



## Data Collection & Product Report for 2016 Seed Project: Mapping of Hydrothermal Explosion Craters in Yellowstone National Park

PI: Louis Garcia ([lgarc18@lsu.edu](mailto:lgarc18@lsu.edu))

Louisiana State University, Department of Geology & Geophysics  
E235 Howe Russell Kniffen, Baton Rouge, LA 70803

### Data Collection Summary:

|                                    |  |
|------------------------------------|--|
| Collection Dates, Flights:         | 3 flights between October 6–9, 2017 (DOY 279 & 282)                |
| Aircraft, Equipment:               | Piper PA-31-350 Navajo Chieftain (N640WA), Optech Titan (14SEN340) |
| Bathymetry Flight Plan Parameters: | Flying Height: 500 m AGL, Swath Width: 460 m, Overlap: 50%         |
| Bathymetry Equipment Parameters:   | PRF: 175 kHz, Scan Frequency: 32 Hz, Scan Angle: $\pm 25^\circ$    |
| Topography Flight Plan Parameters: | Flying Height: 800 m AGL, Swath Width: 750 m, Overlap: 50%         |
| Topography Equipment Parameters:   | PRF: 100 kHz, Scan Frequency: 32 Hz, Scan Angle: $\pm 25^\circ$    |
| Imagery Flight Plan Parameters:    | Collected coincidentally   |
| Collected Area:                    | 67.4 km <sup>2</sup>   |

### GNSS Reference Station Summary:

|      |     |   |
|------|-----|---|
| HVWY | PBO | 44°36'48.94398" N, 110°32'09.41438" W, 2407.530 m (Ellipsoid) |
| LKWY | PBO | 44°33'54.25322" N, 110°24'00.74156" W, 2425.173 m (Ellipsoid) |
| P709 | PBO | 44°23'30.44278" N, 110°17'09.57397" W, 2380.386 m (Ellipsoid) |
| P801 | PBO | 44°23'22.79432" N, 110°32'37.38044" W, 2369.329 m (Ellipsoid) |
| WLWY | PBO | 44°38'22.24399" N, 110°17'11.90609" W, 2643.807 m (Ellipsoid) |

### Data Processing Summary:

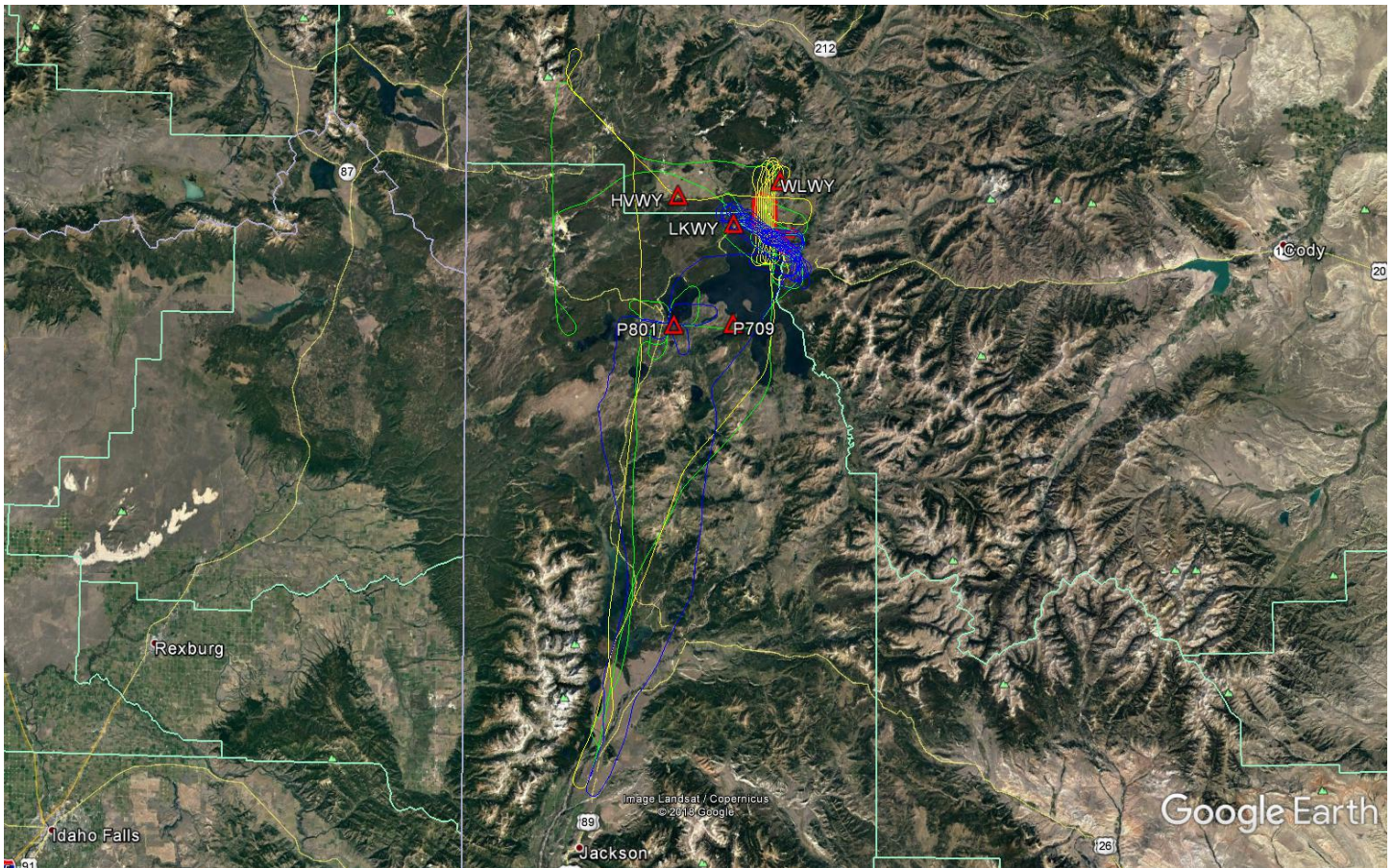
|                             |  |
|-----------------------------|--|
| Scan Angle Cutoff:          | $\pm 1-2^\circ$  |
| Intensity Normalization:    | 800 m  |
| Data Adjustments:           | Line-by-line elevation correction, project elevation shift of -19 cm   |
| Ground Classification:      | Two iterations of moderate ground determination  |
| Bathymetry Correction:      | Vertical and horizontal range correction   |
| Elevation Model Generation: | Elevation values calculated from TIN model, overlap points cut in bare-earth model, channel 2 (nadir) points used in first-surface model |

### Data Product Summary:

|                                |   |
|--------------------------------|---|
| Horizontal / Vertical Datum:   | NAD83(2011) epoch 2010.00 / Ellipsoid   |
| Projection / Units:            | UTM Zone 12N / meters   |
| Point Cloud Tiles:             | 1000-m $\times$ 1000-m tiles in LAS format (Version 1.4) classified by ground, non-ground, bathymetry, and water column returns |
| Bare-Earth Elevation Model:    | ESRI FLT format @ 1-m and 50-cm resolution from classified ground and bathymetry points   |
| Bare-Earth Hillshade:          | ESRI-created raster @ 1-m and 50-cm resolution  |
| First-Surface Elevation Model: | ESRI FLT format @ 1-m and 50-cm resolution with canopy included   |
| First-Surface Hillshade:       | ESRI-created raster @ 1-m and 50-cm resolution  |
| Aerial Images:                 | Radiometrically corrected and rectified 24-bit TIFF files with timestamp and location information                               |

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

**Area of Interest:**



**Location of survey polygons (in red), aircraft trajectories, and GNSS reference stations**

The requested survey areas consisted of two polygons located at Yellowstone Lake in Yellowstone National Park, WY. The polygons enclose approximately 40.0 km<sup>2</sup> (15.5 mi<sup>2</sup>).