Data Collection & Processing Report
2018 Yosemite Illilouette Creek Lidar Survey

PI: Sally Thompson
University of California, Berkeley
661 Davis Hall, Berkeley, CA, 94720

Data Collection Summary:

Collection Dates, # Flights:	Main collection September 21, 2018 (DOY: 264), 2 coverage gap fill flights: September 22 and 23, 2018 (DOY 265, 266)
Aircraft, Equipment:	Piper Navajo PA-31-350 (Tail No. N640WA), LIDAR: Optech Titan (14 SEN/CON 340)
Flight Plan Parameters:	Flying Height: 600 m AGL, Swath Width: 560 m, Overlap: 50%, Line Spacing: 230 m, plus an additional perpendicular swath with a 10% lateral overlap between swaths
Equipment Parameters:	PRF: 125 kHz, Scan Frequency: 30 Hz, Scan Angle: ± 26-2°
Planned Laser Pulse Density:	Mean 25.2 pulse/m² (see Figure 1)
Requested/Collected Area:	35 / 73.44 km² (collected area computed from average DEM/DSM filled nodes)

GNSS Reference Station Summary:

1.	PBO P245	N 37.71311235°	W 119.7061072°	1580.437 (m ellipsoid)
2.	PBO P512	N 37.56263129°	W 119.6944325°	1345.319 (m ellipsoid)

Data Products Summary:

Horizontal / Vertical Datum:	NAD83(2011) / NAD83 (Ellipsoidal Heights) (2011)(EPOCH:2010.0000)
Projection / Units:	UTM Zone 11N / meters
Point Cloud Tiles:	342 total 500 m × 500 m tiles in LAS format (Version 1.4), classified into **ground** (class 2 using strict parameters), **low vegetation** (class 3 potential ground returns using lose ground classification parameters), **unclassified** (class 1 low vegetation based on 0.2 m < hagl ≤ 1.5 m), **medium vegetation** (class 3 based on 1.5 m < hagl ≤ 10 m), **high vegetation** (hagl > 10 m), **high noise** (class 18), **other spurious returns** (class 64) and ignored **swath edge returns** ±2° from edge (class 65).
Raster Sections	All project area in a single raster.
Bare-Earth Elevation Model:	ESRI FLT format @ 50 cm grid spacing from classified ground returns + low vegetation
Bare-Earth Hillshade:	ESRI-created raster @ 50 cm grid spacing using parameters (315° Azimuth, 45° Elev).
First-Surface Elevation Model:	ESRI FLT format @ 50 cm resolution based only on first returns from channel 2.
First-Surface Hillshade:	ESRI-created raster @ 50 cm grid spacing using parameters (315° Azimuth, 45° Elev).
Additional Rasters	(3) density rasters (pulse, return, ground return), (1) canopy height model (CHM), (4) first return intensity rasters (C1 1550 nm, C2 1064 nm, C3 532 nm, false color R = C1 G = C2 B = C3)

A detailed summary of the equipment and processing techniques used by NCALM is included in the Data Collection & Processing Summary.

Special notes:

1. Direct validation of the point cloud and raster datasets within the project area was not conducted due to lack of access to project area. However, indirect validation was conducted through the analysis of the height of lidar returns over Mammoth Lakes, CA which was used as instrument calibration area (flight # 2). An kinematic GPS survey with 5,698 GPS check points was collected between the airport and town, of which 255 were used (see figure 2) to remove vertical bias (14.7 cm) as assess the point cloud vertical precision at 2.5 cm.

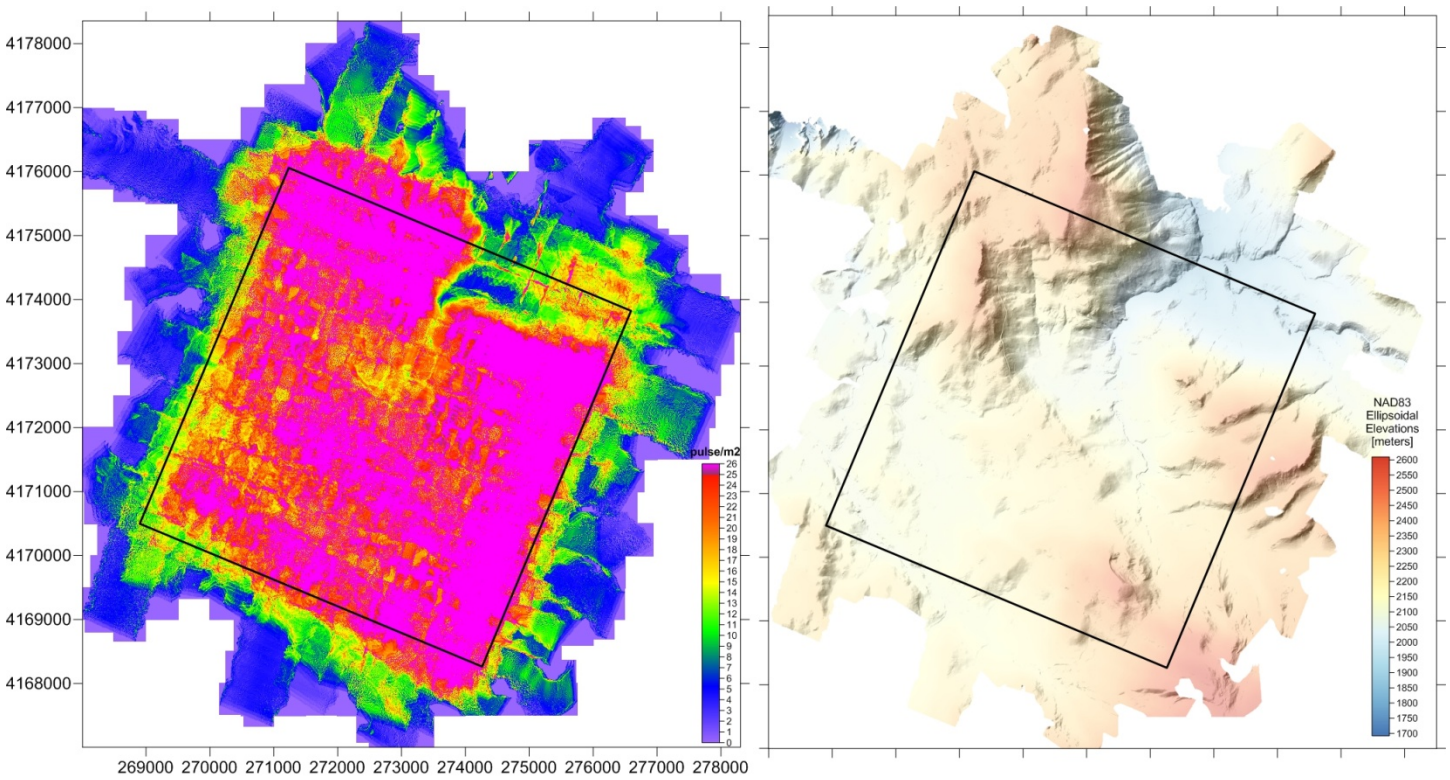

Figure 1. Resultant laser pulse density map and shaded relief map of DEM for the project area.

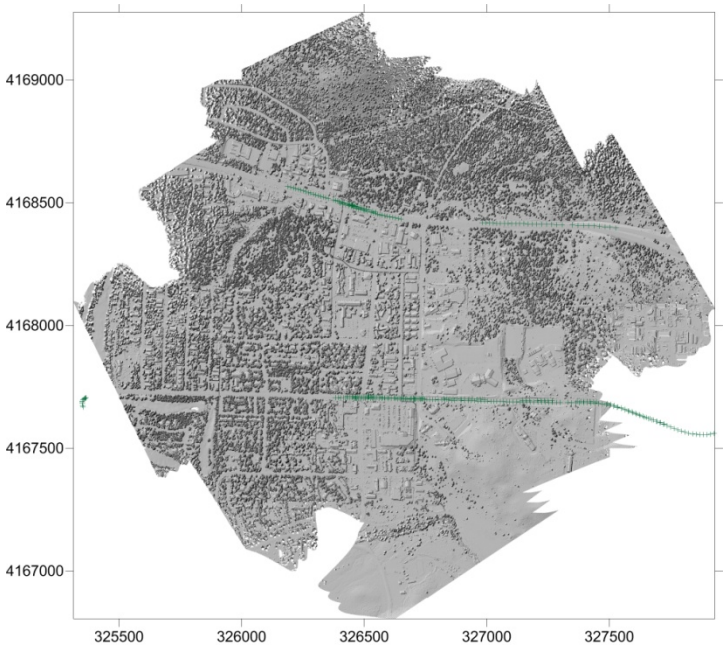

Figure 2. GPS control points (green "+" marks) over a shaded relief map of the DSM of the calibration area (Mammoth lakes, CA) used for indirect height validation and accuracy assessment of the lidar data.