# Brief Data Collection & Processing Report
## Log Jams, Stream Morphology, and Groundwater Interactions in a Partially Burned Mountain Watershed
### Report Version 1.0 (20240305_jcfd)

## Data Collection Summary:

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|---|---|
| Collection Dates, # Flights: | Single flight, on October 5, 2023 (DOY: 23_278) conducted out of the Northern Colorado Regional Airport, Fort Collins/Loveland, CO area. |
| Aircraft, Equipment: | Piper Navajo PA-31 (Tail No. C-GJMT), LIDAR: Optech Titan (14 SEN/CON 340) |
| Flight Plan Parameters: | Flying Height: 500 m AGL, Swath Width: 580 m, Overlap: 50%, Line Spacing: 290 m |
| Equipment Parameters: | PRF: 100 kHz, Scan Frequency: 26 Hz, Scan Angle: ± 30° |
| Planned Laser Pulse Density: | Mean 8 pulses/m² |
| Requested/Collected Area: | 5.91 / 19.0 km² . The computation of collected area is based on DEM filled nodes. |

## GNSS Reference Station Summary:

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|---|---|---|
| 1. | COFC (CORS) | N 40° 35' 36.10799", W 105° 09' 37.56860", 1595.986 m ellipsoidal NAD83 (2011) |
| 2. | KNFL_GSE03 | N ° ' ", W ° ' ", m – Data recorded but not used in trajectory solution |

## Data Products Summary:

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|---|---|
| Horizontal / Vertical Datum: | NAD83 (2011) /NAVD88 via Geoid12B |
| Projection / Units: | NAD83 UTM Zone 13N meters - EPSG:26913 |
| Point Cloud Tiles: | 31 total 1000 m × 1000 m tiles in LAS format (Version 1.4), classified into **ground** (class 2 using strict parameters), **close to ground** (class 8 -0.2 m < hagl ≤ 0.2 m), **low vegetation** (class 3 based on 0.21 m < hagl ≤ 3 m),  **medium vegetation** ( class 4 based on 3.01 m < hagl ≤ 10 m), **high vegetation** (class 5 hagl > 10 m), **high noise** (class 18), **low noise** (7). |
| Raster Sections | Each kind of raster data described below was generated for a single raster section (single file). |
| Bare-Earth Elevation Model: | geoTIFF formats @ 100 cm grid spacing from classified ground returns. |
| First-Surface Elevation Model: | geoTIFF format @ 100 cm grid spacing based only on first returns from all channels. |
| Additional Rasters: | Canopy Height Model (CHM), Density Pulse at 10 m raster spacing and in geoTIFF format |

A detailed summary of the equipment and processing techniques used by NCALM is included in the Data Collection & Processing Summary. Specific information on the sensor can be found in https://www.mdpi.com/2072-4292/8/11/936 and specific information regarding NCALM procedures for the collection and processing of lidar data for archeological studies can be found in https://www.mdpi.com/2072-4292/6/10/9951.

**Special notes:**

1. Direct validation of the lidar datasets elevations within the project area was not conducted. However, data for validation of lidar heights for a previous flight with the same instrument (but different configuration) near Grand Junction, CO is available.

2. Know issues: There is slight corduroy on some areas of the DEM, CH2 presented some elevations inconsistencies within short distance segments in the same scan line. Processing team tried its best at removing artifacts and refining calibration.
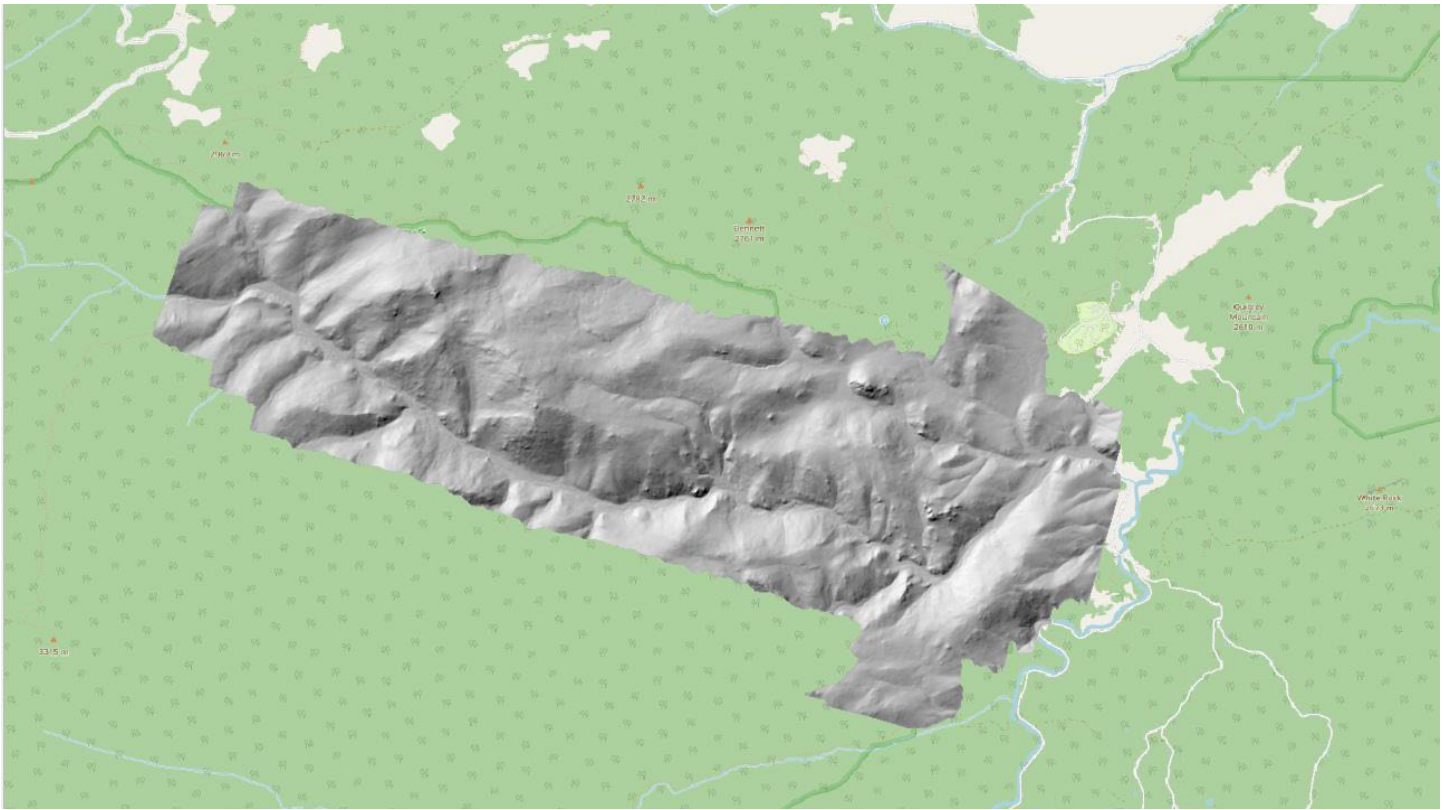
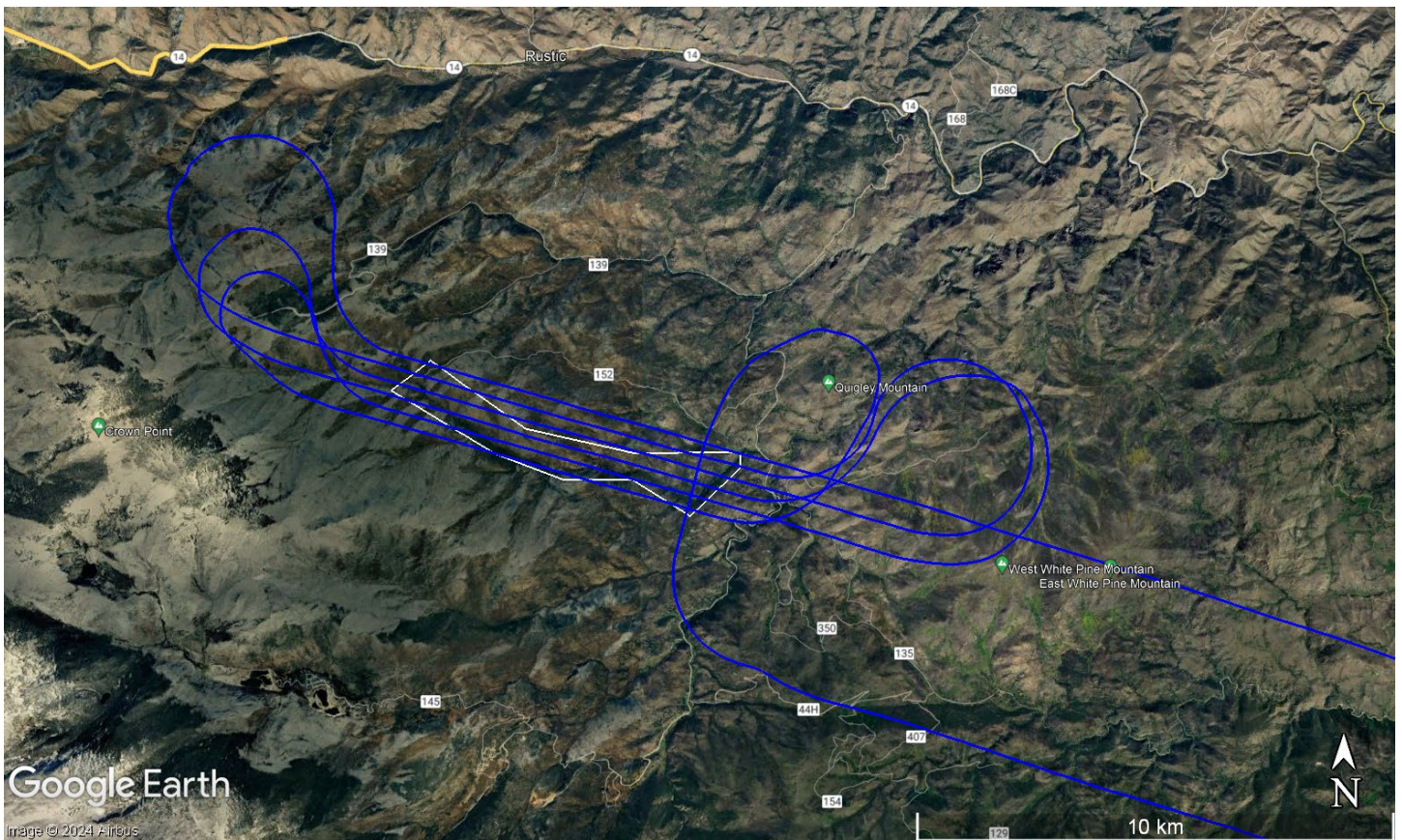Figure 1. Mapped area of interest (DEM hillshade over Open Street Map).



Figure 2. Flight trajectory and AOI polygon over Google Earth view.