



# Data Collection & Product Report for 2021 Seed Project: Using LiDAR to Understand Sources and Functions of Spatial Heterogeneity in Determining Channel Evolution of Large Mountain River

**PI: Anna Marshall** (amarsh01@colostate.edu)  
Colorado State University, Department of Geosciences  
2919 Bozeman Ct, Fort Collins, CO, 80526

## Data Collection Summary:

Collection Dates, Flights:	2 flights on August 8 and 9, 2022 (DOY 215,216)
Aircraft, Equipment:	Robinson R44 (N74767), RIEGL VQ-840G (S9999060) (532nm Green Laser), Integrated RGB Camera
Flight Plan Parameters:	Flying Height: 300–500 m AGL, Speed: 40–60 kt, Overlap: 50%
Equipment Parameters:	Laser: PRR: 50-100 kHz, FOV: 28°, Elliptical Scan Pattern Camera: 12 Megapixel, 16mm Focal Length
Collected Area:	40 km <sup>2</sup>

## GNSS Reference Station Summary:

Station Name	Operating Agency	Control Coordinates (NAD83(2011) epoch 2010.00/Ellipsoid Elevations)
MTFV	NGS CORS	48°13'38.89085" N, 114°19'36.54279" W, 905.671 m
SPTA215	NCALM	48°10'42.69216" N, 114°18'15.83305" W, 878.911 m

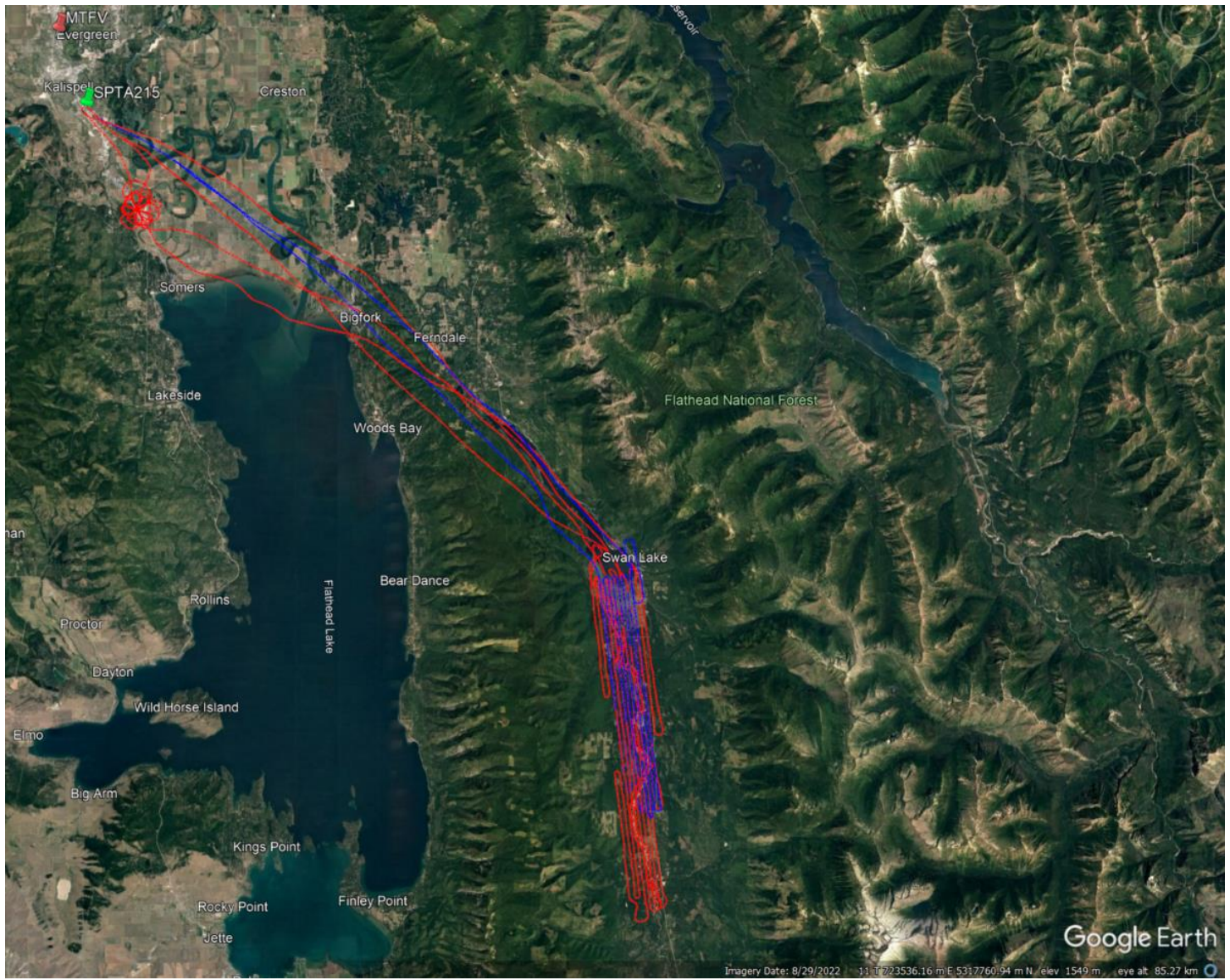
## Data Processing Summary:

Calibration	Calibration for both the LIDAR sensor as well as the digital camera done near Kalispell such that the area had had sloping roofs, roads and paint markings. Calibration lines were flown in clover leaf pattern as recommended by RIEGL
Classification:	<ul style="list-style-type: none"> <li>Returns from the main water channel were classified into three classes Water Surface, Water bottom and Intermediate. Water bottom are lowest points from returns that penetrate the water body and have the highest probability of representing the bottom. Intermediate points are returns from the water body that penetrated it but were not classified as water bottom.</li> <li>Refraction correction was applied to all the points that penetrated the water body. Ground classification was done using a morphological filter for the rest of the area</li> </ul>
Elevation Model Generation:	All elevation raster created using Kriging

## Data Product Summary:

Horizontal / Vertical Datum:	NAD83(2011) epoch 2010.00 / NAVD88 (GEOID18)
Projection / Units:	UTM Zone 12N / meters
Point Cloud Tiles:	1000-m × 1000-m tiles in LAS format (Version 1.4) with following classes: Class 1: unclassified Class 2: ground Class 13: Points that penetrated the water body but not classified as water bottom Class 14: Water Bottom Class 15: Water surface
Bare-Earth Elevation Model:	GeoTiff format @ 1m pixel resolution bare earth DEM created from ground classified and bathymetry classified points
First-Surface Elevation Model:	GeoTIFF @ 1-m resolution with canopy and buildings included created from First returns of all laser shots
RGB Imagery	Orthorectified individual Images, Geotiff format, 8 cm ground pixel resolution

## Area of Interest:



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