



Data Collection & Product Report for 2019 NSF Project: Quantifying the Controls of Wildfire, Climate, and Tectonics on the Transition Between Soil-Mantled and Bedrock Hillslopes

PI: Roman DiBiase (rdibiase@psu.edu)

Pennsylvania State University, Department of Geosciences
306 Deike Bldg, University Park, PA 16802

Data Collection Summary:

Collection Dates, Flights:	6 flights on September 29–October 3, 2019 (DOY 272–276)
Aircraft, Equipment:	Piper PA-31-350 Navajo Chieftain (N640WA), Optech Titan (14SEN340)
Flight Plan Parameters:	Flying Height: 500 m AGL, Speed: 140 kt, Overlap: 50%
Equipment Parameters:	PRF: 75 kHz, Scan Angle: $\pm 30^\circ$, Scan Frequency: 26 Hz
Collected Area:	173.1 km ²

GNSS Reference Station Summary:

Station Name	Operating Agency	Control Coordinates (NAD83(2011) epoch 2010.00/Ellipsoid)
BEPK	UNAVCO	35°52'42.18432" N, 118°04'26.68765" W, 2471.798 m
KIYK	NCALM	35°39'05.02099" N, 117°49'40.74904" W, 710.750 m
P093	UNAVCO	36°36'21.67571" N, 117°59'38.86980" W, 1339.721 m
P465	UNAVCO	36°28'00.58820" N, 118°07'56.70901" W, 2902.294 m
P466	UNAVCO	36°31'52.48154" N, 117°47'22.00820" W, 2755.341 m

Data Processing Summary:

Scan Angle Cutoff:	$\pm 1^\circ$
Intensity Normalization:	500 m
Data Adjustments:	Line-by-line/channel-by-channel roll/elevation correction, project elevation shift of -0.32 m
Ground Classification:	Two iterations of aggressive ground determination, manual classification of misclassified ground
Elevation Model Generation:	First-return calculated from average Z TIN model, bare-earth calculated from Kriging

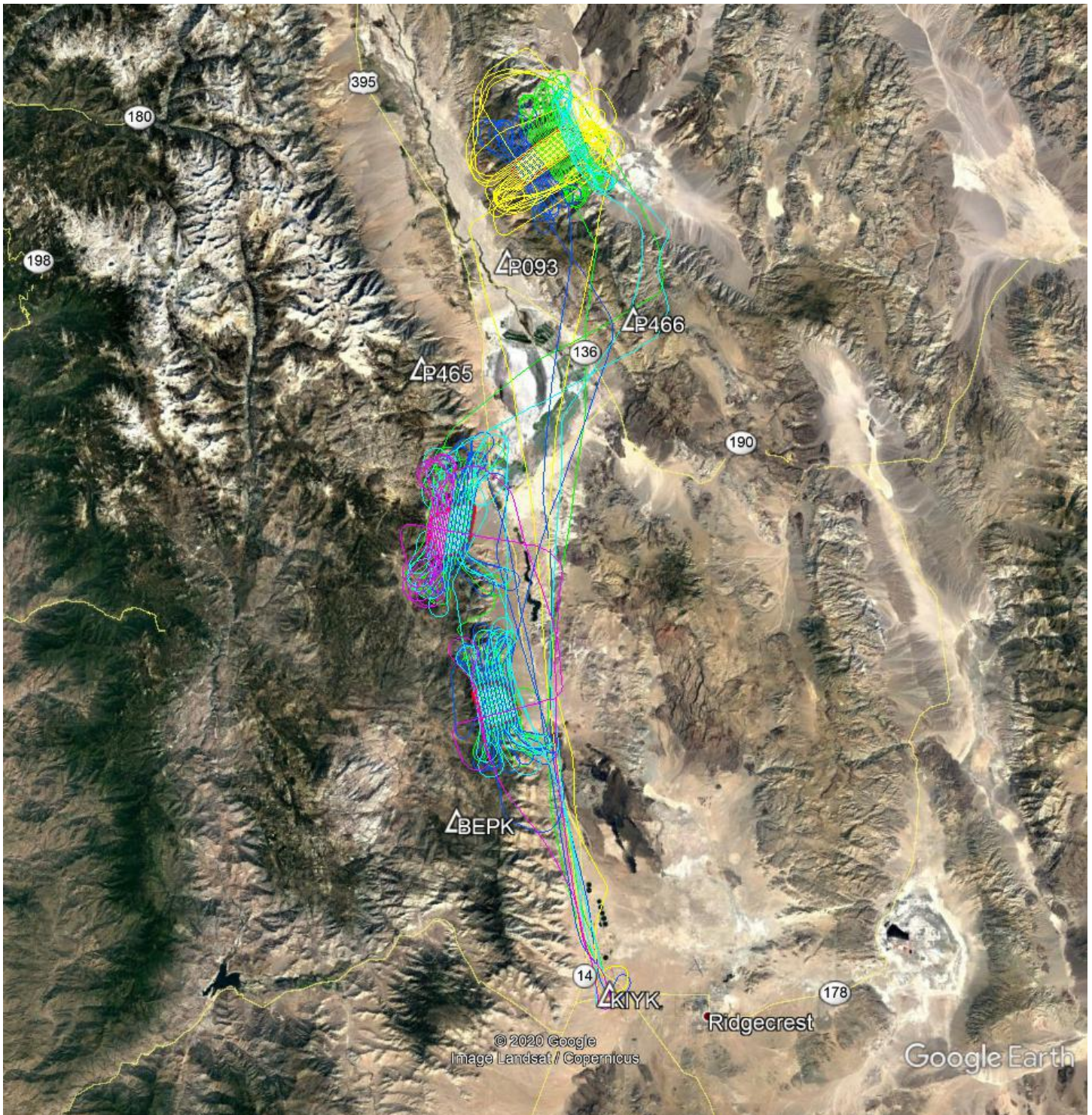
Data Accuracy Summary

Strip-to-Strip Average	0.11 m (north), 0.13 m (central), 0.10 m (south)
GCP Residual RMS	N/A

Data Product Summary:

Horizontal / Vertical Datum:	NAD83(2011) epoch 2010.00 / NAVD88 (GEOID12B)
Projection / Units:	UTM Zone 11N / meters
Point Cloud Tiles:	1000-m \times 1000-m tiles in LAS format (Version 1.4) with non-ground (1), ground (2), low point (7), and high point (18) returns
Bare-Earth Elevation Model:	GeoTIFF @ 1-m resolution from classified ground points
First-Surface Elevation Model:	GeoTIFF @ 1-m resolution with canopy included

Area of Interest:



Location of survey polygons, aircraft trajectories, and GNSS reference stations

The requested survey area consisted of three polygons located north of Ridgecrest, CA. The polygons enclosed approximately 103 km² (40 mi²).

Notes:

Some classified ground points may not be true ground due to thick or low vegetation, downed trees, large rocks, and rugged peaks. Thick vegetation will not allow the laser to penetrate to the ground and can cause the ground point algorithm to classify the bottom of the vegetation as ground. Low vegetation or downed trees can get classified as ground, because the laser cannot distinguish between true ground and near-ground returns, and the algorithm has an eagerness to classify low points as ground. These factors can cause a rough appearance in the bare-earth elevation models. Boulders and rugged peaks often do not get classified as ground, because the terrain changes are too abrupt for the algorithm to classify successfully while not simultaneously classifying low vegetation as ground. The utilized ground point algorithm was aggressive in order to maximize the amount of true ground points near the peaks. Manual classification at the peaks was also performed to maximize the exposed rock in the ground class.