

LiDAR Components

Light Detection and Ranging

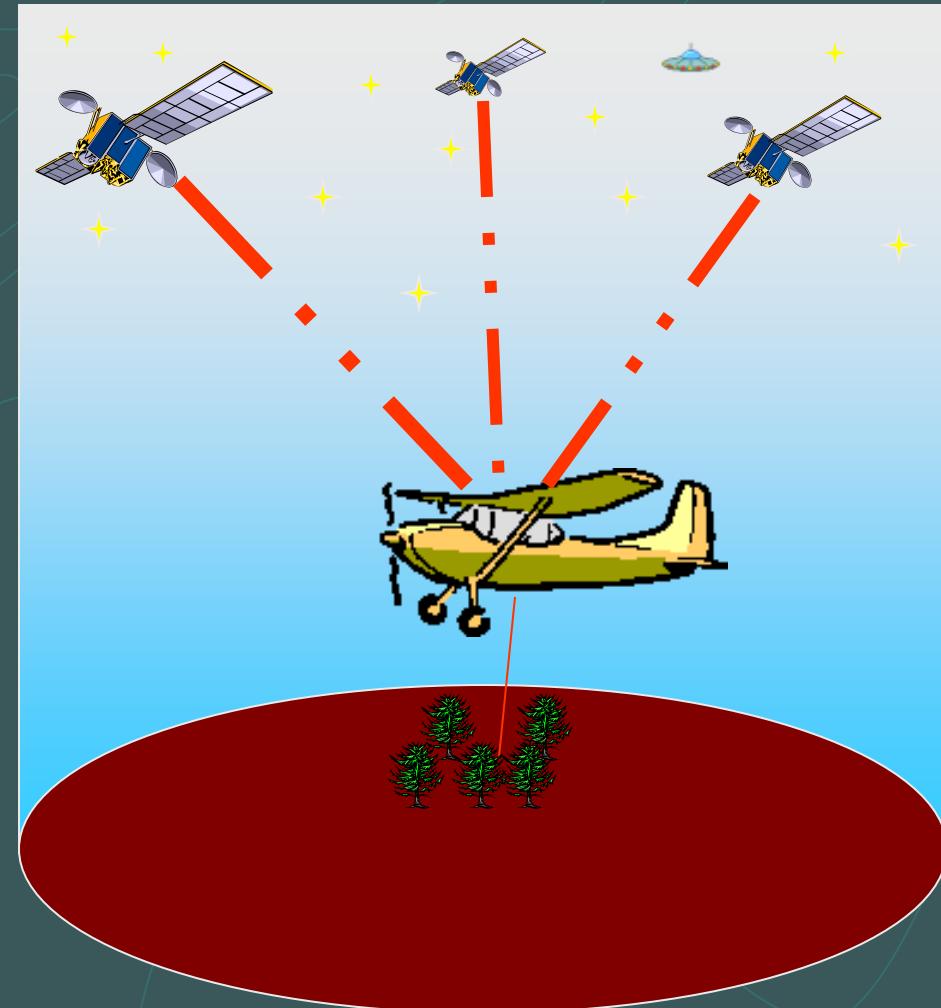
- Laser Rangefinder
 - IMU (INS)
 - GPS
 - On board computer
-
- Produces accurate land elevation data



GPS

Global Positioning System

- Differentially corrected
- Provides cm accuracy of aircraft
- Allows cm accuracy of laser pulse

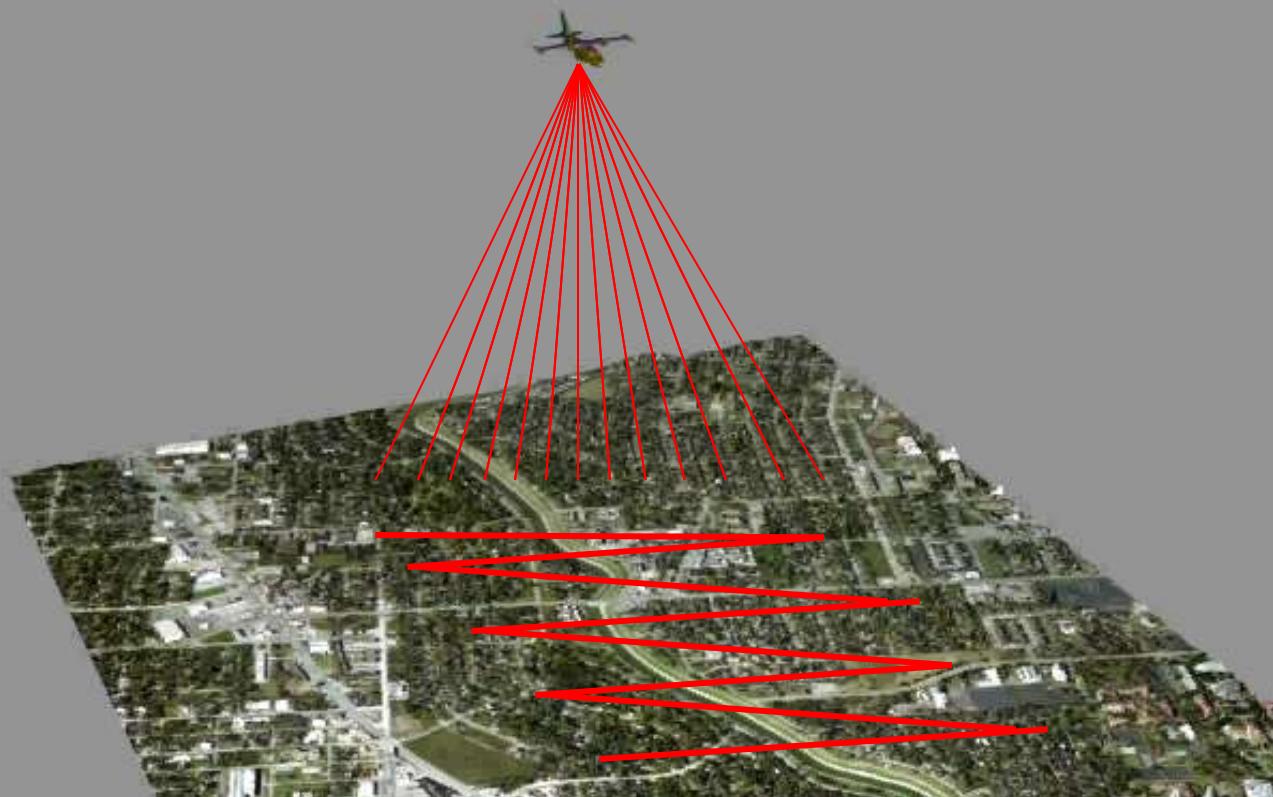


On-board Computer

- Records data
 - Laser distance and intensity
 - Inertial Measurement Unit (IMU) info
 - GPS info
- Converts into
 - X, Y, Z
 - Millions of points
- On-board display



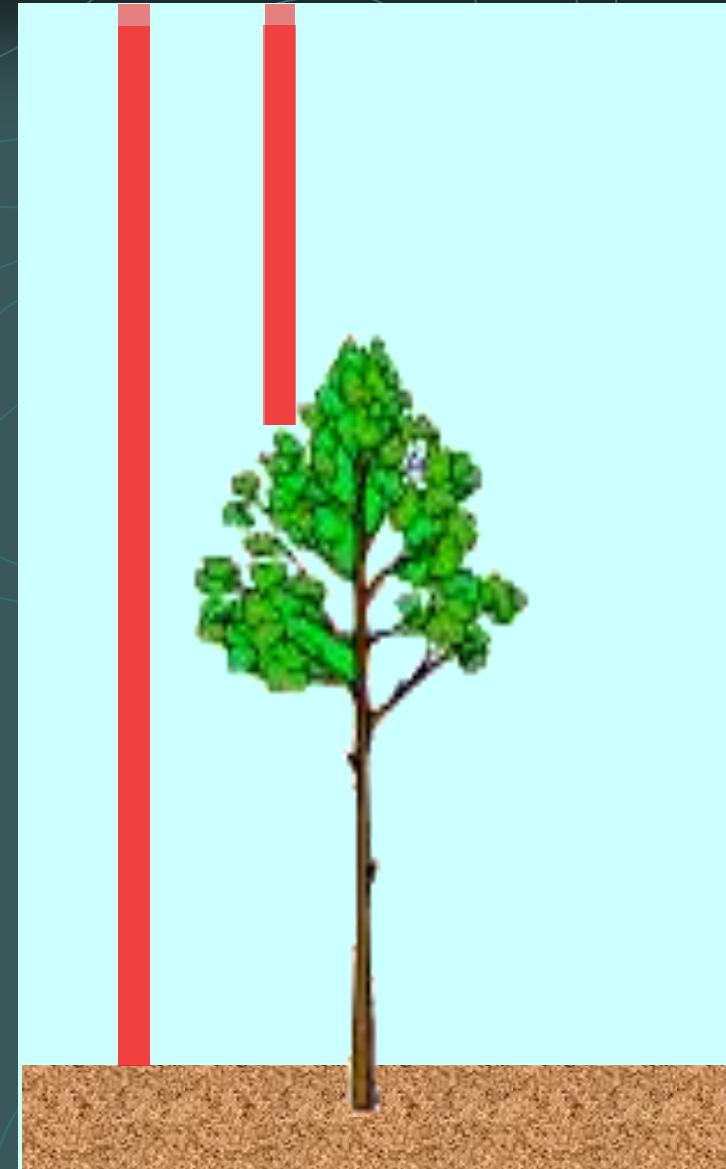
Scanning Lidar



Courtesy of Dodson & Associates

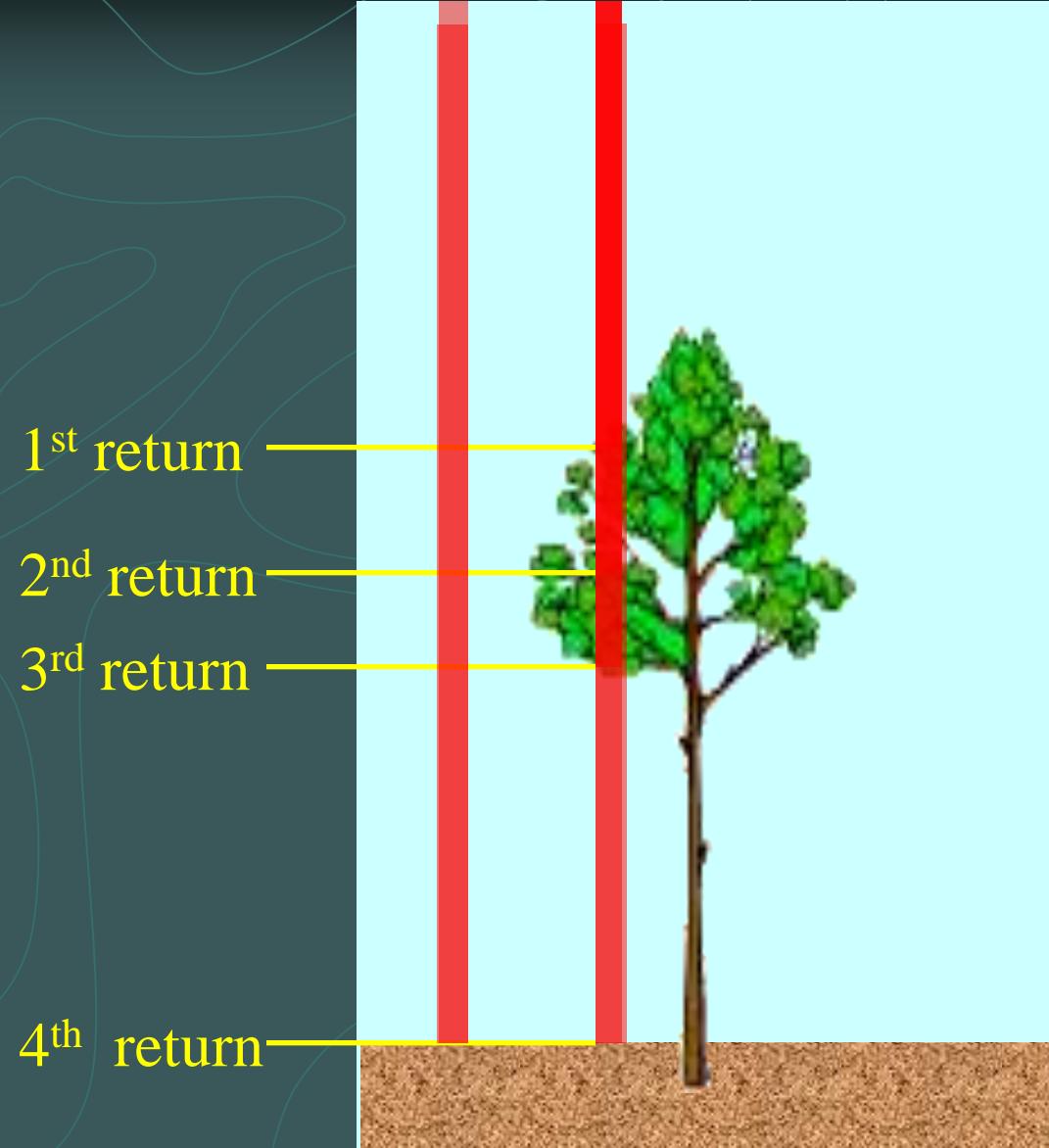
Returns

- Single Return
- Multiple returns
- Waveform Returns



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- Multiple returns
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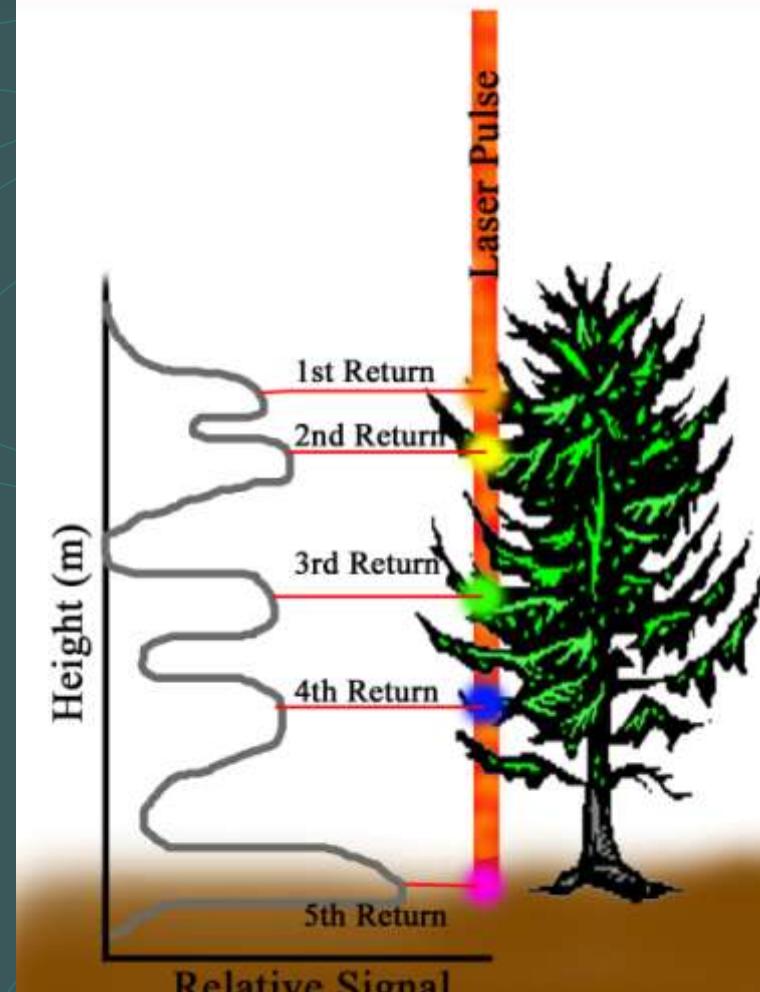
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1/4/2013

LiDAR Basics

Multiple Return Explanation



Slide courtesy of USGS

Potential LiDAR Applications

Water Resources

- Floodplain mapping
- Storm water management
- Drainage basin delineation
- Shoreline erosion

Geology

- Sinkhole identification
- Geologic/geomorphic mapping

Transportation

- Road and culvert design
- Cut and fill estimation
- Archaeological site identification

Agriculture

- Erosion control structure design
- Soils mapping
- Precision farming

Water Quality

- Watershed modeling
- Wetland reconstruction
- Land cover/land use mapping

Forestry

- Forest characterization
- Fire fuel mapping

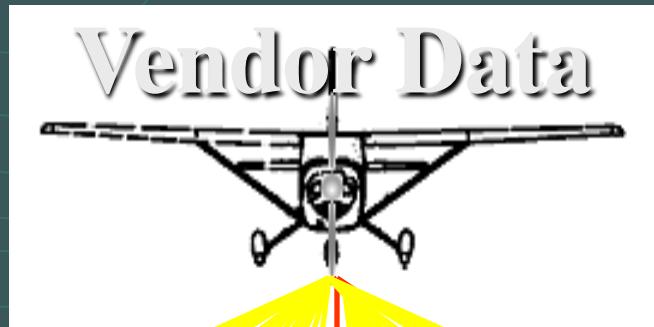
Fish and Wildlife Management

- Drainage and water control
- Walk-in Accessibility
- Habitat Management

Emergency Management

- Debris removal
- Hazard Mitigation

Lidar Applications



**Bare Earth
Analyses**

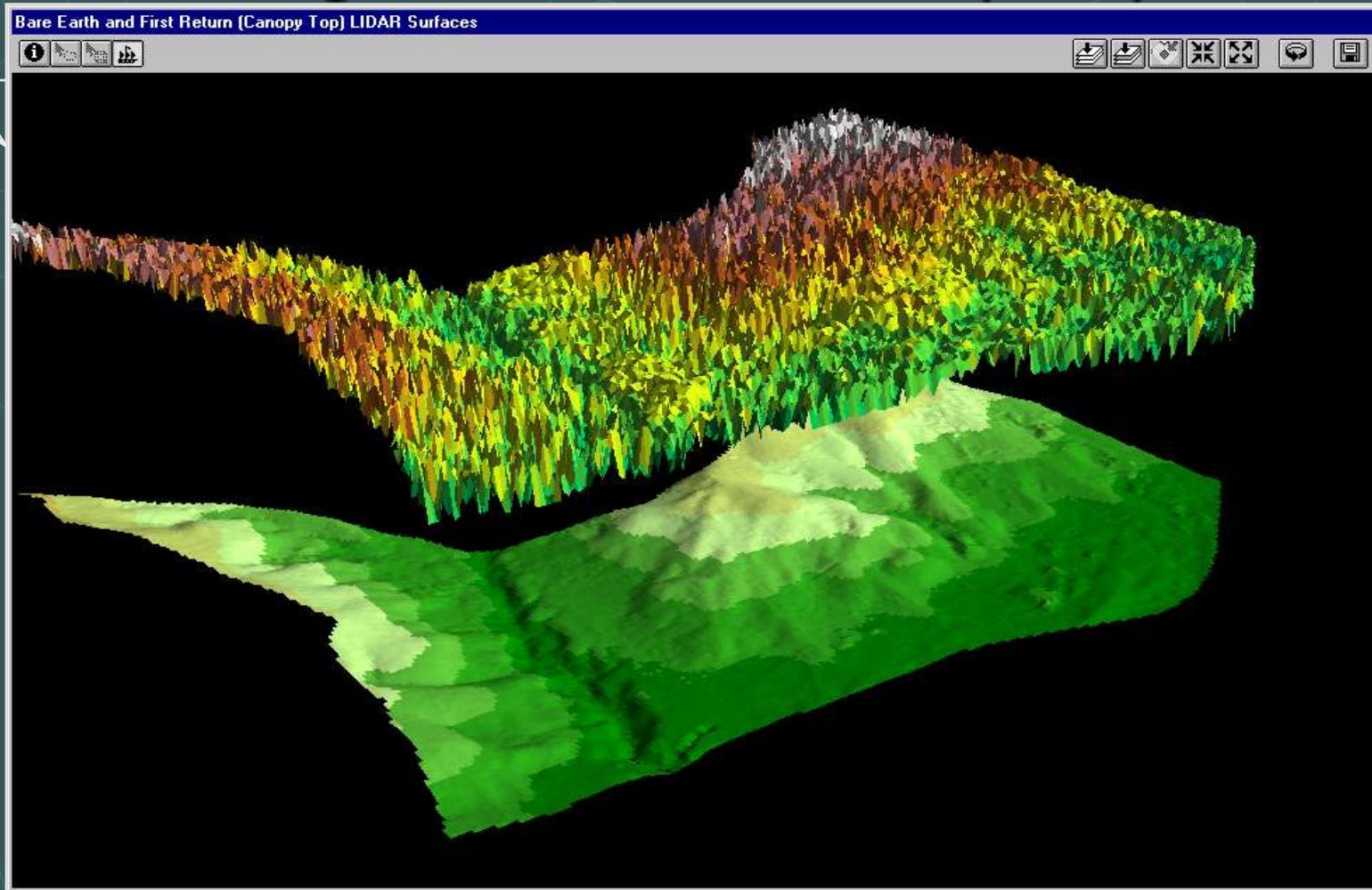
**Vegetative
Analyses**

**Structural
Analyses**

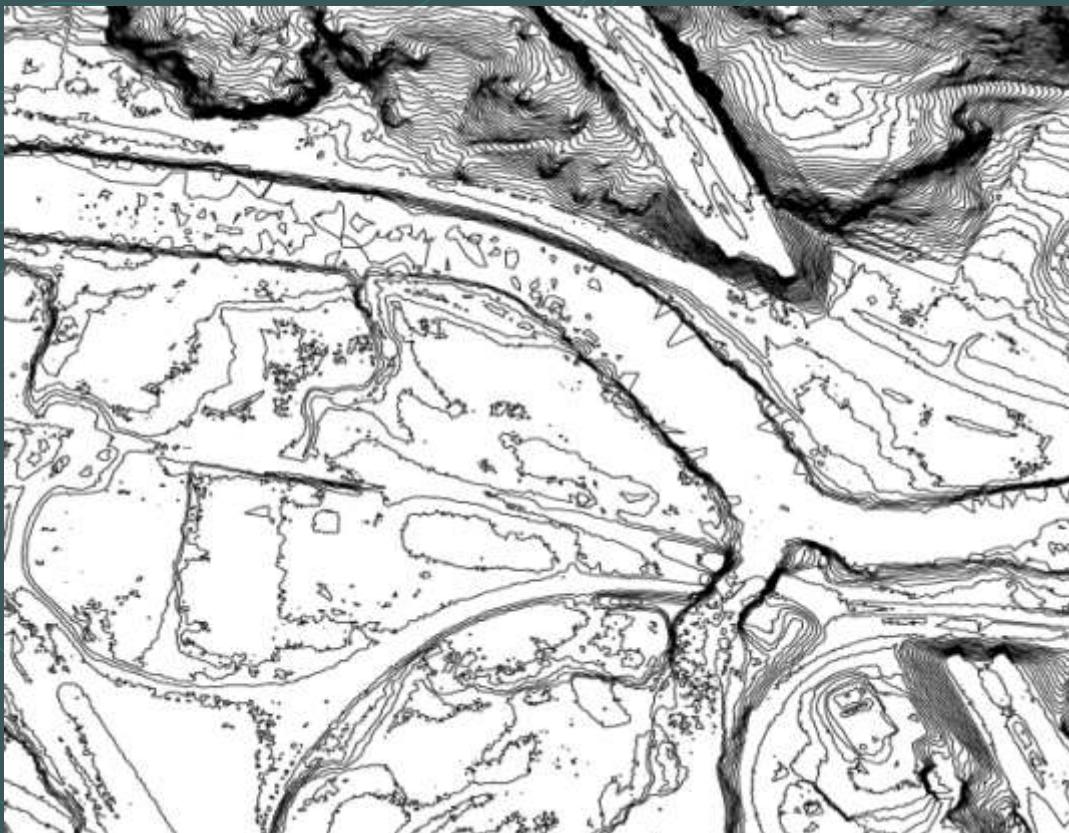
Bare Earth Analysis

- Buildings and Trees removed
- Automatic and Manual filtering
- Shows bare earth surface

Top: Digital Surface Model (DSM) Bottom: Digital Elevation Model (DEM)



Contours – Initial Bare Earth Surface



Contours - Filtered Bare Earth Surface (After Automated & Manual Processing)

