

# NSF Sponsored NATIONAL CENTER FOR AIRBORNE LASER MAPPING

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## Airborne Laser Swath Mapping Project

### Hydrological Processes in Hill Slopes, Tenderfoot Creek, Montana

PI: Brian McGlynn, Montana State University

Date Flown: September 19, 2005 (day 262)

## List of products – quick view

1. 1m DEMs in ESRI GRID file format, based on the filtered (“bare-earth”) and unfiltered last return laser point datasets.
2. 1m Shaded Relief Maps in ESRI GRID file format.
3. 1m Contour Map in ESRI Coverage file format, based on the bare-earth DEM.
4. Raw laser point data (9 columns), ASCII format.
5. Last return laser point data projected to NAVD88 (Geoid03), ASCII format, one file per flight-line.
6. Filtered and unfiltered last return laser point data (xyz), tiled with overlap, ASCII format.
7. Shaded Relief Maps and Contour Map high resolution JPEG images for quick visualization.
8. Report on the data processing.

## Comments

- The bare-earth classification (filtering) was performed using Terrasolid’s TerraScan Lidar processing software. Details about the filtering process can be found in the Processing Report. Please note that these data are what we consider an improvement over the “first look” data you previously received. We suggest you use these new data for all your analysis.
- You may observe a periodic fine scale elevation variation throughout the dataset (about 5 to 20 cm, similar to a “corduroy” pattern), which is a property of the Optech LIDAR system, and it’s within the machine’s error limits. This variation can be removed by using a smoothing routine, but this process could smooth other features as well and we feel that the decision is best left with the PI.

## What's on the DVD(s)

### DVD1

**GIS\_Data** – this folder contains the ArcInfo datasets and the associated “info” directory

- Digital Elevation Models, in ESRI GRID file format
  - “fil\_grd” – bare-earth grid
  - “unfl\_grd” – unfiltered “last-return” grid

Grid Parameters

Cell Size: 1m

Gridding Method: Kriging

Kriging parameters:

Variogram: Linear

Nugget Variance: 0.07 meters

MicroVariance: 0.00 meters

SearchDataPerSector: 10

SearchMinData: 5

SearchMaxEmpty: 1

SearchRadius: 40m

Projection: UTM zone 12N, with orthometric heights in NAVD88 computed using NGS GEOID03 model.

- Shaded Relief Maps, in ESRI GRID file format
  - “fil\_shd” – bare-earth shaded relief map
  - “unfl\_shd” – unfiltered “last-return” shaded relief map

Cell Size: 1m. The shaded relief maps were generated from the 1m DEMs.

- Contour Map, in ESRI Coverage file format
  - “fil\_cnt” – bare-earth contour coverage

Contour Spacing: 1m. The contour maps were generated from the 1m bare-earth (filtered) DEM.

**Images** – This folder contains high resolution images for quick visualization. The images follow the same naming convention as the ArcInfo datasets.

**FlightLines\_LR\_NAVD88** – This folder contains a ZIP archive with unfiltered last return point data, one file per flight strip.

The flight strip number is the ID number as generated by Optech's REALM software. The numbering scheme doesn't start from 1 and the numbers are not necessarily consecutive. The flight strip ID numbers in this archive matches the ID numbers in the 9-column archive but no cross-lines (used for calibration) were converted to NAVD88 values.

The format is 3-column space delimited X Y Z:

X = Easting last return  
Y = Northing last return  
Z = Elevation last return

The projection is UTM zone 12N with orthometric heights in NAVD88 computed using the NGS GEOID03 model.

**Readme.pdf** – this document

**ProcessingReport.pdf** – detailed report describing how the data was processed

## DVD2

**PointData \_FilteredTiles** – This folder contains a ZIP archive with filtered last return laser point data split in 2km x 2km tiles with 60m overlap.

Tile naming convention:

*f<min\_easting>\_<min\_northing>.xyz* (ex. f505811\_5193609.xyz), where:

“f” stands for “filtered”,  
<min\_easting> and <min\_northing> are the coordinates of the lower left tile corner, ignoring the overlap.

The format is 3-column space delimited X Y Z:

X = Easting last return  
Y = Northing last return  
Z = Elevation last return

The projection is UTM zone 12N with orthometric heights in NAVD88 computed using the NGS GEOID03 model.

**PointData \_UnfilteredTiles** – This folder contains a ZIP archive with unfiltered last return laser point data split in 2km x 2km tiles with 60m overlap.

Tile naming convention:

*u<min\_easting>\_<min\_northing>.xyz* (ex. u505811\_5193609.xyz), where:

“u” stands for “unfiltered”,  
<min\_easting> and <min\_northing> are the coordinates of the lower left tile corner, ignoring the overlap.

The format is 3-column space delimited X Y Z:

X = Easting last return  
Y = Northing last return  
Z = Elevation last return

The projection is UTM zone 12N with orthometric heights in NAVD88 computed using the NGS GEOID03 model.

### **DVD3**

**PointData\_9cols** - This folder contains ZIP archives with raw laser point data files in 9-column ASCII format, one file per flight strip. There's one separate ZIP archive for each of the 3 flight passes (262a, 262b, 262c). The 9-column is the most complete format.

The nine columns are as follows:

1. GPS time (seconds of week);
2. Easting last return;
3. Northing last return;
4. Height last return;
5. Intensity last return;
6. Easting first return;
7. Northing first return;
8. Height first return;
9. Intensity first return.

**Note** that in these 9-column files no geoid model has been applied - height values are ellipsoid heights and these height values will NOT match orthometric heights (elevations) found in the 3-column (xyz) output or in the 1-meter DEM grid nodes. The UTM zone code (12) is appended to the Easting coordinate in this nine-column format.

### **Software required for using the data**

The ESRI Grids and Coverages can be viewed with all ESRI software, such as ArcGIS, ArcMAP, and ArcView 3.xx. Please contact NCALM if alternative formats are needed.