


GEOG660

Advanced Remote Sensing using Lidar

Lecture 1 Lab Demo
Intro to ArcGIS Lidar Tools

Demo 1 – Earth Explorer

- Free Online Lidar Data Source...
 - <http://earthexplorer.usgs.gov/>
 - <https://viewer.nationalmap.gov/basic/#/>



USGS
science for a changing world

Welcome to the USGS Center for LIDAR Information Coordination and Knowledge

Home Websites/References Data Access Contact

CLICK
Center for LIDAR Information Coordination and Knowledge

Discrete-return point clouds
Find out more about discrete-return lidar: See if publicly-available lidar is in your area of interest; look for articles and other websites about lidar.

Bare Earth
Find out more about the USGS bare earth derivatives from lidar: Go to our National Elevation Dataset (NED) page. NED contains bare earth elevation data created by lidar and other sources.

USGS-NASA-NPS EAARL Data
Find out more about USGS Coastal and Marine Geology Program's collaboration with NASA and NPS to publish data acquired by the Experimental Advanced Airborne Research

TNM Download (v2.0) Help Custom Views Share Link Contact Us

Datasets Products Cart

Select products below and then hit "Search Products"

Area of Interest: Map Extent/Geometry Search Products Clear Map

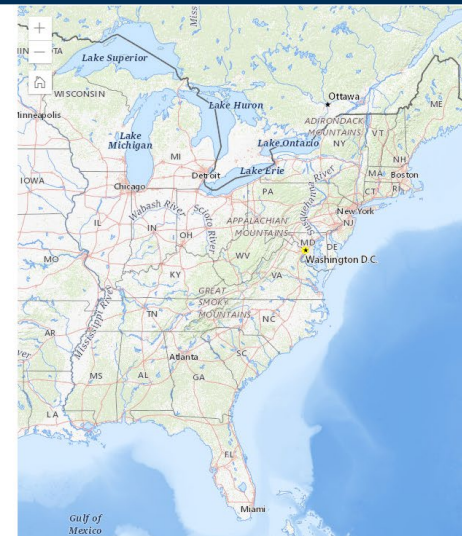
Advanced Search

Map

- ☐ US Topo
- ☐ Historical Topographic Maps

Data

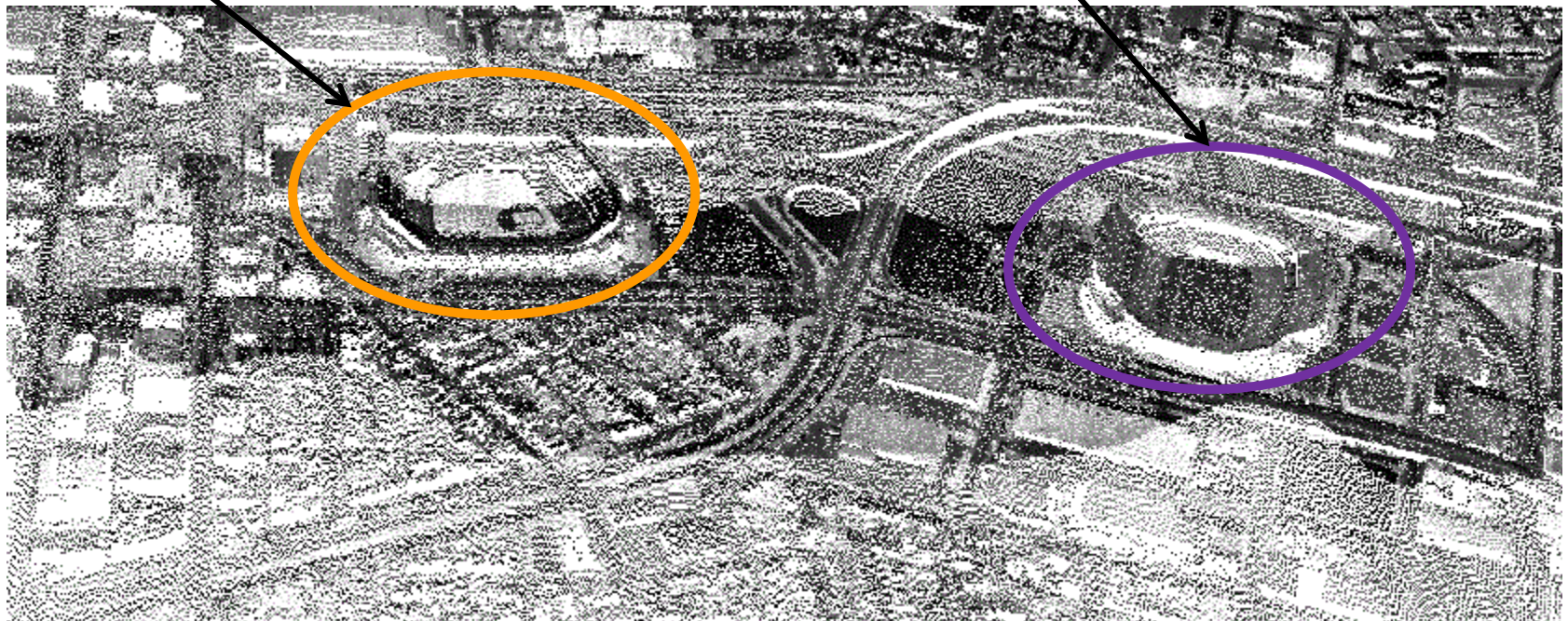
- ☐ Boundaries - National Boundary Dataset
- ☐ Elevation Products (3DEP)
- ☐ Elevation Source Data (3DEP) - Lidar, IfSAR
- ☐ Hydrography (NHDPlus HR, NHD, WSD)
- ☐ Imagery - NAIP Plus (1 meter to 1 foot)
- ☐ Map Indices
- ☐ Names - Geographic Names Information System (GNIS)
- ☐ Small-scale Datasets
- ☐ Structures - National Structures Dataset
- ☐ Topo Map Data and Topo Stylesheet
- ☐ Transportation
- ☐ Woodland Tint
- ☐ Elevation - Topobathy



The National Map

Demo 1 – Study Site

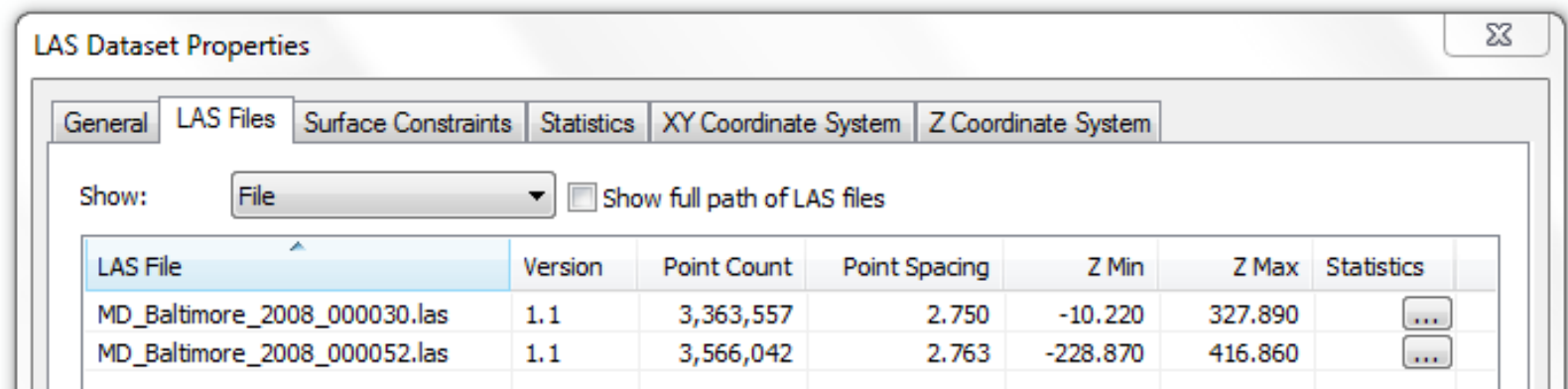
- Lidar point cloud of Baltimore, MD
 - Intensity image (8-bit, 0 to 255, grayscale)
 - Oriole Park at Camden Yards + Ravens Stadium



Demo 2 – ArcGIS Lidar Analysis

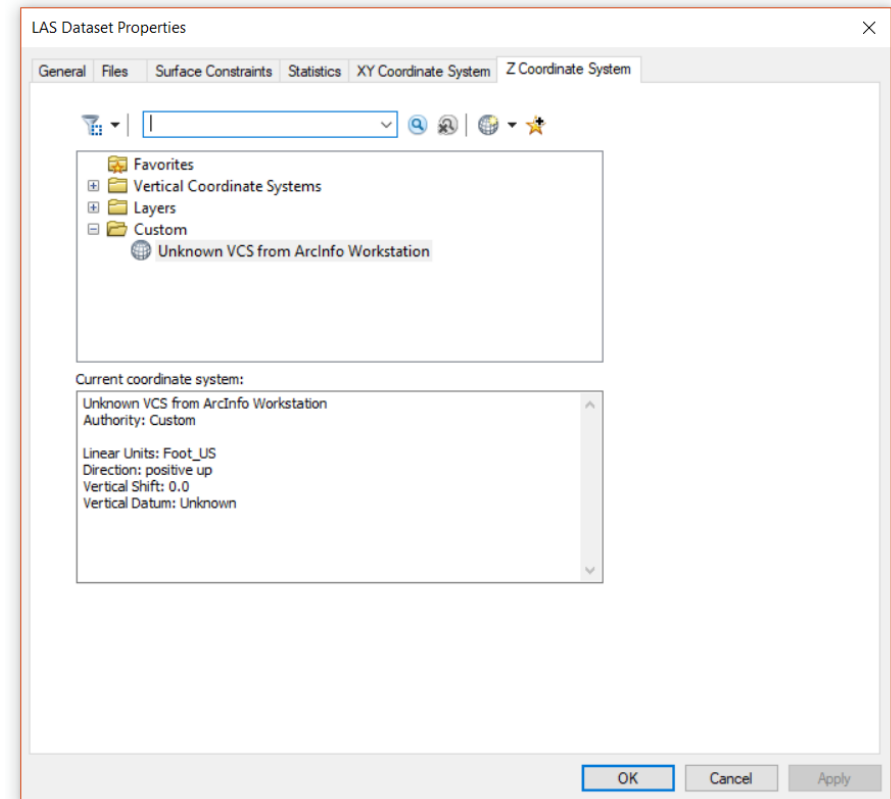
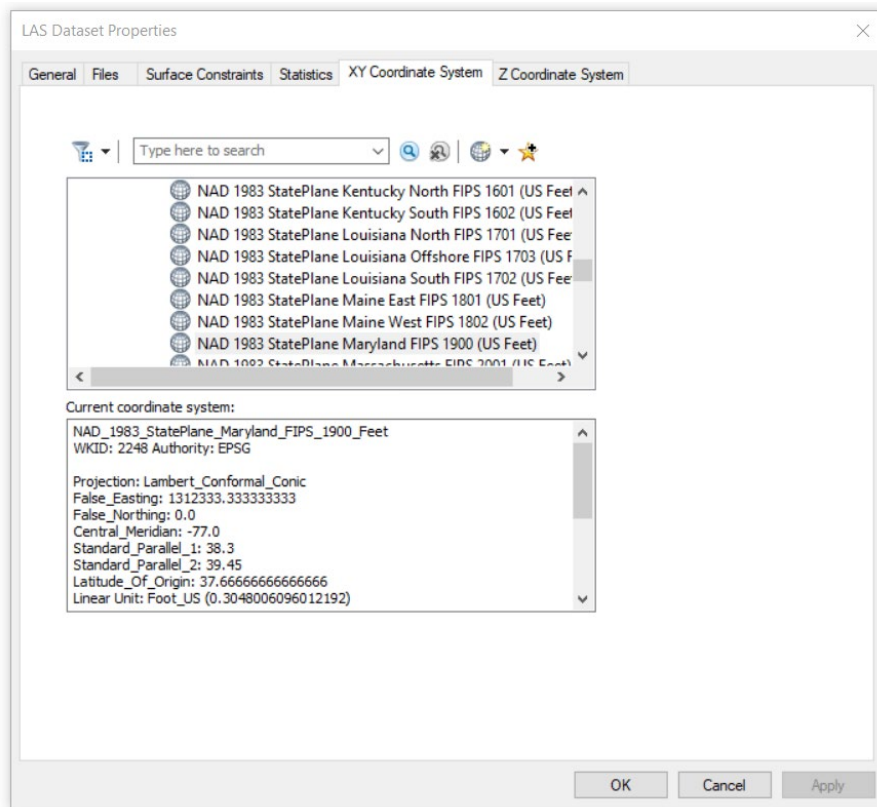
Lidar Data Management

1. Creating a new LAS dataset in ArcGIS
2. Adding LAS files to a LAS dataset
3. Verify the coordinate system
4. Calculate lidar data statistics



Demo 2 – ArcGIS Lidar Analysis

Lidar Data Coordinate Systems



Demo 2 – ArcGIS Lidar Analysis

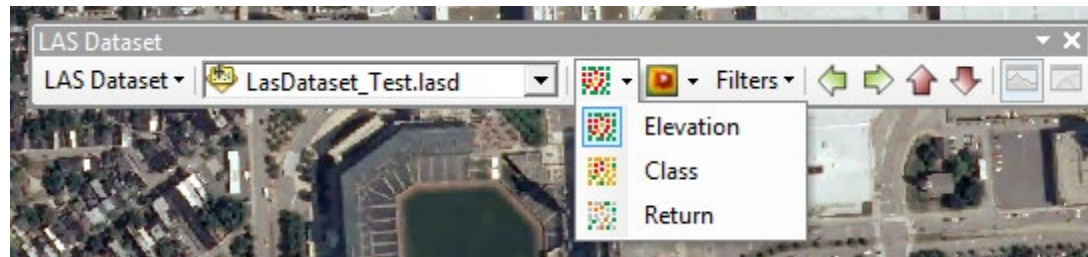
Lidar Data Preprocessing

1. View LAS files in ArcGIS
2. Introduce the Lidar Toolbar
3. Explore different data properties
4. Filter lidar data in various ways
5. Profile and 3-D viewing modes



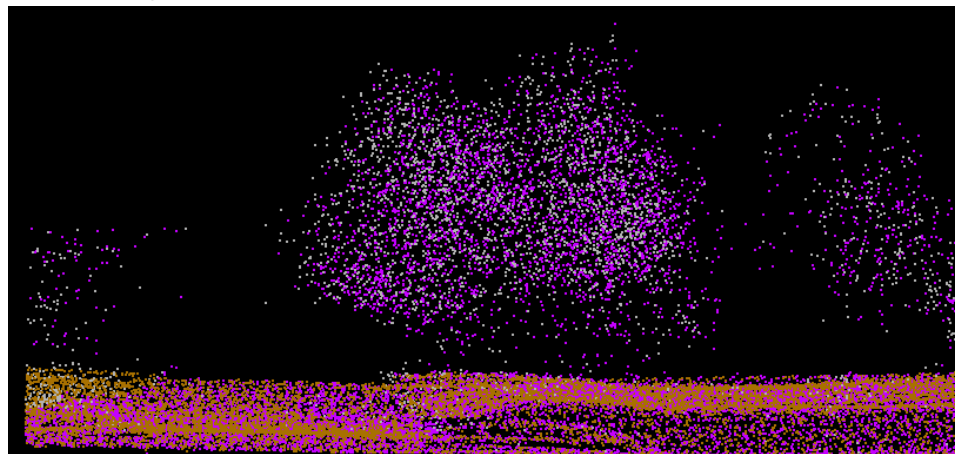
Demo 2 – ArcGIS Lidar Analysis

- Symbolization Options in LAS Toolbar



- Symbolize by Classification

- Classification
- 1 Unassigned
 - 2 Ground
 - 7 Noise
 - 12 Overlap

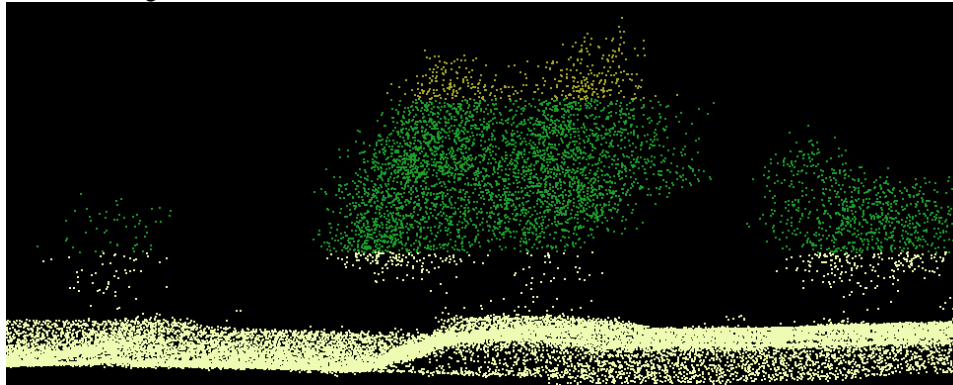


Demo 2 – ArcGIS Lidar Analysis

- Symbolize by Elevation

LAS point elevation

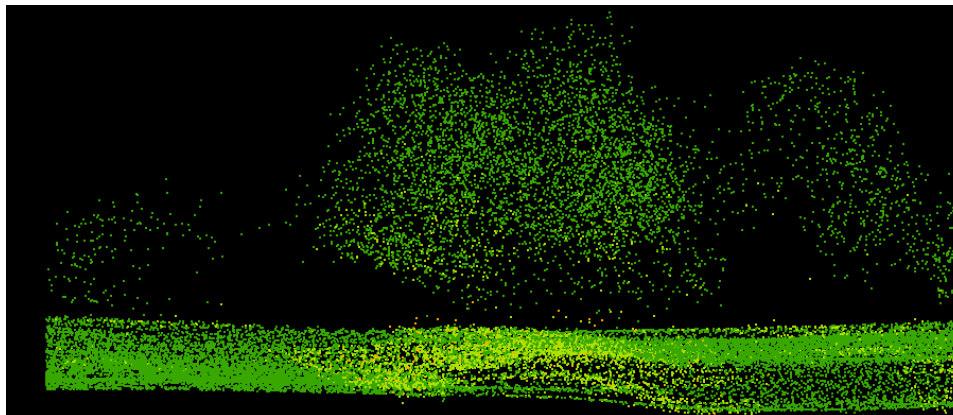
183.87 - 416.86
• 160.92 - 183.87
• 137.97 - 160.92
• 115.02 - 137.97
• 92.07 - 115.02
• 69.12 - 92.07
• 46.17 - 69.12
• 23.22 - 46.17
• -228.87 - 23.22



- Symbolize by Lidar Point Returns

Return number

• 1
• 2
• 3
• 4



ArcGIS Lidar Tools

- Lidar Tools Available in ArcGIS
 - **Search for "LAS"**
 - ArcGIS 10.1 LAS Tools
 - Create LAS Dataset
 - Add Files to LAS Dataset
 - Change LAS Class Codes
 - Set LAS Class Codes Using Features
 - LAS Point Statistics as Raster
 - LAS Dataset to Raster
 - LAS Dataset to TIN
 - We'll explore these more this Lecture...

ArcGIS Lidar Tools

- Lidar Tools Available in ArcGIS
 - **Search for "LAS"**
 - ArcGIS 10.3 LAS Tools
 - Extract LAS
 - Classify LAS Ground
 - Classify LAS by Height
 - Classify LAS Building
 - LAS Point Statistics By Area
 - We'll explore these more in Lecture 6...

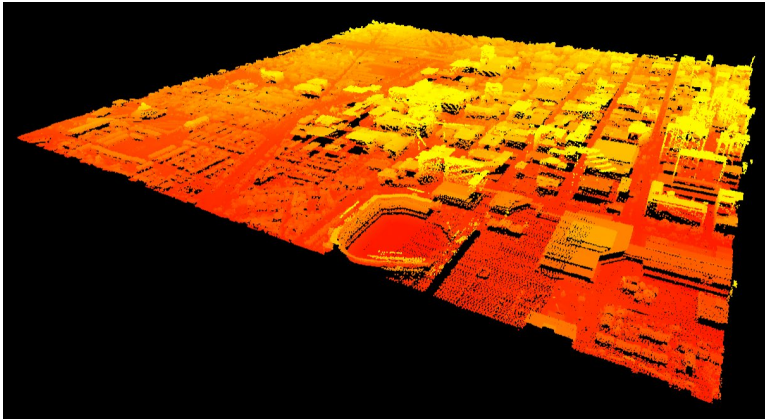
Future Labs...

- Preprocessing lidar data...
 - LAStools (Lecture 2)
- Postprocessing lidar data...
 - Creating DEMs (Lecture 3)
 - Data Fusion (Lecture 4)
 - Change Detection (Lecture 5)
 - Feature Extraction (Lecture 6)

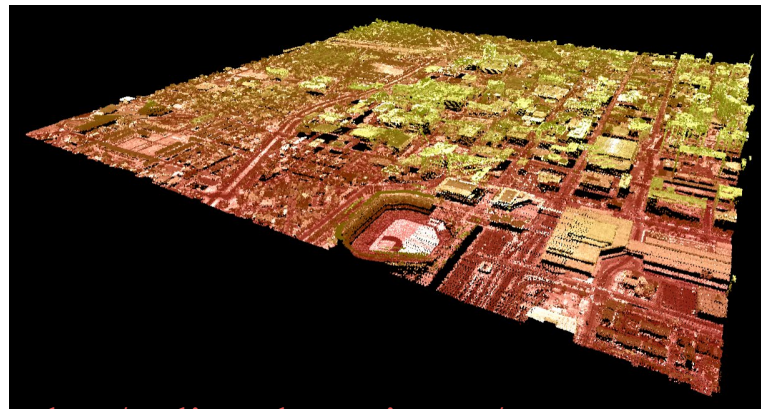
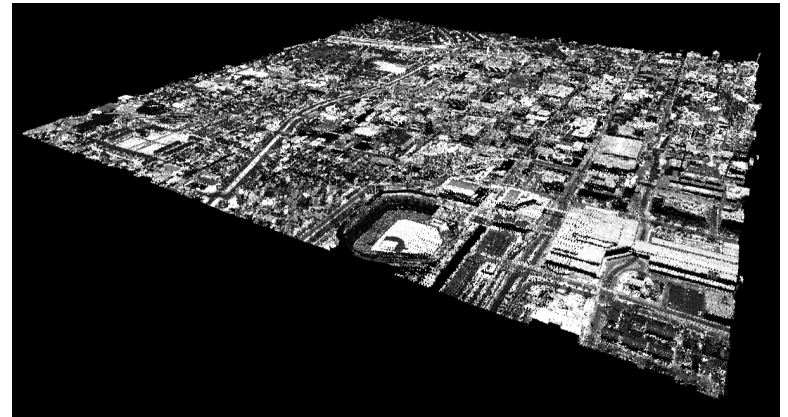
Demo 3 – Online LAS Viewer

- <http://plas.io/>

Symbolized by Elevation



Symbolized by Intensity



**Blended Elevation
and Intensity**

<http://neondataskills.org/lidar-data/online-data-viewer/>

Lab Assignment 1 Review

- Part 1 – Annotated Review
 - Select any lidar related scientific paper of interest
 - Google Scholar search is the best way to go
 - Post a link to your paper on the discussion forum
- Part 2 – Lidar Data in ArcGIS
 - Browse through ESRI's online documentations
 - Answer the questions that I added at the end
- Part 3 – LAS Datasets
 - Create the LAS Dataset that I demoed today
 - Play around with the LAS Dataset Toolbar