_CA	-1971775.158	1582567.660	714.669	714.690	0.021
3074_2018_CA	-1933233.066	1573431.445	879.872	879.870	0.002
3075_2018_CA	-1989093.151	1603701.276	1769.739	1769.720	0.019
3076_2018_CA	-1956645.917	1457989.376	881.216	881.280	0.064
3077_2018_CA	-1945063.058	1457930.402	683.638	684.000	0.362
3078_2018_CA	-1892239.951	1442708.839	2021.724	2021.670	0.054
3079_2018_CA	-1889060.582	1441149.844	1977.846	1978.000	0.154
3080_2018_CA	-1880214.737	1442279.408	2577.944	2577.960	0.016
3081_2018_CA	-1888773.026	1452078.886	2061.205	2061.230	0.025
3082_2018_CA	-1921705.527	1456284.877	1715.148	1715.240	0.092
3083_2018_CA	-1961449.440	1405899.814	1077.574	1077.510	0.064
3084_2018_CA	-1958833.789	1436849.781	212.753	212.750	0.003
3085_2018_CA	-1967995.894	1433454.033	169.796	169.800	0.004
3086_2018_CA	-1928688.704	1393424.629	440.349	440.380	0.031
3087_2018_CA	-1918180.961	1400229.654	460.217	460.420	0.203
3088_2018_CA	-1916247.095	1412900.262	460.640	460.650	0.010
3089_2018_CA	-1907322.344	1397347.969	535.509	535.520	0.011
3089A_2018_CA	-1908438.377	1397687.300	527.051	527.030	0.021
3090_2018_CA	-1909530.703	1421427.509	798.799	798.900	0.101
3090A_2018_CA	-1909496.914	1421435.982	799.757	799.800	0.043
3091_2018_CA	-1924535.954	1411918.215	438.536	438.540	0.004
3092_2018_CA	-1934523.817	1403790.281	431.546	431.550	0.004
3093_2018_CA	-1995275.348	1434365.226	70.883	71.080	0.197

Point ID	Easting	Northing	Known Z	DEM Z	dZ
3094_2018_CA	-1966004.780	1441076.713	229.252	229.400	0.148
3095_2018_CA	-1950026.755	1452468.495	443.419	443.490	0.071
3096_2018_CA	-1915365.801	1390486.884	519.554	519.710	0.156
3097_2018_CA	-1938440.076	1396590.711	424.535	424.830	0.295
3098_2018_CA	-1889342.926	1382700.068	1403.611	1403.630	0.019
3099_2018_CA	-1961124.681	1392683.607	394.724	394.740	0.016
3099A_2018_CA	-1961098.819	1392722.279	397.042	397.090	0.048
3100_2018_CA	-1966163.810	1384006.809	478.828	478.980	0.152
3101_2018_CA	-1982867.158	1435650.312	203.567	203.770	0.203
3102_2018_CA	-1964679.352	1464151.230	1103.484	1103.540	0.056
3103_2018_CA	-1954673.321	1471541.835	1673.936	1674.070	0.134
3104_2018_CA	-1933769.369	1453270.558	450.979	451.040	0.061
3105_2018_CA	-1922250.531	1448417.966	638.448	638.450	0.002
3106_2018_CA	-1965893.108	1419775.156	435.153	435.070	0.083
3107_2018_CA	-1907474.072	1384416.383	1027.208	1027.230	0.022
3108_2018_CA	-1897438.505	1391438.820	808.117	808.140	0.023
3109_2018_CA	-1887449.327	1394887.519	1985.941	1986.700	0.759
3110_2018_CA	-1893162.548	1399900.640	1643.066	1643.180	0.114
3111_2018_CA	-1904061.993	1402269.969	605.678	605.780	0.102
3112_2018_CA	-1952192.852	1420213.161	402.104	402.130	0.026
3113_2018_CA	-1935134.172	1426702.985	562.378	562.430	0.052
3114_2018_CA	-1925550.844	1432294.016	448.922	449.100	0.178
3115_2018_CA	-1979389.797	1415752.911	245.089	245.080	0.009
3116_2018_CA	-1942979.236	1411561.923	699.459	699.380	0.079
3117_2018_CA	-1988753.358	1396665.122	66.596	67.430	0.834
3119_2018_CA	-1940326.173	1441952.273	326.175	326.280	0.105
3119A_2018_CA	-1940335.740	1441994.342	326.152	326.230	0.078
3120_2018_CA	-1953856.206	1489037.130	1174.810	1174.840	0.030
3121_2018_CA	-1954117.113	1497523.697	981.631	981.640	0.009
3122_2018_CA	-1953504.464	1505877.061	890.416	890.440	0.024
3123_2018_CA	-2188918.500	1571782.702	141.076	141.100	0.024
3124_2018_CA	-2167414.446	1563890.551	233.758	233.810	0.052
3125_2018_CA	-2201983.999	1575071.856	21.083	21.080	0.003
3126_2018_CA	-2192991.882	1567265.055	59.574	59.790	0.216

Point ID	Easting	Northing	Known Z	DEM Z	dZ
3127_2018_CA	-2124818.189	1528294.278	351.398	351.480	0.082
3128_2018_CA	-2209891.493	1579099.546	5.407	5.580	0.173
3129_2018_CA	-2208319.237	1577270.160	8.188	8.260	0.072
3130_2018_CA	-2171464.060	1559272.954	152.011	152.290	0.279
3131_2018_CA	-2196952.805	1557438.181	316.027	316.100	0.073
3132_2018_CA	-2150629.918	1563791.713	733.054	733.060	0.006
3133_2018_CA	-2143377.270	1535339.678	102.714	102.760	0.046
3134_2018_CA	-2164662.386	1549694.640	1017.533	1017.680	0.147
3135_2018_CA	-2187331.131	1554336.974	295.238	295.230	0.008
3136_2018_CA	-2121528.395	1523809.072	32.589	32.650	0.061
3137_2018_CA	-2130728.003	1535268.807	1051.054	1051.170	0.116
3138_2018_CA	-2164629.717	1541342.771	24.531	24.610	0.079
3139A_2018_CA	-2150157.322	1567864.435	993.202	993.250	0.048
3140_2018_CA	-2152714.947	1568706.405	1357.084	1357.190	0.106
3141_2018_CA	-2144509.517	1545281.670	324.424	324.500	0.076
3142_2018_CA	-2150532.040	1542484.776	885.054	885.070	0.016
3143_2018_CA	-2142052.919	1545220.780	323.395	323.520	0.125
3144A_2018_CA	-2150471.737	1563875.427	731.490	731.570	0.080
3145_2018_CA	-2207214.717	1557464.422	26.013	26.090	0.077
3146_2018_CA	-2138140.145	1601100.167	502.188	502.210	0.022
3147_2018_CA	-2002529.278	1409473.938	22.484	22.750	0.266
3148_2018_CA	-2012173.176	1425686.056	4.287	4.480	0.193
3148A_2018_CA	-2012186.125	1425631.058	4.386	4.540	0.154
3149_2018_CA	-1941931.805	1471832.291	1058.968	1059.050	0.082